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EFFECTIVENESS OF BTTM (BRAIN TARGETED TEACHING MODEL) ON THREE DOMAINS OF LEARNING

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Abstract

The main aim of this research was to study the effectiveness of Brain Targeted Teaching Model on Cognitive, Affective and Psychomotor domains of VIIIth standard students of Maharashtra State Board School. Researcher adapted Solomon Four Group Design for this study which had two Experimental Groups with Pre-test Post-test (PPT) and Post-test (PT) Design and two Control Groups with (PPT) Design and (PT) Design. Sample size consisted of total 124 students'. Experimental Groups consisting of 62 students were taught through BTTM and Control Groups of 62 students through Conventional Method of teaching. The tools for data collection viz., Achievement test, Affective and Psychomotor Domain Assessment scales were prepared by the researcher and content validity was done by the experts. Split half and Test-Re-test Reliability of Affective and Psychomotor Domain Assessment scales were done. Achievement test, Affective and Psychomotor Domain Assessment scales were administered as Pre-test and Post-test before and after BTTM implementation. The findings show that there is a significant difference between the Mean Achievement test score of Experimental Groups and Control Groups, there is a significant difference between Affective Domain Assessment Scale score and Psychomotor Domain Assessment Scale score of Pre-test and Post-test of Experimental Groups of VIIIth standard students of Maharashtra State Board School at 0.05 and 0.01 level of significance. Thus from the findings we can draw a final conclusion that BTTM does have an impact on all the three domains of learning which is holistic in nature. Hence it is highly recommended that BTTM may be adapted in the classroom for developing Cognitive, Affective & Psychomotor Domains.

Key Words: *BTTM, Cognitive, Affective, Psychomotor, Achievement test, Control, Experimental, Assessment scale.*

Introduction:

The main goal of education had always been the holistic development of an individual and society. Education should nurture their cognitive, social, emotional and physical well-being for holistic development. 21st century education system is Brain-based education through use of brain research. Our education system is still practising 20th century conventional teaching –learning which is redundant. We need to adapt innovative models of teaching where there is optimum student engagement and nurturing of all the three domains of learning.

Dr. Mariale M. Hardiman, a neurologist and an educational practitioner of John Hopkins University, USA taking into account all the aspects of neuroscience and applying to research based effective instructional practices in classroom translated brain research into classroom instruction through her model of Brain-Targeted Teaching Model.

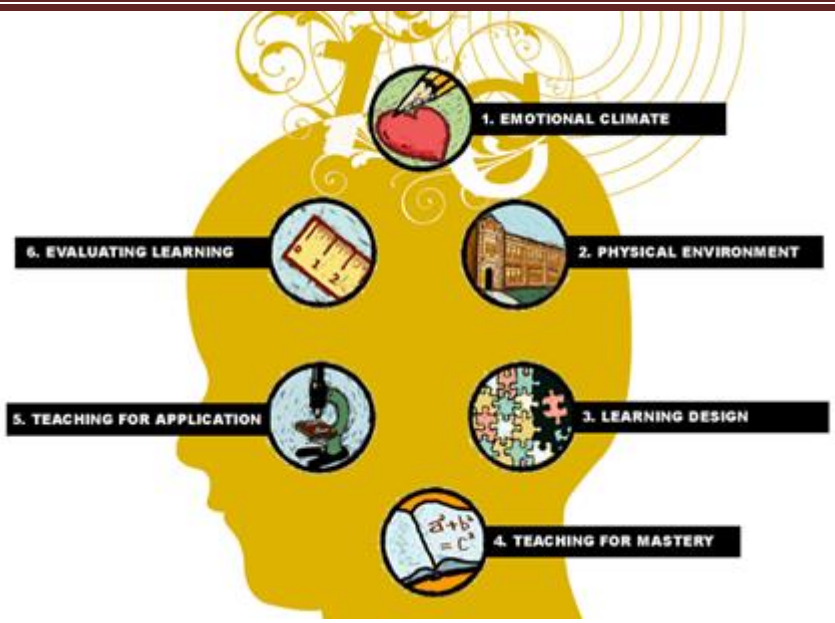


Fig.1 Brain Targeted Teaching Model[1]

BTTM includes six targets namely, Emotional climate, Physical environment, Learning Design, Teaching for Mastery, Teaching for Application and Evaluating Learning.

Researcher wanted to study the Brain Targeted Teaching Model effectiveness and verify whether this Model works in Indian context and caters to all the three Cognitive, Affective and Psychomotor Domains of Learning.

[1] https://www.braintargetedteaching.org/

Literature Review:

Few Reviews related to Brain based learning, BTT and Student engagement in India and Abroad:

Masurkar,R.K. (2021) emphasized to incorporate brain research in teacher education, significance of brain based learning, educational implications and changing role of teacher to meet these demands were echoed in this paper.

Arun, Dr. G .Singaravelu (2020) results showed that Brain Based Learning helped in improving the achievement Mean score, problem solving and creativity of students.[2]

Jyothi.K.R (September, 2020) found that Brain Targeted Teaching Model is more effective than Activity Oriented Method on enhancing the 21st Century Skills and Achievement in Science of Secondary School students.[3]

Jenkins R.T., (uploaded on 17 January, 2019) in her article 'The Brain-Targeted Teaching Model' and 'Research- Based Strategies to Ignite Student Learning'. She found that Research-Based Strategies to Ignite Student Learning was also equally effective like BTT as students reported that they could learn independently, they found that lessons interesting as they had different strategies like beginning the lessons with intrigue/a hook/open discussion than normal traditional lecture-style lessons, strategies were more informal, stress-free, students had to think independently, no spoon feeding and equipped pupils with the skills to ask for help when needed.[4]

Bernstein.L, (April 8, 2022) highlighted that student with high Behavioural, Emotional and Cognitive student engagement performed better in all their subjects as compared to students with low student engagement. [5]

Research gap –After reviewing many researches in India and abroad, to the best of the researcher's knowledge there were very few studies on BTTM. But there is no study of BTTM in teaching of Mathematics involving three domains of learning in Indian context. As mathematics is considered a difficult subject and to connect Mathematics emotionally to students is a challenge, the researcher also wanted to explore whether this BTTM could cater to all three domains to bring in all round development in the student and enhance student engagement.

Objectives of the study:

- To study the effectiveness of Brain Targeted Teaching Model in comparison with the Conventional method of teaching mathematics to VIIIth standard students.
- To find out the Achievement Test score of VIIIth standard students in the Pre-test and Post-test of Experimental Group in PPT and PT Design of Maharashtra State Board School.
- To find out the Achievement Test score of VIIIth standard students in the Pre-test and Post-test of Control Group in PPT and PT Design of Maharashtra State Board School.
- To find out the Affective Domain Assessment Scale score of Pre-test and Post-test of Experimental Group of VIIIth standard students of Maharashtra State Board School.
- To find out the Psychomotor Domain Assessment Scale score of Pre-test and Post-test of Experimental Group VIIIth standard students of Maharashtra State Board School.

Operational Definitions of Key Terms:

In the present study, the various terms were defined as follows:

BRAIN TARGETED TEACHING MODEL:

In this study, the meaning of Brain Targeted Teaching Model has been defined by the researcher as a model which would aid in connecting the content emotionally, convert the physical environment into very beautiful conducive environment, assist in preparing learning Designs, support in acquiring mastery of the content taught, develop the ability to apply the content taught and also provide novel ways of evaluating learning.

EMOTIONAL CLIMATE

In this study, the researcher has defined the Emotional climate as the positive learning environment created in the classroom by eliminating factors that cause stress and impede learning. For e.g. The researcher encouraged the students to emotionally connect to the unit taught through card making consisting of four sides wherein students made cards with emoji's expressing their feeling, captured their favourite Quadrilateral/Circle through skilful drawings, wrote poem on their favourite quadrilateral/Circle and drew various quadrilaterals and circle shaped everyday items. Thus the researcher could infuse visual and arts in the lesson plans to tap into children's emotional response systems to enhance school connectedness.

PHYSICAL LEARNING ENVIRONMENT

In this study, the researcher has operationally defined Physical learning environment as the physical infrastructure, comfortable seating, proper ventilation, lighting, beautiful ambience provided to students. For e.g. The researcher asked the students to be comfortable in their seats and asked them to keep their bags in allotted place, students wanted to be seated with friends so they were allowed as it would be productive. Researcher saw to that there was proper ventilation, lightning, and visibility in the classroom. When the researcher was implementing BTTM in the classroom students prepared charts, cut-outs, cards, rangoli Designs using quadrilaterals and Circle which were displayed bringing in novelty and beautified the classroom ambience.

LEARNING DESIGN

According to the researcher, Learning Design is operationally defined as the Unit Plan Designed for teaching-learning process in the classroom. It consisted of concept map and graphic organizers to optimize learning by providing clarity in the concepts taught. For e.g. Learning Design which the researcher used in teaching the units of Quadrilateral and Circle in the classroom to enhance learning by providing clarity in the concepts taught and make it concrete learning. The researcher used concept maps / graphic organizers for the units of study as it is compatible with the brain's natural learning systems. The learning Design was planned from simple to complex order. To make learning more concrete and avoid loss of retention of content taught, the researcher used concept maps or graphic organizers which related to the big picture.

TEACHING FOR MASTERY

In this study, the researcher operationally defined Teaching for Mastery as the various activities provided by the researcher which enabled the student to gain mastery of the content through innovative methods, integration of art

etc. For e.g. The researcher enabled the students to develop mastery of skills, content, and concepts by providing students with multiple learning activities such as quizzes, word problems, video , visual displays, chart preparations, worksheets etc. The poems on topic of quadrilaterals and circle composed by students also helped in better understanding of the concept in-depth.

TEACHING FOR APPLICATION

Researcher defined Teaching for Application operationally as deep learning and application of theoretical knowledge to real world problems. For e.g. The researcher chalked out real-world activities like how the content taught can be used in real life e.g. how much lace will be required for table cloth of round table which had radius 50 cm? The student had to first understand that he/she had to find the circumference of the table, the student need to understand to use formula for circumference then relate to circumference of the round table will be equal to lace required.

EVALUATING LEARNING

Researcher defined Evaluating learning operationally as the immediate feedback given by the teacher through various innovative, creative evaluating methods in classroom. E.g. The researcher used various innovative methods like quizzes, puzzles, multiple choice, true/false, etc. (Row wise student responses in classroom) and were given immediate feedback. The researcher aligned learning objectives, instructional activities and evaluation methods. Researcher provided oral feedback to individual activities like card preparation (4 sides) and group activities such as gallery walk, charts, scrap books etc.

Effectiveness of BTTM in terms of Academic Achievement, Affective domain Assessment and Psychomotor domain Assessment is discussed in this study.

Three Domains of Learning: Researcher defined the three domains of learning as Cognitive Domain (Head) (Revised Bloom's taxonomy- viz., Remembering, Understanding, Applying, Analyzing, Evaluating and Creating , Affective (Heart) concerned with feelings/emotions, & psychomotor (Hand) (physical activities).

Methodology:

Table No. 1

Experimental Design–Solomon Four Group Design

GROUP	PRE-TEST	TREATMENT	POST-TEST
R1 (Experimental Grp 1)(PPT)	O_1	x	O_2
R2 (Control Group 1) (PPT)	O_3		O_4
R3 (Experimental Grp 2) (PT)		x	O_5
R4 (Control Group 2) (PT)			O_6

Where, R_1, R2. R3, R4 are randomly assigned Groups.

R1-Experimental Group 1 (PPT-Pretest-Post-test),
R2-Control Group 1(PPT-Pretest-Post-test),
R3- Experimental Group 2(PT-Only Post-test),
R4-Control Group 2(PT-Only Post-test)

O_1 andO_3 Pre-test assessment test Mean score of the Experimental Group and Control Group respectively.
O_2 and O_5 are the Post-test assessment test Mean score after the Intervention module of Experimental Groups.
O_4 and O_6 are the Post-test assessment test Mean score of the educational units taught in Conventional method of Control Group.

Fig.2 Implementation of the Research Design of this study

In the present study Pre-test of Achievement Test of Mathematics (Unit Quadrilateral), Affective & Psychomotor Domain Assessment scales were administered before the BTTM implementation to find their level of Cognitive, Affective and Psychomotor Domain development. The Solomon four Group consisted of two Experimental Groups (PPT &PT Design) and two Control Groups (PPT &PT Design). Unit Quadrilateral of Mathematics was taught to both the Experimental Groups (PPT& PT Design) using BTTM and both Control Groups (PPT &PT Design) were taught the same Unit Quadrilateral using Conventional method of teaching. So after BTTM implementation and Conventional teaching again both the Experimental Groups (PPT &PT Design) were administered the same Achievement Test of Mathematics (Unit Quadrilateral), Affective & Psychomotor Domain Assessment scales as Post-tests. The whole process took place for more than two weeks.

Nature and size of the Sample

Table No. 2

Distribution of the sample on the basis of School Board

Sr. N	Name of the School	School Board	No. of student
1.	Sai Holy Faith High School, Koperkhairane	Maharashtra State Board Schoo	124

Table No. 3

Tools of Data Collection with Maximum Marks of each tool

Sr. No.	Instrument	No. of Questions/ Statements	Max Marks
I.	Achievement Test	12	25
III.	Affective Domain Assessment Scale	24	120
IV.	Psychomotor Domain Assessment Scale	24	120

i) Achievement Tests

The researcher made Achievement Test (Cognitive Domain) of Unit of Quadrilateral was prepared using Blue print based on Revised Bloom's taxonomy i.e Remembering, Understanding, Applying, Analyzing, Evaluating and Creating. Answer key was prepared to score the tests. It comprised of 12 questions of 25 Marks it tested student's concept of different types of Quadrilaterals, student's problem solving skills and creative thinking abilities and application capacity in daily life. This Unit was taught through BTTM.

ii) Affective Domain & Psychomotor Domain Assessment Scales

The researcher developed Affective & Psychomotor Domain Assessment Scales with 12 positive and 12 negative statements. The statements thus formed were based on the Affective & Psychomotor Domain outcomes. These statements Mean score would reflect the students' Affective & Psychomotor Domain development. This assessment scale can be scored on Likert scale as Strongly Agree-5, Agree-4, Undecided -3, Disagree-2 and Strongly Disagree-1.

Validity and Reliability of the Tools

Table No. 4

Validity and Reliability of Tools

BTTM	**Content Validity was done by the experts in the field of Education. T feedback and suggestions given by the experts were taken i consideration and incorporated into the final tools used for experimental study.**		
Achievement Test			
Affective Domain Assessment Scale			
Psychomotor Domain Assessment Scale			
		Split half reliability value	**Test-Retest reliability value**
Affective Domain Assessment Scale		**0.79**	**0.77**
Psychomotor Domain Assessment Scale		**0.76**	**0.74**

Control of Threats

Researcher herself taught mathematics (Unit Quadrilateral) to Experimental Groups using BTTM and Control Groups using Conventional method of Teaching.

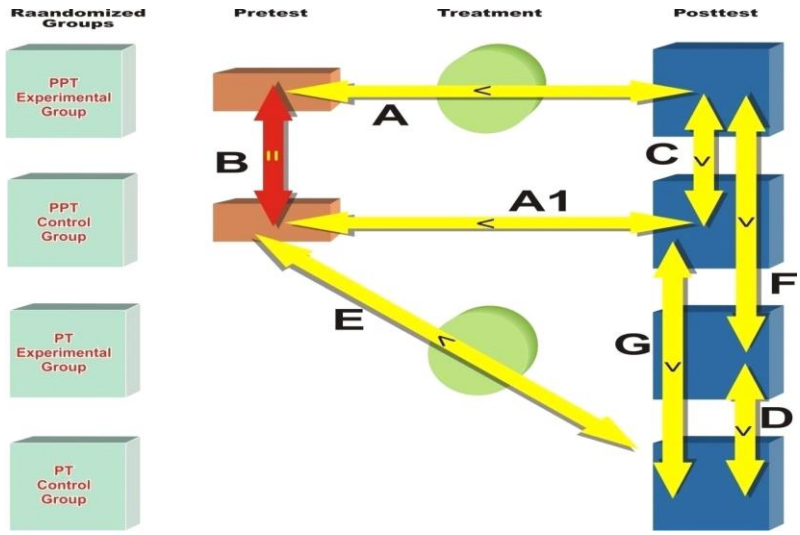
Researcher herself scored the responses of participants.

Pre-test and Post- test contained same items for Achievement Test-Cognitive Domain, Affective & Psychomotor Domain Assessment Scales.

Both Experimental and Control Groups belonged to the same school

Major findings of the study:

SOLOMON FOUR GROUP DESIGN



A - PPT Experimental Group Pre-test(vs)PPT Experimental Group Post-test
A1 -PPT Control Group Pre-test (vs) PPT Control Group Post-test
B - PPT Experimental Group Pre-test (vs) PPT Control Group pre test
C - PPT Experimental Group Post -test (vs) PPT Control Group Post-test
D -PT Experimental Group Post-test(vs) PT Control Group Post-test
E –PPT Control Group Post-test(vs) PT Control Group Post-test
F -PPT Experimental Group Post-test(vs)PT Experimental Group Post-test
G -PPT Control Group Post-test(vs)PT Control Group Post-test

Fig 3. Diagrammatic representation of Solomon Four Group Design[6]

HYPOTHESES TESTING OF THE STUDY

H01: There is no significant difference between the Mean score of Experimental Group and Control Group among VIII[th] Standard students in Mathematics belonging to Maharashtra State Board School

[6] http://hdl.handle.net/10603/340703

The investigator in order to test the above hypothesis used Solomon four Group Design which included the following sub hypothesis:

A. There is no significant difference between the Pre-test and Post-test Mean score of Experimental Group in PPT Design.
B. There is no significant difference between the Pre-test Mean score of Control Group in PPT Design and Post-test Mean score of Control Group in PPT Design.
C. There is no significant difference between the Pre-test Mean score of Experimental Group in PPT Design and Pre-test Mean score of Control Group in PPT Design.
D. There is no significant difference between the Post-test Mean score of Experimental Group in PPT Design and Post-test Mean score of Control Group in PPT Design.
E. There is no significant difference between the Post-test Mean score of Experimental Group in PT Design and Post-test Mean score of Control Group in PT Design.
F. There is no significant difference between the Pre- test Mean score of Control Group in PPT Design and Post-test Mean score of Control Group in PT Design.
G. There is no significant difference between the Post-test Mean score of Experimental Group in PPT Design and Post-test Mean score of Experimental Group in PT Design.
H. There is no significant difference between the Post-test Mean score of Control Group in PPT Design and Post-test Mean score of Control Group in PT Design.

Table No. 5

RELEVANT STATISTICS OF THE PRE-TEST & POST-TEST SCORES OF EXPERIMENTAL AND CONTROL GROUP OF UNIT QUADRILATERAL PPT & PT DESIGN OF VIII[th] STANDARD STUDENTS OF MAHARASHTRA STATE BOARD.

Variable	Total Sample	N	Df	Mean	SD	Table Evaluation		t value	Level of significance	
						.05	.01		.05	.01
	PPT (Experimental Gro) Pre-test	31	30	7.51	2.5	2.04	2.75	6.617	S	S
	PPT(Experimental Grou Post-test			11.83	2.87					

Achievement Te Scores of Unit Quadrilateral	PPT (Control Group) Pre-test	31	30	5.5	1.7	2.04	2.75	10.95	S	S
	PPT(Control Group) Post-test			9.19	2.55					
	PPT (Experimental Gro) Pre-test	31		11.83	2.87	2.0	2.66	10.52	S	S
	PPT(Control Group) Pre-test	31	60	5.51	1.71					
	PPT (Experimental Gro) Post-test	31		11.83	2.87	2.0	2.66	3.83	S	S
	PPT(Control Group) Post-test	31	60	9.19	2.55					
	PT (Experimental Grou Post-test	31		14.45	2.54	2.0	2.66	6.618	S	S
	PT(Control Group) Post-test	31	60	10.67	1.90					
	PPT (Control Group) Pre-test	31		5.51	1.71	2.0	2.66	11.22	S	S
	PT(Control Group) Post-test	31	60	10.67	1.90					
	PPT (Experimental) Post-test	31		11.83	2.87	2.0	2.66	3.79	S	S
	PT(Experimental) Post-test	31	60	14.45	2.54					
	PPT (Control) Post-test	31		9.19	2.55	2.0	2.66	2.60	S	NS
	PT(Control) Post-test	31	60	10.67	1.90					

Table No. 6

Significance Table of Solomon Four Group Analysis of Maharashtra State Board School

Experimental Group / Con Group in PPT &PT Design	**Based on their Achievement Test Mean score of Unit Quadrilateral < >**	**Mean**	**Level of Significan 0.05**	**0.01**
PPT (Experimental) Pre-test X PPT (Experimental) Post-test	PPT (Experimental) Post-test > PPT (Experimental) Pre-test	11.83 7.51	S	S

PPT (Control) Pre-test X PPT (Control) Post-test	PPT (Control) Post-test > PPT (Control) Pre-test	9.19 5.5	S	NS
PPT (Experimental) Pre-test X PPT (Control) Pre-test	PPT (Experimental) Pre-test > PPT (Control) Pre-test	7.51 5.5	NS	NS
PPT (Experimental) Post-test X PPT (Control) Post-test	PPT (Experimental) Post-test > PPT (Control) Post-test	11.83 9.19	S	S
PT (Experimental) Post-test X PT (Control) Post-test	PT (Experimental) Post-test > PT (Control) Post-test	14.45 10.67	S	S
PPT (Control) Pre-test X PT (Control) Post-test	PT (Control) Post-test > PPT (Control) Pre-test	10.67 5.5	S	S
PPT(Experimental) Post-test X PT (Experimental) Post-test	PT(Experimental) Post-test > PPT (Experimental) Post-test	14.45 11.83	S	S
PPT (Control) Post-test X PT (Control) Post-test	PT (Control) Post-test > PPT (Control) Post-test	10.67 9.19	NS	NS

S-Significant **NS- Not Significant**

Solomon Four Group Analysis of Maharashtra State Board School

We can observe that in Experimental Group (PPT) Post-test Achievement Test Mean score (11.83) are higher than Experimental Group (PPT) Pre-test Achievement Test Mean score (7.51) and Control Group (PPT) Post-test Scholastic Achievement Mean score (9.19) are higher than Control Group (PPT) Pre-test Achievement Test Mean score (5.5). So from this we can draw a conclusion that both BTTM and Conventional method of Teaching both had an impact on Achievement Test Mean score of VIIIth standard students of Maharashtra State Board School in mathematics learning.

From the table, we can find that Experimental Group (PPT) Pre-test Achievement Test Mean score (7.51) is higher than Control Group (PPT) Pre-test Achievement Test Mean score (5.5) which is not significantly different at 0.05 and 0.01 level of Significance. Experimental Group (PPT) Post-test Achievement Test Mean score (11.83) is higher than Control Group (PPT) Post-test Achievement Test Mean score (9.91).So from this we can conclude there is no Pre-test influence and also that BTTM is more effective than Conventional method of Teaching.

It had also been observed that Experimental Group (PT) Post-test Achievement Test Mean score (14.45) is higher than Control Group (PT) Post-test Achievement Test Mean score (10.67). So from this we can conclude that BTTM is effective than Conventional method of Teaching.

From the table we can also draw a conclusion that Control Group (PT) Post-test Achievement Test Mean score (10.67) is higher than Control Group (PPT) Pre-test Achievement Test Mean score (5.5). So it is proved that Conventional method of teaching is effective and also there is no Pre-test influence even in Control Group Pre-test PPT Design.

We have understood from the findings that Experimental Group (PT) Post-test Achievement Test Mean score (14.45) is higher than Experimental Group (PPT) Post-test Achievement Test Mean score (11.83) which proves that there is no Pre-test influence and also that BTTM is very effective.

In a similar way Control Group (PT) Post-test Scholastic Mean Achievement test score (10.67) is higher than Control Group (PPT) Post-test Achievement Test Mean score (9.19). So it is proved that Conventional method of Teaching is effective too. But Experimental Group (PT) Post-test Scholastic Achievement test score (14.45) is higher than Control Group (PT) Post-test Scholastic (10.67).

So from all the above data, we can confidently come to a final conclusion that Experimental Group in PPT Design & Experimental Group in PT Design have performed better than Control Group in PPT Design & Control Group in PT Design so reassuring that the BTTM is more effective than Conventional method of teaching. The reasons for this result may be that the BTTM for Unit Quadrilateral implemented for more than two weeks was rigorous as it exposed the students' to the activities which helped in developing Cognitive, Affective & Psychomotor domains towards Unit Quadrilateral through coverage of all the six target areas as proposed in the BTTM by Dr. Mariale Hardiman. Their participation in different activities like quizzes, problem solving, chart description , gallery walk and their representation of emotions through emoji's, poems, depiction of everyday items in quadrilateral shapes, display of video songs related to content helped them to clear their concept of quadrilateral and learn the Unit Quadrilateral in a much effective manner.

H02: There is no significant difference between Affective Domain Assessment Scale score of Pre-test and Post-test of Experimental Group of VIIIth standard students of Maharashtra State Board School.

Table No. 7

Relevant Statistics of the Affective & Psychomotor Domain Assessment Scale Pre & Post Mean score of Experimental Group (PPT & PT Design) of Maharashtra State Board School.

Variable	Total Sample	N	Df	Mean	SD	Table Evaluat		t value	Level of Significance	
						.05	.01		.05	.01
Affective Domain Assessment Scale Mean score	PPT & PT (Experimental Group) Pre-test Mean score	62	61	89.9	11.18	2.00	2.660	13.70	S	S
	PPT &PT (Experimental Group) Post-test Mean score	62		97.53	9.14					

S-Significant NS- Not Significant

From the table it can be seen that for df = 61, the table value at .05 level of Significance is 2.$_{00}$ and at .01 level of Significance it is 2.660. The obtained value of t is 13.70 which is much more than both the tabulated values at both level of Significance. Hence the null hypothesis is rejected at both 0.05 and 0.01 level of Significance.

Conclusion:

There is a significant difference in the Pre-test Affective Domain Assessment Scale scores and Post-test Affective Domain Assessment Scale scores of Experimental Groups (PPT Design & PT Design) of Maharashtra State Board school. This proves that BTTM has sensitized and influenced their affective domain through its emotional climate building by the various activities like drawing their emotional state in the form of emoji's, drawing their favourite Quadrilateral and writing their favourite quotes inside these figures, writing poems on their favourite Quadrilateral and drawing the everyday items based on their favourite Quadrilateral. Thus BTTM connected them emotionally to the content taught.

$H_0$3: There is no significant difference between Psychomotor Domain Assessment Scale score of Pre-test and Post-test of Experimental Group of VIIIth standard students of Maharashtra State Board School.

Table No. 8

Relevant Statistics of the Psychomotor Domain Assessment Scale Pre & Post Mean score of Experimental Group (PPT & PT Design) of Maharashtra State Board School.

Variable	Total Sample	N	Df	Mean	SD	Table Evaluation		t value	Level of Significance	
						.05	.01		.05	.01
Psychomotor Domain Assessment Scale Mea score	PPT & PT (Experimental Group) Pre-test Mean score	62	61	85.95	9.94	2.00	2.660	11.13	S	S
	PPT &PT (Experimental Group) Post-test Mean score			92.06	8.17					

S-Significant NS- Not Signific

From the table it can be seen that for df = 61, the table value at .05 level of Significance is 2.00 and at .01 level of Significance it is 2.660. The obtained value of t is 11.13 which is much more than both the tabulated values at both level of Significance. Hence the null hypothesis is rejected at both 0.05 and 0.01 level of Significance.

Conclusion:

There is a significant difference in the Pre-test Psychomotor Domain Assessment Scale scores and Post-test Psychomotor Domain Assessment Scale scores of Experimental Group (PPT Design & PT Design) of Maharashtra State Board school. This proves that BTTM has been able to develop psychomotor skills i.e. head, heart and hand co-ordination as students could express their content taught by the researcher using BTTM through preparation of charts, cards with emoji's, draw their favourite quadrilaterals, prepare cards with day to day items having shapes of various quadrilaterals, organize gallery walk on content taught of Unit Quadrilateral, rangoli Designs (Using Quadrilateral shapes) etc.

Data Analysis

Raw Data was tabulated in MS Excel 2007 and analysis was done using online platform www.statskingdom.com

Educational Implications of the Study

i) For Policy Makers

BTTM caters to all the three domains of learning which reflects NEP 2020 goal towards holistic education (11.1-11.13) hence the policy makers can form guidelines to encourage and motivate the educators to consider such models of teaching in their classroom teaching.

ii) For Administrators: Management / Principals can organize seminars, symposiums, workshops to disseminate the information regarding BTTM.

iii) For Teacher Educators: Teacher educators can integrate BTTM as an innovative model of teaching-learning. They can incorporate as one of Practice teaching lesson for the student-teachers.

iv) For Teachers:

It will help teachers to become aware of an alternative mode for transaction of curriculum.

It will encourage teachers to promote activity based learning.

v) For Students:

BTTM would free the students from the clutches of rote learning and cater to 'Learner Centered' education.

It would help in development of all the three domains of learning and incorporate student engagement for optimum performance.

BTTM helps in retention of content and allows to apply their theoretical knowledge to real life situations.

Suggestions for Further Research

Brain Targeted Teaching Model in Teaching of various subjects and at various levels can be taken up.
BTTM in relation to various variables like learning styles, anxiety, stress etc. can be studied.
Studies of BTTM with larger sample sizes and different boards can be studied.
A comparative study of BTTM in India and abroad can be conducted.
A Study of the Effectiveness of Brain Targeted Teaching Model in multidisciplinary subjects can be taken up.

Recommendations

- Explore more Models of Teaching which will bring in all round development of the student.
- Devise new Models of Teaching which cater to three domains of learning.

Neuroscience, brain based learning techniques research studies should be taken up to contribute to the GenZ education system.
In this era of AI & Hybrid learning research need to be conducted for adapting these technologies for betterment of our society.
Research studies on outcomes of NPE 2020, 21st century skills like collaboration, communication, critical thinking and creativity which advocated to make education more inclusive, equitable and holistic should be taken up.

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