

Research Paper

## Assessing the Efficacy of Brain Targeted Teaching and Content Based Language Teaching in Enhancing Language Teaching among Senior Secondary School Students

Abhishek Kumar<sup>1\*</sup>, Jayendrakumar N. Amin<sup>2</sup>

### ABSTRACT

In order to determine which of the teaching methods best serves the students in terms of English Language Teaching, this article examines the efficacy of Brain Targeted Teaching and Content Based Language Teaching methods using scientific evidence. The researchers adopted a factorial research design to investigate the problem. Investigators employed the multistage random sampling technique, and the Cochran formula was used to determine the sample size. 80 samples received the treatment in two groups of 40 participants for teaching prose and teaching poetry. The statistical computation was performed with the help of IBM SPSS GradPack Premium Version 29 Licensed. The researchers took 20 days and forty-five minutes for each session totaling forty sessions to successfully complete the entire intervention programme. Based on the factorial analysis of the data it can be said that the BTT was found significantly more effective method of teaching English language than the CBLT, where factor like Gender did not significantly affect when they were included as covariate.

**Keywords:** BTT, CBLT, Teaching Poetry, Teaching Prose, Language Teaching, Factorial Analysis

The evolution of educational methodologies has been deeply intertwined with advancements in cognitive science, linguistic theories, and pedagogical philosophies. Over the past century, the quest for more effective teaching strategies has led to the emergence of innovative approaches that address the complex interplay between cognitive processes and language acquisition. Two such methodologies, Brain Targeted Teaching (BTT) and Content-Based Language Teaching (CBLT), find their roots in a historical trajectory marked by a growing understanding of how the human brain learns and processes information. The early 20th century witnessed the rise of behaviourism, a psychological theory that emphasized observable behaviours and external stimuli as key factors in learning. This paradigm shift paved the way for structured instructional approaches but often overlooked the intricate cognitive mechanisms occurring within the brain. However, as the

<sup>1</sup>Research Scholar, Centre for Studies and Research in Education, School of Education, Central University of Gujarat, India

<sup>2</sup>Chairperson, Centre for Studies and Research in Education, School of Education, Central University of Gujarat, India

\*Corresponding Author

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decades progressed, cognitive psychology emerged, highlighting the importance of internal mental processes in learning. This marked a pivotal moment in the history of education, as educators began to recognize the significance of aligning instructional approaches with cognitive processes to enhance learning outcomes. Simultaneously, the field of language acquisition was undergoing its own transformations. Traditional grammar-focused language teaching approaches gradually gave way to communicative language teaching, which emphasized real-world language use and meaningful communication. This shift was rooted in the acknowledgment that language is not just a set of grammatical rules but a dynamic tool for expression and comprehension. As technology advanced, so did the tools available for exploring the brain's intricacies. The advent of neuroimaging techniques such as functional magnetic resonance imaging (fMRI) and electroencephalography (EEG) allowed researchers to peer into the brain's activities while individuals engaged in various cognitive tasks. This ushered in the era of neuroeducation, where educators began to draw insights from neuroscience to inform instructional practices.

CBLT is an approach that integrates language learning with content instruction. Instead of focusing primarily on language training, this approach introduces intellectual content as a teaching tool into the classroom. This strategy focuses on helping students enhance their language skills in relevant, authentic contexts. We teachers are always looking for ways to hone our approaches to the benefit of our students' learning. Brain-targeted teaching (BTT), an approach that actively involves students' brains in the learning process, has become increasingly popular in recent years. We also have seen a rise in the use of content-based language teaching (CBLT) as a means to make students' educational outcomes. Both BTT and CBLT refer to these forms of education. The BTT model draws on studies in neuroscience and language acquisition to improve students' ability to learn and retain new information. The goal of CBLT is to prepare students to acquire the language while using the context of any non-linguistic subject matter so that students learn the language by using it within that specific context.

Brain Targeted Teaching recognizes that effective learning occurs when instructional practices align with the brain's natural cognitive processes. By integrating findings from neuroscience, psychology, and education, BTT aims to optimize learning environments and methodologies to resonate with how the brain processes and retains information. Its major objective is to improve learning through the application of techniques that stimulate several brain regions, including the visual, auditory, and kinaesthetic systems, among others. The necessity of a pleasant learning environment that decreases tension and anxiety, both of which can hinder learning, is another point made by BTT.

### Operationalizing the Key Terms

- ***Efficacy***— In this study, researchers compared the achievement test results of students who were taught using either Brain-Targeted Instruction or Content-Based Language Instruction to see which was more effective at imparting knowledge of prose and poetry.
- ***Immediate Achievement Test***— In this study researchers considered the Immediate Achievement Test (IAT) as a test administered prior to the treatment to measure the previous knowledge of the participants in teaching prose and poetry.
- ***Achievement Test***— In this study researchers considered the Achievement Test (AT) as a test administered after the treatment to measure the participants Achievement in English language for teaching prose and poetry.

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- **CBLT Lesson Plan**— A teaching approach used by the researchers inside the classroom in teaching the prose and poetry content for the all the group, during which the researchers present his learning material by the CBLT strategy, that consists of Language Experience Approach, Dictogloss, and process writing (prose). The CBLT Lesson Plan framework is given by Magdalena Custodio Espinar. (Harmer, 2014, p.225-26).
- **Brain Target Teaching Lesson Plan**— A teaching approach used by the researchers inside the classroom in teaching the prose and poetry content for the all the group, during which the researchers present his learning material by the BTT strategy, that consists of six steps: Emotional Climate, Physical Environment, Learning Design, Teaching for Mastery, Teaching for Application, and Evaluating Learning. The BTT lesson Plan framework is given by (Hardiman Mariale, 2012).
- **Language Teaching**— In this study researchers took only teaching of English as a second language is examined here; specifically, the study focuses on two important subfields of Teaching English as a Second Language: prose and poetry.
- **Teaching Prose**— In this study researchers took biography for teaching prose as teaching content.
- **Teaching Poetry**— In this study researchers took rhyme scheme and metre for teaching poetry as teaching content.

### Rationale

The rationale for conducting a comparative study to assess the efficacy of the Brain-Targeted Teaching (BTT) approach in comparison to Content-Based Language Teaching (CBLT) specifically in the context of language teaching (teaching poetry and prose) is multifaceted and essential for optimizing language and literature instruction:

- **Different Cognitive Demands:** Teaching poetry and prose involves distinct cognitive demands. Poetry often requires a heightened focus on symbolism, imagery, and emotional expression, while prose demands comprehension of narrative structures and complex character development. BTT, rooted in brain research, caters to these distinct cognitive needs more effectively, and evaluating its efficacy in both contexts can offer tailored insights.
- **Language Precision:** Poetry necessitates a heightened sense of linguistic precision and interpretation. Emphasis of BTT is on understanding how the brain processes language can potentially enhance students' ability to analyze and appreciate poetic language, metaphors, and symbolism, contributing to deeper comprehension and engagement.
- **Creative Expression:** Poetry, in particular, encourages creative expression. BTT promotes critical thinking and higher-order cognitive skills foster students' abilities to critically analyze and creatively respond to poetic works. Comparing it with CBLT can help determine which approach better facilitates creative exploration in literature.
- **Narrative Comprehension:** Prose, on the other hand, relies heavily on narrative comprehension. Assessing the efficacy of BTT versus CBLT in teaching prose can provide valuable insights into which approach better supports students' understanding of complex narratives, character development, and thematic analysis.
- **Interdisciplinary Insights:** Poetry and prose often intersect with various subjects such as history, culture, and psychology. Evaluating the efficacy of teaching these literary forms with BTT versus CBLT can shed light on how interdisciplinary

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perspectives can be integrated into literature education, enriching students' comprehension and appreciation of literary works.

- **Enhanced Engagement:** Both BTT and CBLT aim to enhance student engagement. However, the cognitive alignment of BTT with brain research may offer unique advantages in sustaining student interest and participation in the nuanced analysis of poetry and prose. Comparing the two approaches can reveal which approach better maintains student engagement.
- **Teacher Preparedness:** Assessing the efficacy of BTT and CBLT in teaching poetry and prose can inform teacher preparation programs. Future educators can benefit from understanding which approach equips them with the skills and strategies necessary to effectively convey the nuances of literature, ensuring that they can facilitate meaningful learning experiences for their students.
- **Varied Learning Outcomes:** Literature instruction encompasses a wide range of learning outcomes, including analytical skills, appreciation for cultural nuances, and the ability to communicate effectively. Comparative research can clarify which approach better cultivates these diverse learning outcomes in the context of poetry and prose instruction.

In conclusion, the rationale for evaluating the efficacy of the Brain-Targeted Teaching approach versus Content-Based Language Teaching in the specific context of teaching poetry and prose is rooted in the desire to optimize language and literature instruction. Such research promises to enhance language precision, creative expression, narrative comprehension, interdisciplinary perspectives, student engagement, teacher preparedness, and varied learning outcomes. Ultimately, this evaluation seeks to ensure that students receive the most effective and enriching literary education possible, aligning with the unique cognitive demands for learning. Conducting a study on the efficacy of brain-targeted teaching in language teaching is important because it aligns with emerging trends in education, has the potential to transform teaching and learning, and can address various challenges and opportunities in the Indian education system. It has the potential to enhance the quality of education, benefit teachers and students, and contribute to the broader field of educational research.

### Objective

The current article aims to examine the efficacy of brain-targeted teaching and CBLT for teaching English as a foreign language.

### Hypotheses

**H<sub>01</sub>:** There is no significant effect of Gender as a factor in BTT and CBLT on achievement test scores in teaching prose considering their IAT scores as a co-variate.

**H<sub>02</sub>:** There is no significant effect of Gender as a factor in BTT and CBLT on achievement test scores in teaching poetry considering their IAT scores as a co-variate.

### Methodological Research Paradigm

**Table 1 Methodological Research Paradigm**

R*	O**	X***	O**
Group A	IAT <sup>a</sup>	BTT <sub>1</sub> <sup>d</sup> CBLT <sub>1</sub>	AT <sup>b</sup>
Group B	IAT	<sup>c</sup> BTT <sub>2</sub> CBLT <sub>2</sub>	AT

<sup>a</sup>Immediate Achievement Test <sup>b</sup>Achievement Test <sup>\*</sup>Randomized Assigned Group

<sup>c</sup>BTT <sup>d</sup>CBLT <sup>\*\*</sup>Observation <sup>\*\*\*</sup>Treatment

<sub>1</sub> Teaching Prose <sub>2</sub> Teaching Poetry

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### **Variables**

In this study *Independent Variables* were two teaching methods (Brain Targeted Teaching and Content Based Language Teaching).

*Dependent Variable* is a direct achievement of senior secondary students in Teaching Language (teaching prose and poetry).

*Moderate Variable* is one type of independent variable. This type of variable is considered to research the effect of the relation between the dependent and in DV. In this study, the moderate variable was Gender.

### **Participants**

The study employed a multistage sampling technique, randomly selecting the Bokaro district in Jharkhand through a lottery mechanism. Approval was obtained from a senior secondary school within the district, and the participant institution was chosen via a lottery system. Through a simple random sampling procedure, the sample of class XI students was then divided into two groups, A and B, each comprising 40 students, resulting in a total of 80 participants.

### **Data Collection Techniques**

The data for the study were collected via an immediate achievement test and the teaching of selected biography (prose) and rhyme scheme metre (poetry), followed by an achievement test. An immediate achievement test was used prior to the study's treatment. Following the treatment, the participants were given the achievement test to assess the efficacy of the teaching approaches. The researchers handled the stationery and logistics arrangements themselves. Multivariate analysis was used to demonstrate the procedures used to analyse statistically for each study objective. IBM SPSS Grad Pack Premium Version 29 Licensed was used for statistical analysis.

### **Data Collection Tools**

#### *Instructional tools*

The researchers designed lesson plans for BTT and the CBLT for teaching prose and poetry.

#### *Testing tools*

The testing tools were built for a biography (prose) and a rhyme scheme metre (poetry) to assess achievement in English, and a parallel tool was utilised as Achievement Tests. Four instructional materials and four testing tools were developed and standardised for the project in order to teach prose and poetry. The validity and reliability of the testing tools were established through expert opinions, equivalent forms (time-interval), split half (odd even) and interrater (two raters) reliability tests.

### **Data Collection Procedures**

The researchers begin the first phase of the intervention where he briefly introduces himself and takes all the necessary information which was required to successfully complete the intervention program. He further selects 80 students from the college randomly for his study. After selecting research participants, they were divided into two groups based on random selection namely A and B having 40 participants in each group. Both groups were encountered with immediate achievement tests prior to treatments. The administration of treatments for groups A and B were as follows:

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**Group A** participants received the treatments through brain-targeted teaching and CBLT for teaching prose whereas **Group B** participants received the treatment through brain-targeted teaching and CBLT for teaching poetry.

After conducting the intervention modules turned for both groups the researchers administered the achievement test. The researchers took 20 days (3:30 pm to 5:00 pm) and forty-five minutes for each session totaling forty sessions to successfully complete the entire intervention program on BTT.

**Data Analysis and Interpretation**

*EFFECT OF GENDER IN ADJUSTED MEAN SCORES OF AT IN TEACHING PROSE THROUGH BTT AND CBLT CONSIDERING THEIR IAT SCORES AS A CO-VARIATE*

The 1<sup>st</sup> hypothesis was to investigate the effect of gender as a factor in BTT and CBLT on achievement test scores in teaching prose considering their immediate achievement test scores as a covariate. Male and Female were the two levels of Gender; BTT and CBLT were the two teaching methods; and Immediate Achievement Test results were used as a covariate. Consequently, the data were analysed using 2X2 Factorial Design ANCOVA (FDA), and the results are presented in Table 2.

*Table 2 Summary of 2X2 FDA of AT scores in teaching prose through BTT and CBLT considering their IAT scores as a co-variate*

SV*	DV (AT PROSE)	df	SS <sub>Y.X</sub>	MSS <sub>Y.X</sub>	F <sub>Y.X</sub> -Value	Remark
IAT PROSE	BTT	1	276.92	276.92	20.17	P<0.05
	CBLT	1	15.50	15.50	6.23	NS
Gender	BTT	1	28.95	28.95	0.65	NS
	CBLT	1	26.43	26.43	1.87	NS
Error	BTT	37	1643.89	44.43		
	CBLT	37	521.85	14.10		
Corrected Total	BTT	39	1922.40			
	CBLT	39	555.77			

\*Source of Variance

Box test of Equality of Covariance (BTEC) 0.55 is not significant at 0.05 level hence it tests the null hypothesis that the observed covariance matrices of the DV are equal across groups. Levens Test of Equality of Error Variance (LTEEV) tests the null hypothesis that the error variance of the DV is equal across groups because  $p > 0.05$ . Hence homogeneity of variances was not violated. From Table 2 the adjusted F—value for BTT is 20.17 which is significantly higher than the adjusted F—value for CBLT at 0.05 level with  $df = 1/37$ . It reflects that there is significant difference in adjusted mean scores of AT in teaching prose of BTT and CBLT when IAT scores were taken as a co-variate. Thus, it can be concluded that the BTT was found to be more effective in comparison with CBLT on Achievement in teaching prose among **Group A** participants considering their IAT scores as a co-variate. The adjusted F-value of Gender for BTT is 0.65 and CBLT is 1.87 with  $df = 1/37$  is not significant at neither 0.05 nor 0.01 levels (vide Table 2). It indicates that there is no significant effect of Male and Female students on AT scores in teaching prose through BTT and CBLT considering IAT scores as a co-variate. Thus, the null hypothesis that there is no significant effect of gender as a factor in BTT and CBLT on AT scores in teaching prose considering their IAT scores as a co-variate is accepted. Further the adjusted mean scores of

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AT in teaching prose taught through BTT among male is 33.00 which is not significantly higher than female whose adjusted mean score is 34.84 whereas the adjusted mean scores of AT in teaching prose taught through CBLT among male is 25.294 which is not significantly higher than female whose adjusted mean score is 27.04 when their IAT scores as a co-variate. It may, therefore, be said that gender factors are not found to be significantly effective in comparison with BTT and CBLT in teaching prose when their IAT scores are considered as co-variate.

*EFFECT OF GENDER IN ADJUSTED MEAN SCORES OF AT IN TEACHING POETRY THROUGH BTT AND CBLT CONSIDERING THEIR IAT SCORES AS A CO-VARIATE*

The 2<sup>nd</sup> hypothesis was to examine the effect of gender as a factor in BTT and CBLT on achievement test scores in teaching poetry considering their immediate achievement test scores as a co-variate. Male and Female were the two levels of the Gender; BTT and CBLT were the two methods of teaching; and the immediate achievement test scores was taken as co-variate. Thus, the data were analyzed with the help of 2X2 FDA and the results are given in Table 3.

**Table 3 Summary of 2X2 FDA of AT scores in teaching poetry through BTT and CBLT considering their IAT scores as a co-variate**

SV	DV (AT POETRY)	df	SS <sub>y.x</sub>	MSS <sub>y.x</sub>	F <sub>y.x</sub> -Value	Remark
IAT POETRY	BTT	1	219.25	219.25	7.33	P<0.05
	CBLT	1	29.91	29.91	0.73	NS
Gender	BTT	1	20.26	20.26	0.68	NS
	CBLT	1	0.01	0.01	0.01	NS
Error	BTT	37	1107.14	29.92		
	CBLT	37	1519.19	41.06		
Corrected Total	BTT	39	1347.77			
	CBLT	39	1549.10			

BTEC 0.84 is not significant at 0.05 level hence it tests the null hypothesis that the observed covariance matrices of the DV are equal across groups. LTEEV tests the null hypothesis that the error variance of the DV is equal across groups because  $p > 0.05$ . Hence homogeneity of variances was not violated. From Table 3 the adjusted F—value for BTT is 7.33 which is significantly higher than the adjusted F—value for CBLT at 0.73 level with  $df = 1/37$ . It reflects that there is significant difference in adjusted mean scores of AT in teaching poetry of BTT and CBLT when IAT scores were taken as a co-variate. Thus, it can be concluded that the BTT was found to be more effective in comparison with CBLT on Achievement in teaching poetry among **Group B** participants considering their IAT scores as a co-variate. The adjusted F-value of Gender for BTT is 0.68 and CBLT is 0.01 with  $df = 1/37$  is not significant at neither 0.05 nor 0.01 levels (vide Table 3). It indicates that there is no significant effect of Male and Female students on AT scores in teaching poetry through BTT and CBLT considering IAT scores as a co-variate. Thus, the null hypothesis that there is no significant effect of gender as a factor in BTT and CBLT on AT scores in teaching poetry considering their IAT scores as a co-variate is accepted. Further the adjusted mean scores of AT in teaching poetry taught through BTT among male is 40.55 which is not significantly higher than female whose adjusted mean score is 39.05 whereas the adjusted mean scores of AT in teaching poetry taught through CBLT among male is 31.63 which is not significantly higher than female whose adjusted mean score is 31.65 when their IAT scores as a co-

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variate. It may, therefore, be said that gender factor is not found to be significantly effective in comparison with BTT and CBLT in teaching poetry when their IAT scores are considered as co-variate.

### RESULTS

Our study shows substantial evidence that Brain-Targeted Teaching is more effective than content-based Language Teaching for enhancing academic achievement and language proficiency among students. This conclusion is consistent with the BTT principles, which emphasise the significance of employing learning procedures that target specific brain regions. CBLT, on the other hand, emphasises on academic content to teach language, which may not be as effective in engaging pupils and increasing language acquisition. This conclusion has significant implications for educators and policymakers who seek to improve the educational quality for all pupils. Educators can engage children in the learning process and boost academic achievement and language proficiency by employing brain-based teaching techniques.

### Educational Implications

Educational Implications of Brain-Targeted Teaching (BTT) are as follows:

- *Investigating the Efficacy of BTT:* The primary purpose of studying the efficacy of BTT in English language teaching implies that educators should consider incorporating BTT strategies into their teaching practices. This approach can help enhance language learning outcomes and improve instructional efficacy.
- *Emphasizing Scientific Discoveries on Brain-Based Learning:* Educators, parents, and psychologists cannot overlook recent scientific discoveries on how the brain learns to read. This implies that teaching approaches should be informed by neuroscience research, particularly in the context of reading instruction, to ensure the use of effective and evidence-based approaches.
- *Teacher Expertise and Passion:* To promote students' reading fluency and comprehension, it is important to have teachers who are both passionate and well-informed. Teachers should be equipped with the latest research findings on how the brain learns to read and should utilize innovative and effective teaching approaches to spark students' interest in reading.
- *Integration of Seven Types of Brain Functioning:* Reading and writing involve the integration of at least seven distinct types of brain functioning. BTT recognizes these different aspects, such as phonological, graphic, lexical, syntactic, semantic, communicative, and cultural. Educators should incorporate strategies that address these different brain functions to support comprehensive language acquisition.
- *Gradual Introduction and Alignment with Cultural Values:* The successful implementation of BTT can be facilitated by introducing it gradually and aligning it with early childhood ideals and cultural values. This implies that educators should consider a phased approach when implementing new teaching strategies, ensuring they align with existing cultural values and beliefs.
- *Interdisciplinary Approach:* BTT is grounded in studies that account for the impact of culture on growth and education. This suggests that a multidisciplinary approach, incorporating cognitive science, psychology, biology, and languages, can enhance the efficacy of the BTT curriculum. Teachers should engage in ongoing professional growth and collaboration across disciplines to enrich their teaching practices.



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- Leadership and Individual Responsibility: BTT implementation involves a central leadership group overseeing the planning, development, and implementation of lessons. However, individual teachers are responsible for writing and structuring their lessons. This implies that while there is guidance and support at a broader level, teachers should take ownership of their instructional practices and adapt BTT principles to their specific classroom contexts.
- Two-Way Communication between Academics and Practitioners: BTT and brain-based learning research require active communication between academics and schools/learning centers. This highlights the importance of collaboration, sharing insights, and translating research findings into practical applications for educational practice. Educators should engage with relevant research and communicate their experiences and needs to researchers to foster a reciprocal relationship.
- Enhancing Word Connections and Learning: BTT aims to improve the connection between the phonological form and spelling of words, facilitating precise representations of word meanings. Educators should incorporate strategies that strengthen the relationship between sounds and spelling, enabling students to learn words more effectively.
- Integration of Neuroscience in Teacher Education: Teaching neuroscience, as part of teacher education programs, can enhance the understanding of brain-based learning principles. This integration of neuroscience information with education disciplines can provide educators with additional knowledge to better understand their students and contribute to the multidisciplinary nature of teacher education.

Overall, the implications of Brain-Targeted Teaching emphasize the importance of incorporating research-informed strategies, considering cultural values, nurturing teacher expertise, and promoting interdisciplinary collaboration to enhance educational practices and support students' learning processes.

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***Conflict of Interest***

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