EFFECTIVENESS OF WHOLE BRAIN TEACHING FOR ENHANCEMENT OF ENGLISH LANGUAGE SKILLS: AN EXPERIMENTAL STUDY

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

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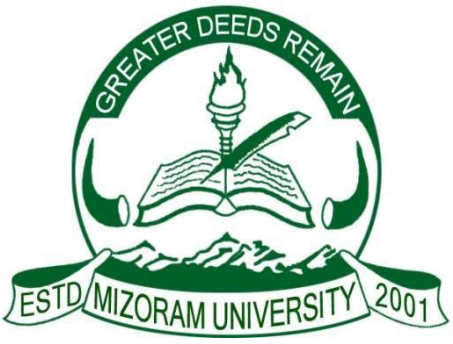

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CERTIFICATE

This is to certify that the work incorporated in this thesis entitled **"Effectiveness of Whole Brain Teaching for Enhancement of English Language Skills: An Experimental Study**" is the bonafide research work carried out by Lal Rem Siami under my supervision and the same has not been submitted previously for any degree.

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Month: September **Year: 2022**

DECLARATION

I, Ms. Lal Rem Siami, hereby declare that the subject matter of the present thesis entitled, **"Effectiveness of Whole Brain Teaching for Enhancement of English Language Skills: An Experimental Study**" is a record of work done by me, that the contents of this thesis did not form basis of the award of any previous degree to me or to the best of my knowledge to anybody else, and that the thesis has not been submitted by me for any research degree in any other University or Institute.

This is being submitted to the Mizoram University for the degree of Doctor of Philosophy in Education.

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INTRODUCTION

1.1.0 Background of the Study

Language is the expression of ideas and interests in employing sounds and speech combined into 'language'. It is a feature every individual should be given the opportunity to explore. Language is required for both receptive and expressive functioning. Receptive includes the ability to read and listen whereas expressive includes the ability to write and speak (Scribner, 2013). Language is a social tool that influences the academic achievement of the students to a great extent.

Whatmoush (1967) defines language as an unwritten figurative system where individuals share knowledge and distribute information. Language skills are a code employing symbols, signs, and gestures that are used for communicating interests and ideas. To excel in all walks of life, a comprehensive language skills foundation is needed for the students as language is regarded as a non-instinctive system of communication (Sapir, 1921). The methodologies of teaching English language skills should include - communicative teaching, grammar-translation and structural technique (Robinson, 1995). The main goal of teaching language is not to blindly achieve the skills but to commune efficiently in daily activities. A shift from a rigid structural method to an interactive method of teaching and learning is a pressing need today.

The development of English language skills is formulated by the National Policy on Education (1968& 1986) where importance is given to implementing English language skills in letter and in spirit. With the growing demand and change in the education sector, the Government of India has put forward a wide range of proposals like the RTE Act, 2009 that aims to provide a comprehensive education structure in all stages of education. RTE integrated with SSA provides a clear thrust on education for students belonging to disadvantaged groups. RMSA and RUSA are another two major flagship innovative programmes for educational development.

The National Curriculum Framework (NCF) 2005 highlights how language teaching is one of the most neglected areas in schools, and how it has become the most unchallenging site of education. It emphasizes that language teaching should be multilingual wherein schools should follow a three-language formula. Educators must be aware of this inconsistency and provide effective intervention in the hope to change the education system. Thus, there is a need to modify the method of teaching and learning language among school students. What is needed is a brain-based teaching approach since all teaching and learning activities are connected to the brain in some way or the other. Brain-based learning maybe put in three basic words: strategies, co-operative learning and principles (Jensen, 2000).

Hart (1999) compares teaching without understanding the functions of the brain as making a glove that has no sensation of the hand. He further puts forward his argument in order to drive home his key point; the brain 'the organ of learning' should be accommodated in the classrooms if they are to be places of teaching and learning. Shifting from rote memorization to collaborative learning is the foremost aim of brain-based teaching and learning. Brain-based teaching and learning has given us extensive research evidence which suggests that adoption of teaching and learning method based on the formation of the brain can enhance learners' academic performance (Sontillano, 2018; Wolken, 2017; Palasigue & Torres, 2009; Sousa, 1998). Functioning of the brain and its effect on learning outcomes provides a scope for change and improvement of teaching method.

The method of teaching paves the way towards the attainment of a certain goal or reaches a new dimension (Rowley, 1945). According to Webster's dictionary, the method is defined as a well-ordered purpose to be accomplished to present the materials effectively. Whole brain teaching (WBT) also called power teaching is a brain-based teaching method that focuses on stimulating the whole brain in teaching and learning (Alford, 2014). It combines instructional strategies and directs instruction while the respective teachers facilitate the lesson's core concept (Alaniz, 2015). WBT is a teaching method that focuses on how the brain is intended to attain information; it is a flexible approach which can be employed for all age groups. It is recognized as the

world's fastest-growing reformative movement in the education sector (Biffle, 2010). The longer we talk, the more students we lose – is the first law of WBT (Bajak, 2014).

Brain-based learning is a new approach in teaching and learning process that has paved the way for transforming educational practices. It suggests extensive ways to revolutionize schools into inclusive learning organizations. At present, many conventional educational curriculums have been facing problems on all levels. There is a need for a fundamental shift; the present educational problems cannot be solved with the same traditional teaching tools that created them. Schools must unlock their collective doors to a solution on how do we create a learning environment where the brain learns best? This brain-based approach continues to be a new leading frontier; it is regarded as the most important and relevant technique for enhancing the quality of education system.

1.2.0 Brain-based Learning

Brain-based learning model that tries to bridge between educational practices and brain-based research was introduced in the year 1983(Cave, Ludwar & Wendy, 2000).The scientific research study on brain-based learning is both comprehensive and convincing. Brain-based learning is a system of learning based on the function of the brain, a multidisciplinary discipline which may be the most significant educational reform. It is an approach that emphasizes the uniqueness and structure of the brain by using diversified choices in the teaching process (Grade Hub, 2017).

Brain based teaching and learning is an advanced technique that focuses on supporting speedy and efficacy of learning; it focuses on accelerating the learning process to improve the resiliency of the brain (Swan, 2019). Through a brain-based research study, Caine and Caine (1991, 1994) stated the core principles of brain based education in connecting human brain and teaching method and identified that the brain was a complex processor that could control a wide range of proceedings. Each brain is uniquely accompanied by the same set of systems but is integrated differently in every brain. Fitzel (2017) also put forward a teaching method for students designed on the need and requirement of the brain as identified through research study.

Brain based approach is regarded as the involvement of different learning strategies put together based on the findings identified from the study of the brain. It is common knowledge that we are all natural learners. The failure of schools and students is an indication of a faulty educational system – not a faulty brain (Jensen, 2008). The passion for learning flourishes when the students are provided with an effective teaching and learning methodology. The brain has its unique rhythms and cannot function on the command of a pre-designed curriculum. A teacher must know nature's engine run to maximize learning.

Brain based teaching and learning approach may not be the solution to all our educational problems but it is a new paradigm of teaching upon which we can recognize progressive principles of teaching (Jensen, 2008). At present, educational neuroscience is an emerging scope and an evolving set of principles. With such a wide range of scientific research and findings, it can be a foundation for an innovative curriculum that can improve the quality of students' learning.

1.3.0 Whole Brain Teaching (WBT)

Whole brain teaching (WBT) is an instructional approach derived from a neuro-linguistic depiction that aims to maximize learning by activating the whole brain (Biffle, 2010). In 1999, Christ Biffle put forward the whole brain teaching method, an innovative reformation movement for the attainment of pedagogically sound curriculum and effective classroom management which has increased popularity around the nations (Battle, 2010). Whole brain teaching comprises of several teaching strategies that rely on social theory; it discovers that effective learning occurs when every part of the brain is active.

As the founder of whole brain teaching Biffle (2013) explains that WBT combines the characteristic of direct instruction and cooperative learning. This creates a student-centered classroom environment, an engaging and flexible teaching method that is enjoyable for both students and teachers. Students have the passion to learn and explore new information when they are active and emotionally engaged (Biffle, 2013).

Supportively, research finding by Jensen (2005) confirmed that there is a significant relationship between the brain and human emotions.

Active learning increases students' academic performance, it is empirically validated teaching practice in a classroom setup (Freeman et al. 2014). In a study conducted by Bajak (2014) on the effectiveness of traditional stand-and-deliver lecture method, the researcher rightly pointed out that when teachers teach using traditional method the students' performance are questionable in achieving academic success when compared to students who are provided with the comprehensive active teaching method. For students to grow and improve efficiently the teaching method should be accompanied by various activities. Therefore, 'The longer we talk the more students we lose' is the first and foremost law put forward by WBT (Whole brain teaching).

Sontillano (2018) established the impact of using whole brain in his quasi-experimental research study conducted among middle school students. The researcher points out that the academic performance of the students has a positive impact after formulating whole brain teaching in a class. The learning activities require active participation both from the teachers and students. Albert Bandura's social learning theory is considered as the basis of whole brain teaching (Trianto, 2007). According to Bandura, human selectively attained knowledge and information which is later strengthened by repetition.

Whole brain teaching is gaining popularity worldwide; practitioners are campaigning to have it more widely implemented. The whole brain teaching method is beneficial for everyone in the educational platform. Both teachers and students attained massive amount of information through cooperative learning. A student-centered teaching model has proven to be victorious in the enhancement of students' academic achievement (Wolken, 2017). Advocates from different fields affirm that educators apply the teaching techniques to enhance the students' academic achievement (Biffle, 2010).

1.4.0 The Brain on Whole Brain Teaching

As numerous research studies have revealed the inextricable relationship between brain and education, the problem for teachers and educators is to establish a profound brain-based teaching and learning method. Fischer (2011) postulates that the teaching method used must be multidimensional. The educational instructions should help the students recall and engage to build up new innovative ideas (Brown, 2012; Worden, Hinto & Fischer, 2011). With the numerous brain-based research findings, it provides us with evidence that engaging different parts of the brain provides different scope for learning.

Biffle (2013) identified that our brain composed of specialized cells that collaboratively process varied information. The left hemisphere in the brain identifies the challenges that are already known, and the right hemisphere is set to creatively interpret new challenges. For encoding and decoding of varied information, these neurons are responsible. If the whole brain is active and engages in learning there is no room for disruptive behaviors. The following are the main regions as put forward by Biffle (2013):

1. **Prefrontal Cortex (Boss Brain):** It is the central reasoning center that switches on curiosity, attention span, and creativity.
2. **Broca's Area (Producing language):** It plays a vital role in producing spoken languages.
3. **Wernicke's Area (Understanding language):** It helps the students listen and understand language.
4. **Nucleus Acumbens (Pleasure):** It plays a key role in the production of brain's pleasure chemical Dopamine.
5. **The limbic system (Emotion):** It activates the brain's emotional core when the learner exhibits different emotions.
6. **Motor Cortex (Movement):** Motor Cortex is the most powerful for memory retention that controls all the physical movement of the body.
7. **Visual Cortex (Sight):** It is often regarded as the 'seeing brain' that obtains and integrates visual information.

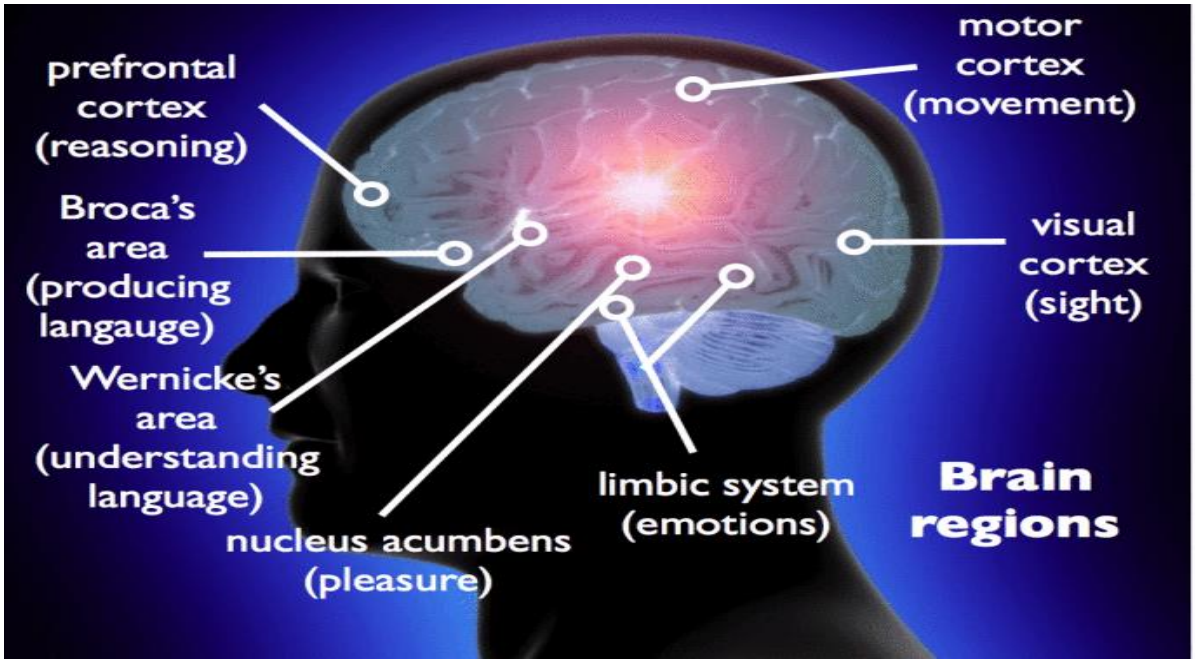

Figure 1.1.0 Image 1 Brain Regions Retrieved September 18, 2018,

from https://wholebrainteaching.com/brain-course/

1.5.0 The Big Seven

The seven core techniques of whole brain teaching known as the 'Big Seven' (Biffle, 2010) breaks teaching into segments which leads to active and cooperative learning, direct instruction and constant feedback. The techniques are briefly described below:

1. The first technique is called Class – Yes - Attention Getter. It helps the teacher to achieve students' attention by saying 'Class' and the students answer with 'Yes'. The attention-getter stimulates the prefrontal cortex (Biffle, 2013).
2. The second technique is Classroom Rules - The Organizer used to manage the classroom discipline. Five classroom rules are utilized to help manage the students. Each given rule corresponds to its gestures that activate the students' **motor cortex** and **limbic system** (Biffle, 2013).

3. The third technique is Hands and Eyes - The Focuser. This teaching technique facilitates the teacher to achieve maximum attention from the students (Clark, 2016).
4. The fourth technique is called Teach – Okay - Whole Brain Activator. In this technique the **visual cortex**, **motor cortex**, **broca's area**,**wernicke's area and limbic system** are activated (Biffle, 2013).
5. The fifth technique is Mirror Words - The Class Unifier. This technique helps the students in retaining the information. The students mirror the words and gestures that activate the **motor cortex** of the brain**.** Several research studies have proved that learning accompanied by gestures help in the attainment of better recollection (Jones, 2014).
6. The sixth technique is Switch - The Involver. Switch allows all the students to get involved in the classroom, one teaches and the others listen, the teacher gives a cue to switch and the students respond okay then the role is exchanged. The class is divided into two groups – Brocaians (speaker) and the Wernikites (listener), this improves listening and speaking skills (Biffle, 2013).
7. The seventh technique is known as The Scoreboard -The Motivator. To reinforce the students the teacher creates the scoreboard. The main aim is not to change the students' behavior but to unify students' attention (Biffle, 2013).

1.6.0 Theoretical Framework for Whole Brain Teaching

Albert Bandura's Social Learning Theory

Albert Bandura (1977) is in agreement with the behaviorists learning theories classical - conditioning and operant conditioning. He advocates that behavior is learned through the process of observational learning. Bandura's social learning theory is often described as the 'bridge' between cognitive psychology and traditional learning theory (behaviorism) as it includes motivation, attention and memory (McLeod, 2016). It emphasizes on how behaviors are influenced by the cognitive operations during social gathering.

According to Bandura, the students' responses that are reinforced are more likely to recur than responses that are reinforced. Satisfaction and pleasure (Nucleus acumbens) affected the learners' behavior. Another important mechanism is imitation by which a child learns and develops. The child attains a wide range of knowledge by imitating the behavior of the model through observation. Imitation follows principles such as prestige, skills, competency and familiarity of the knowledge (Chauhan, 2007).

Bandura theorized that observational learning may not be maximized unless there is a cognitive process at work. He believes that student learns from each other with the help of observation, imitation, and modeling. Bandura's theory moves ahead of behavioral theories, which advocate that all behaviors are attained with the help of cognitive theories and conditioning which take into consideration the psychological influences such as memory and attention (Cherry, 2019).

The mental factors intervene in the attainment of knowledge; individuals do not automatically imitate the given educational model if there is no meditation before imitation. Bandura put forward four meditational processes which are as follows (Teach Thought, 2020):

1. **Attention:** Attention is a pivotal element in the learning process, we cannot learn if we are not giving attention.
2. **Retention:** Learning happens when one internalized information in the memories. Memory must be formed to be performed later when it is required. Much of social learning is not immediate it depends on the context, so this process is vital.
3. **Reproduction:** Behavior, skills, and knowledge attained are reproducing from the previously learned information. Reproduction occurs on demand.
4. **Motivation:** Motivation often originated from the observation. It can be intrinsic and extrinsic. It is considered as the will to perform and exhibit the perceived behavior based on the given condition.

1.7.0 English Language

English language is the first-choice foreign language of several countries and the second language in several multilingual countries including India. With so many sources behind its evolution, English is considered to be acquiescent with new words and meanings being invented time after time (Nordquist, 2020). Modern English has been widely spread around the world since the 17th century under the influence of the United States and the British Empire.

In India, English as a medium of instruction and teaching was highly recommended by Lord Macaulay in his famous Minutes of 1835. He wrote that all funds spent in enhancing education must be employed on English literature alone; he believes that the English language would enable the people of India to have commercial intercourse with the distant countries (Iyer, 2019). Respectively, Sir Charles Woods in Wood's Despatch of 1854, directed the government to emphasize on the importance of developing English language and also suggested that it could be a medium at the higher branches and vernacular for the lower level.

English is a widely spoken language, often termed as a window of the world. It is regarded as a 'global language' in all branches of study. The Kothari Commission (1964-66) has precisely highlighted that the English language would play a fundamental role as a library language. The Commission stressed that no students should be considered qualified for a master's degree, until and unless he/she has attained proficiency in English. On the other hand, the University Education Commission (1948-49) considers that without the presence of the English language, the quality of education may decline and deteriorate to a great extent (Begum, 2014).

At present, Indian parents in understanding the significance of the English language enrolled their children in English medium schools. With the ever-increasing population using English language as a medium of interaction, since the year 2005, India has had been acknowledged as one of the world's largest English- speaking country. Amid the advancement of technology and communication, a new utility for oral and written communication has emerged (Latha, 2018). Henceforth, English is an indispensable link language in a land of diversity like India.

1.8.0 Language: A Skill

Language is basically an ability that aims to enhance knowledge and information. A skill may be the ability to do something innovative; it naturally comes under the psychomotor domain (Husain, 2005). It is a system that functions through structures, sounds, and words by vocabulary, phonetics and grammar. Language skills are our ability to communicate that permits an individual to share and interact.

Language cannot be considered as a content-based subject like History, Economics, Mathematics, Geography, Social Sciences, etc. It is a multifaceted set of sub-skills, viz. LSRW (listening, speaking, reading, and writing) that are needed to be acquired for complete communication; they are the four basic language skills that are indispensable parts of teaching and learning. These skills are unique and separate skills but are connected with undividable bondage (Sadhiku, 2015).

It is vital to consider different kinds of language skills in designing and developing a teaching-learning method. It plays an important part in all language learning expedition. The attainment of language skills enhances the quality and standard of teaching and learning process. For the effective and efficient functioning of the education system, language skills are needed to be reinforced following the needs and level of the learner (Darancik & Yasemin, 2018).

Language skills serve many purposes. They are the main tools for achieving a well-round development of the student. When a teacher carries out classroom activities that focus to enhance language skills simultaneously (listening, speaking, reading, and writing), it opens room for a learning environment that allows for valuable progress in all areas of learning. Incorporating classroom activities relating to language skills serves numerous helpful insights and provides learners the proficiency in language.

1.9.0 Language Skills

1.9.1 Listening Skill

Listening is not simply hearing but a receptive language skillthat allows an individual to understand the communication process (Sadhiku, 2015). Listening is the method of processing and constructing, making significance meaning out of spoken language. A good listener always exhibits readiness and the ability to articulate and comprehend the systematic sounds into words. Academically, students learn better when they can listen better; it plays a dominant role in the process of both teaching and learning.

1.9.2 Speaking Skill

Speaking skill is a means to express and impress in spoken language often considered as an act of creativity. The classroom is the ideal platform to attain affluent good communication skills (Rao, 2019). In the activity of speaking, the speakers persuade and reinforce his or her ideas and interest without making grammatical mistakes.

1.9.3 Reading Skill

Reading is a learning skill, fun, and effective way to knowledge hunt, a conscious activity. It is the ability to understand written text (Sadhiku, 2015). With the help of efficient reading, it helps to develop language intuition in the corrected form. We extensively learn, comprehend, and interpret written words within a short period. It is regarded as a gateway to attaining new knowledge.

1.9.4 Writing Skill

Writing is a gem to pick, a productive skill often considered as an alternative medium. It is the process of passing on information through written symbols that help to consolidate the grasp of vocabulary. It is a medium of communication representing a language with symbols.

1.10.0 Teaching of English Language Skills

The art of teaching different language skills is the capacity to arrange the subtle strings of classroom dynamics. It is the method of learning through active learning, engagement, involvement, and whole brain-based learning. Active learning increases students' academic performance, it is empirically validated teaching practice in a classroom setup (Freeman, et al. 2014). It has become increasingly crucial to record students' data insights, and know how the brain functions (Hill, 2018). These can make every precious moment spent in the classroom more productive.

When we learn any language, it begins by listening and then we speak followed by reading and at the end we write. It also involves the attainment of specific grammar rules. The enhancement of language skills is generally regarded as a natural process. The practice of sub-consciously acquiring a native language is identified as language acquisition (Krashen, 1997). It points out that language acquisition is a sub-conscious practice as a result of random contact to a language user.

The outcome of the English language regarded as a global language has led to a reassessment of how receptive and productive language skills are taught in schools. Learners must be given the opportunity to learn and grow through different teaching methods (Marlina, 2018). As the English language is the leading window to achieve a comprehensive teaching and learning environment, it is nearly unfeasible to picture the present education system without English language (Cioffi, 2015).

The sole purpose of enhancing English language is not to merely master the given four skills - Listening, Speaking, Reading, and Writing (LSRW) but to communicate effectively and efficiently in all walks of life. Teaching method like brain-based learning method proves to be tremendously influential in the present education system. It has played a significant role in enhancing language skills among learners at all levels.

1.11.0 Education System in Mizoram

The formal schooling system in Mizoram may be said to date back from the year 1894 when British missionaries started a school due to lack of a script in the native Mizo language. They not only brought a script for the people of Mizoram but their vision and effort opened doors to massive enlargement and institutionalization of education in the state. Christian religion and literacy seem to go hand in hand among the people of Mizoram. The missionaries translated scriptures from the Bible and taught them how to read and write. Those who could not attend schools would be taught in Sunday school organized by the churches.

At present, the educational organization in Mizoram initiated by the missionaries is very guaranteeing as seen from the perspective of literacy rate at 91.33 percent; Mizoram is holding the third position in the country (The pioneer, 2021). It is a matter of pride that Mizoram has a high literacy percentage when compared to the most developed states in India. The quantitative expansion and improvement have been achieved to a significant extent. However, priority must also be given to attain qualitative expansion, advanced teaching methodology, and improved infrastructural facilities in the education sector.

The state government of Mizoram has taken an extensive step to improve the education system. Education Reforms Commission, Mizoram (ERCM) was set up in the year 2009 and by following the route put forward by the Group of Experts (GOE), extensive steps have been taken (Nunchunga, 2019). The state's attempt to establish a better education system has not yet been fully attained due to lack of funds and there have been problems identified in different fields of education.

Today the state of Mizoram has become an educational hub not only for the people of Mizoram but for the whole North-eastern region. It is well encompassed with plenty of public, private, mission schools and colleges. The state government has urged mandatory education up to the basic primary level. The extensive establishment and expansion of educational institutions from training institutions to technical courses have led to drastic changes with research and projects with various international colleges and

universities (Kaur, 2015). The educational institutions have also opened opportunities for many students to migrate and pursue further studies abroad. However, it is not a scenario we can be satisfied with as education should be looked at from the angle of productivity and contribution in improving the calibre of life.

The academic scenario in Mizoram has seen tremendous improvement and today it is the home to many educational institutions. The department of education is well organized; the English language has gradually been used as a medium which proved to be a great challenge for students as well as teachers (Education in Mizoram, 2020). However, the use of the English language is progressively being made the main medium of instruction in class. The critical aspect identified is the poor quality of teaching method that is extremely unsatisfactory.

Given the foregoing shortcomings and defects in language teaching, the fundamental task is to remodel and enhance the teaching methodology and focus on enhancing innovative teaching strategies. In this scenario, educators and teachers play a significant position in the identification of effective teaching methods or curriculum. The marked weaknesses of learners in English language skills should be addressed with sincerity. Teachers should be given special guidance in teaching English language skills (Chuaungo, 2014).

The education sector calls for a drastic change, the structure of teaching the English language needs to be revamped and reviewed. The education system in Mizoram needs a standard qualitative modification and reforms amidst the light of several challenges. With the use of innovative teaching method and comprehensive analysis, emphasis should be laid on attaining an all-round development at all levels. The state of Mizoram along the years proved to reach the stage where quantitative growth has been achieved. However, priority must be credited in achieving qualitative growth, improved infrastructure, and teaching methods.

1.12.0 Theoretical Framework for English Language Competency Modules and Lesson Plans

Bloom's Taxonomy

Bloom's Taxonomy was created by psychologist Benjamin Bloom and a group of experts. It a classification system for students' performance evaluation revised over the years. Bloom identified six developmental cognitive levels of complexity with complexity mounting from fundamental knowledge - remembering skills to the highest level-evaluation (Coffey, 2009). It serves as the backbone for those learning methods that focus on developing and enhancing students' skills.

It is a multi-tiered model that can be used across grade levels and different educational fields. With the help of Bloom's Taxonomy, a teacher can examine students' academic performance, within each level – Knowledge, Comprehension, Application, Analysis, Synthesis, and Evaluation. This learning process exhibits how different levels of the taxonomy can be accomplished in class (Coffey, 2009).The structure of Bloom's taxonomy provides a precise and comprehensive tool for teaching and learning language skills (Krathwohl, 2002). The six major cognitive levels are as below:

1. Knowledge: It includes memorization, recall facts without necessarily understanding the in-depth information.
2. Comprehension: It demonstrates an understanding of facts through interpretation and description.
3. Application: Application involves the use of acquired knowledge, applying techniques and methods, rules.
4. Analysis: It examines existing information into various parts, determining the connection and identifying the causes.
5. Synthesis: Synthesis involves building up facts and ideas to make whole new information.
6. Evaluation: Evaluation involves presenting a feedback and form a set of criteria.

1.13. Rationale of the Study

National Curriculum Framework (2005) precisely points out how language learning is the most neglected and unchallenging sites of education. The significant outcome of enhancing language skills may possibly be undermined by educationists and linguistics. A competent educator may recognize the existing gap in language teaching and learning (NCF, 2005). Therefore, there is a need to formulate effective and efficient teaching method; students must be given opportunity to attain proficiency in English language.

UNICEF's State of the World Children 1999 addressed that the convention on rights of children leads us in the direction of a child-centered model of teaching, where children are independent and actively involved, share their ideas and interests which in turn enhance students' sense of worth. The programme of study may be customized based on the need and requirements in order to enhance the language skills (listening, speaking, reading and writing) of students.

Effectiveness of the present teaching methods must be assessed to facilitate the students to move from rote memorizing to concept mastery where students can freely apply their knowledge and experience achieved (Sindhu, 2013). Many researchers confirm that teaching method has an extensive influence on students' academic performance, and further identify that students' academic performance depends upon the teaching method a teacher adopted since effective learning takes place when there is efficient and effective teaching (Karami, Pakmehr & Aghili, 2012; Adewale & Ogunshola, 2012; Ganyaupfu, 2013).

Until recently, one of the common observations is that most students learn language with no in depth understanding of the basic grammar and comprehension; this can occur due to absence of an effective language teaching method. The magnitude of formulating English language in the programme of study is extensively acknowledged and there has been an extensive effort taken at various levels. However, these steps taken may possibly fail because of incompetent administration and organization. Non-

availability of effective teaching methods appears to be one of the most crucial factors. We need an innovative steer to reconstruct the teaching method at all levels.

Multiple researches recognize that creating joy is an essential element to boost students' involvement in learning (Elias, 2016). This is one of the most common challenges faced by teachers to incorporate joyful teaching and learning in the class. Teachers are incorporating the whole brain teaching method to improve students' readiness to attain new knowledge and information, for teachers who have been practicing this teaching method say that whole brain teaching has made a massive difference in students' academic achievement (Szott & Molitoris, 2010).

Reviews show that impact study on whole brain teaching method is quite a new area of research in our country and abroad. It is a virgin area of research not yet thoroughly explored particularly in Mizoram. Moreover, no study is found to have been researched on experimenting effectiveness of whole brain teaching on enhancement of English language skills. The questions that may be raised in this regard are:

1. Will whole brain teaching be more effective than traditional teaching for the enhancement of English language skills among students?
2. Will the effectiveness of whole brain teaching using the English Language Competency Modules (ELCM) be the same or different among boys and girls?

Questions of this type cannot be provided with meaningful answers unless the research is conducted. To address this type of research questions and fill the research gap in this regard, an experimental study on the effectiveness of whole brain teaching for enhancement of English language skills has been undertaken. The study is an earnest attempt to enhance the English language skills by applying the whole brain teaching method among seventh grade students.

1.14.0 Statement of the Problem

The central purpose of the present study is to assess the effectiveness of whole brain teaching for enhancement of English language skills among students. The problem of the study is thus stated as:

'Effectiveness of Whole Brain Teaching for Enhancement of English Language Skills: An Experimental Study'

1.15.0 Operational Definitions of Key Terms Used

Effectiveness The term 'effectiveness' in the study implies the capability of the whole brain teaching method to enhance English language skills.

Whole Brain Teaching The term 'Whole Brain Teaching' in the study refers to a teaching method that activates different areas of the brain by using the seven core techniques of teaching developed by Chris Biffle (1999).

English Language Skills In the study, English language skills refer to listening, speaking, reading, and writing skills in English.

1.16.0 Delimitation of the Study

Population of the present study has been delimited to class VII or seventh grade students in Mizoram who study English textbooks prescribed for class VII by State Council of Educational Research and Training (SCERT), Mizoram, Aizawl.

1.17.0 Objectives of the Study

The present study was conducted with the following objectives:

1. To develop the English Language Competency Modules (ELCM) for the enhancement of English language skills.
2. To prepare a traditional Herbartian lesson plan based on English Language Competency Modules (ELCM).
3. To prepare whole brain teaching lesson plan based on English Language Competency Modules (ELCM).
4. To construct English Language Competency Test.
5. To find out the progress in English language skills during intervention.
6. To find out the effectiveness of whole brain teaching for the enhancement of English language skills.
7. To find out the effectiveness of whole brain teaching for the enhancement of English language skills across gender.

1.18.0 Null Hypotheses of the study

1. There exists no significant difference between mean scores of pre-test and post-test in English language listening skill among students from control group.
2. There exists no significant difference between mean scores of pre-test and post-test in English language speaking skill among students from control group.
3. There exists no significant difference between mean scores of pre-test and post-test in English language reading skill among students from control group.
4. There exists no significant difference between mean scores of pre-test and post-test in English language writing skill among students from control group.
5. There exists no significant difference between mean scores of pre-test and post-test in English language skills among students from control group.
6. There exists no significant difference between mean scores of pre-test and post-test in English language listening skill among students from experimental group.
7. There exists no significant difference between mean scores of pre-test and post-test in English language speaking skill among students from experimental group.

8. There exists no significant difference between mean scores of pre-test and post-test in English language reading skill among students from experimental group.
9. There exists no significant difference between mean scores of pre-test and post-test in English language writing skill among students from experimental group.
10. There exists no significant difference between mean scores of pre-test and post-test in English language skills among students from experimental group.
11. There exists no significant difference between mean scores of control and experiment groups in English language listening skill.
12. There exists no significant difference between mean scores of control and experimental groups in English language speaking skill.
13. There exists no significant difference between mean scores of control and experimental groups in English language reading skill.
14. There exists no significant difference between mean scores of control and experimental groups in English language writing skill.
15. There exists no significant effectiveness of whole brain teaching for enhancement of English language skills.
16. There exists no significant difference between the pre-test scores of boys and girls in English language listening skill.
17. There exists no significant difference between the post-test scores of boys and girls in English language listening skill.
18. There exists no significant difference between the pre-test scores of boys and girls in English language speaking skill.
19. There exists no significant difference between the post-test scores of boys and girls in English language speaking skill.
20. There exists no significant difference between the pre-test scores of boys and girls in English language reading skill.
21. There exists no significant difference between the post-test scores of boys and girls in English language reading skill.
22. There exists no significant difference between the pre-test scores of boys and girls in English language writing skill.

23. There exists no significant difference between the post-test scores of boys and girls in English language writing skill.
24. There exists no significant difference between the pre-test scores of boys and girls in English language skills.
25. There exists no significant difference between the post-test scores of boys and girls in English language skills.
26. There exists no significant difference between mean scores of control and experimental groups in English language listening skill across gender.
27. There exists no significant difference between mean scores of control and experimental groups in English language speaking skill across gender.
28. There exists no significant difference between mean scores of control and experimental groups in English language reading skill across gender.
29. There exists no significant difference between mean scores of control and experimental groups in English language writing skill across gender.
30. There exists no significant effectiveness of whole brain teaching for enhancement of English language skills across gender.

CHAPTER - II

REVIEW OF RELATED STUDIES

The present chapter is devoted to review of related studies, which is a central component that cannot be avoided in a research study. The perusal lets the researcher arrange the reviews in a proper manner, gives an insight into the problem selected and provides extensive understanding of the area of study. The reviews in the present study have thrown light on studies conducted mainly in the area of whole brain teaching. However, to provide a clear picture for the present study, the reviews have been made comprehensive. Thus, the reviews are presented under the following heads:

2.1.0 Studies related to brain based teaching and learning

2.2.0 Studies related to whole brain teaching

2.3.0 Studies related to enhancement of English language skills

2.4.0 Studies related to English language competency modules

2.5.0 Gap analysis

2.1.0 Studies Related to Brain Based Teaching and Learning

Scientists and educators have been carrying out extensive research studies to identify how the human brain functions and learns. The result of their respective study known as brain-based teaching and learning is popularly carried out nationwide (Swan, 2019). The main goal of brain-based teaching is to build a learning environment where students can thrive (Emporia State University, 2021). In today's postmodern society, it is a great challenge to gain students' attention in classroom teaching. There has been a constant debate on the need to change the teaching and learning style in the education sector. Hart (1999) rightly pointed out that teachers who teach without the knowledge of the brain are like creating a glove without any knowledge of a hand. Understanding the brain plays a vital role to alter the foundation of education, transform the conventional classroom into a more engaging and productive learning environment

(Laxman, Kumar; Chin & Kueh, 2010). Therefore, a teacher must have precise knowledge of how the brain functions.

Brain based education has provided us with an extensive research confirmation which recommended that a teaching strategy which is based on how the brain functions and learns can enhance the academic performance of students at all levels (Wolken, 2017; County, 2015; Duamn, 2010; Palasigue, 2009; & Sousa, 2008). When adopting a brain-based teaching methodology, educators must investigate the cognitive science discoveries as aspiration.

An experimental study conducted by Duman (2006) aimed to distinguish between brain-based instruction and the traditional teaching method among sixth grade students in social science subject. The study found out that the students' achievement improved after applying a brain-based instruction.

Kiedinger (2011) researched on brain-based teaching and learning method and its effect on reading skill among elementary students from different sections i.e., III, IV, and V grade. The study found an extensive development in the reading skill. The efficacy of brain-based teaching on reading skill was also explored by McNamee (2011) in an experimental study among 44 second grade students.

Bas (2010), from his experimental study found that the brain-based teaching and learning was more efficient and effective when compared to the traditional approach to teaching and learning and that the level of student's achievement improved with brain-based approach. In another study conducted by Sema (2008), the role of brain-based teaching on vocabulary learning and consolidation strategies were researched. The study identified gender differences among 200 students at TOBB University and revealed that females employed more variety of strategies when compared to male students.

Supportively, Awolola (2011) also investigated the effectiveness of brain- based learning strategy among senior secondary school mathematics students. The study concluded that a brain-based instructional strategy made learning more contextual and engaged learners in decision-making, forming co-operative groups, locating resources, and applying knowledge.

In a study conducted by Avci and Yağbasan (2007) that aimed to increase the level of students' performance and retention, the researchers found out that brain-based learning strategy had a significant effectiveness on the performance and permanence among seventh grade students. Tuba (2007) also studied the outcome of using a brain-based approach on students' performance and the level of retention in social science subject, the study came out with the same results. This study was supported by Inci and Erten (2011) whose experimental study concluded that there were statistical differences in the entire variables put forward between the students from experimental and control group.

The effectiveness of brain-based teaching on students' achievement was also studied by Riasat (2010). The result of this experimental study confirmed that brain-based teaching was successful and had a positive impact. The students of the experimental group performed better when compared to students from control group who were taught through traditional method of teaching.

Futhermore, Gultekin and Ozen (2008) explored the effectiveness of brain-based teaching on the students' academic performance and retention in science subject. The study revealed that the group favoring brain-based learning showed superior performance when compared with the scores of students taught through traditional teaching method. The result of this experimental study was also supported by Melek and Serap (2009) whose study aimed to identify the significant effectiveness of brain-based teaching on the students' academic achievement, attitude and retention. The result of the study indicated that a brain-based teaching and learning environment had a significant impact among university students in Turkey.

In a meta-analytical study carried out by Gozuyesil, Eda,Dikici and Ayhan (2014) on the effectiveness of brain-based teaching and learning on variables like - students' performance, level of education, sampling size, subject matter and the countries where studies were carried out; brain-based teaching and learning was found to have a high significant impact only on the students' performance. No significant differences were found for the other variables.

In an experimental study on the effects of brain-based learning among students from Mugla University with different learning styles conducted by Duman and Bilal

(2010), the test scores of students from the experimental group were found to be superior when compared with the scores of students from the control group. Arnold (2015) in his experimental study also confirmed that when the learners were asked to teach, they were able to remember about 90% of what they had learned from brain-based teaching and learning method. Supportively, Tufekci and Demirel (2009) also revealed that the students had an optimistic outlook to learning when the teachers applied brain-based teaching and also that students recognized each other's strengths and weaknesses.

Mekarina and Ningsih (2017) measured the value of a brain-based teaching on student's achievementand motivation among eleventh grade students in senior high schools. Results of the study confirmed that a brain-based learning enhanced students' academic achievement and motivation in Mathematics learning. The effects of a brain-based instructional approach were also studied by Murphree (2005) among third grade students in three schools. The study focused on the effects of teaching methodologies. The findings indicated that the brain-based teaching and learning method had a significant impact for all three schools.

Supportively, Akyurek, Erkan, Afacan and Ozlem (2013) undertook an experimental study on brain-based learning approach among seventh grade students. The pre/post-test experimental study was employed among 57 students to explore their motivation and level of attitude. The experimental group was found to perform better on the achievement test scores. Seyihoglu and Kepitan (2012) also researched the brain-based approach on students' attitudes. The result confirmed that the students' attitudes towards learning improved with the brain-based teaching.

In a quasi-experimental study conducted by Saleh and Salmiza (2012) on the use of the brain-based teaching in scientific understanding of Newtonian Physics among two secondary schools in Malaysia; brain-based teaching techniques put forward by Caine and Caine (1991, 1994) were employed. The study confirmed that the teaching and learning approach proved to be an effective and efficient tool in improving the performance of the secondary students.

Furthermore, to enhance the academic performance of sixth grade students, Herson (2006) investigated the effectiveness of brain-based techniques. The

experimental study identified how students who received brain-based instruction achieved higher scores when compared with students provided with conventional strategies. Another experimental research conducted by Amanda and Jeri (2007) showed a brain-based approach strengthened academic achievement and the level of intelligence among third and fourth grade students. In the same year, Pociask and Settles (2007) also attempted to improve the academic performance of students by formulating the brain-based teaching method.

A study undertaken by Tufekci and Demirel (2009) on the outcome using a brain-based teaching technique on variables like - retention, attitude, learning process and academic achievement focused on identifying the effectiveness of brain-based teaching among third-year education students. The study concluded that students who received brain-based learning scores higher.

Winters (2001) in his research also attempted to prove that in the process of teaching and learning, the student learns best through extensive engagement and repetition and the emotions triggered in learning influence retention. Brain-based approach has proven over time to be an important teaching method helping both teachers and learners to learn more effectively.

Laxman and Chin (2010) agree with Winter's (2001) findings. They found that the brain could potentially alter the nature of learning if the traditional system was transformed into a more engaging classroom environment. If the teacher provided a stimulating environment which is both engaging and challenging, then the brain will be able to derive the connections between the concepts introduced and the practical applications and students will be able to understand better. Hence it provides the students with a greater pathway of learning and creating long-term knowledge instead of rote memorization.

The review of related studies in this chapter gives us a clear picture and provides a positive direction that a brain-based approach to teaching is an advanced teaching technique that aims to increase the speed and efficacy of students' growth and development. It has revealed that brain-based teaching brought about a significant improvement in the academic performance particularly retention, motivation, and attitude. It aims to enhance and accelerate the learning process (Freeman, Greta, Wash

& Pamela, 2013). With the advancement of technology, teaching in the digital age has become increasingly challenging for educators. By applying brain-based teaching technique, more purposeful techniques can be executed to reach a greater number of learners. According to Bruer (1999), there have been numerous positive attributes identified in the brain-based learning approach. Brain-based educators introduced a constructivist model where students remain active and engaged in the classroom, creating a classroom environment that is low in threat, yet high in challenges. Emphasis is also laid on helping the learner develop high order of understanding and thinking rather than rote memorization.

The implications of brain-based teaching and learning are far-reaching. It is the application of meaningful principles put forward by experts after an intensive research study. Whole brain teaching is one of the most prominent brain-based teaching and learning approaches that enhances students' performance (Liftoff, 2018). It is a teaching strategy that continually engages students' brain, eliciting continuous spoken responses from the students, hyper-focused teaching method developed for both teachers and students. Integrating a whole brain-based teaching and learning will create a more engaging environment (Palasigue& Torres, 2009).

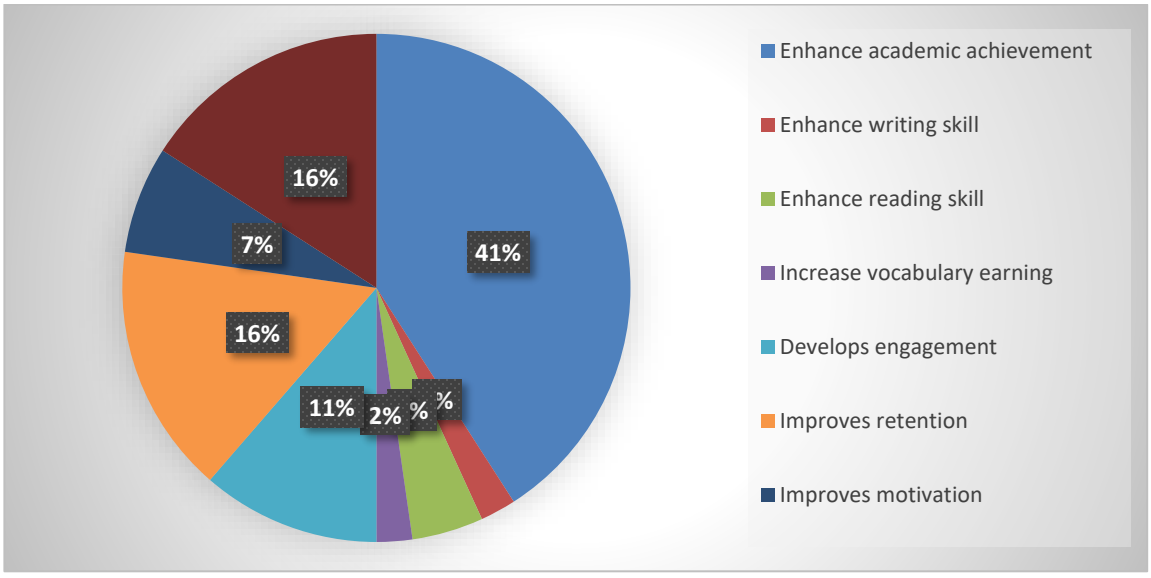

Figure 2.1.0 Reports on Brain-Based Teaching and Learning

2.2.0 Studies Related to Whole Brain Teaching (WBT)

The system of education is a ‘give and receive’ no matter what angle you are looking in at the classroom. In the process of teaching and learning, the teaching model plays a significant role. Teachers are expected to teach optimally by identifying the best teaching model. In the modern age of technology, it is a challenge for teachers to teach effectively; it is becoming difficult each day. The best of the learning model is the model that is based on how the brain functions (Handayani & Corebima, 2017). Educators must consider the diversified spectrum of learning styles. Therefore, it is imperative to implement effective and efficient brain-based learning and teaching method (Boer, et al. 2001). Understanding the function of the brain will facilitate teachers in designing an effective and efficient teaching model.

Christ Biffle created whole brain teaching; a brain-based teaching technique that has grown to be the fastest-growing teaching approach around the nation. Formerly known as 'power teaching' that relies on social theory, the whole brain teaching method emerges because of one setback teachers faced i.e., the use of lecture method led to the rise of disengaged students in classroom teaching (Biffle, 2010). With its motivating, engaging, and student-centered classroom environment whole brain teaching is beneficial for both teachers and students (Wolken, 2017).

The model of whole brain teaching (WBT) is a teaching approach imitated from neuro-linguistic pictures developed based on how the left and right hemisphere of the brain functions (Lee & Hung, 2009). As described by Biffle (2010), the whole brain teaching method is a strategy where students are constantly engaged in seeing, hearing, doing, and speaking. This is supported by Dale (1969) in his theory named 'Cone of experiences', where he highlighted that learning can take place only when it comes with unforgettable understanding. At present, students are not trained to discern and create new ideas in school. Rather, they are forced to memorize and acquire knowledge based on the rigid lecture method (Lee & Reeves, 2007). When a student’s whole brain is engaged, the synaptic nerves will be connected and make them more complex in learning (Pedersen, 2010). Teachers must be willing to adopt a brain-based teaching method as learning does not occur through lectures alone (Dafford, 2004).

The WBT can be regarded as one of the most current teacher-researcher integrated educational reform. In an experimental study put forward by Melani (2005) on the impact of whole brain teaching in enhancing language vocabulary among 60 SMP Sultan Agung seven standard students, the findings concluded that whole brain teaching had an impact on the students' mastery in English language vocabulary. Further, the students were found to be more motivated to learn and grow in class.

In an action research study carried out by Asmayanti and Amalia (2014), the findings confirmed that there was an improvement in the speaking skill of students. This study is supported by Dwintan and Aulia (2016) whose study proved that there was a significant distinction between the two groups and that the students from experimental group showed better scores and improvement in their speaking achievement.

The use of the whole brain teaching (WBT) to improve language skills of students was also researched by Rimatika and Miladiyah (2015). The study highlighted that the students were more engaged and focused on the lectures when WBT was employed. Lahita, Mujiyanto; and Sutopo (2018) experimented on WBT to develop and enhance the reading skill of students from grade eight with positive results.

An Action research conducted by Santoso (2016) focused on improving spiritual intelligence in English language inscription by formulating whole brain teaching approach. The result revealed that there was an improvement found in spiritual intelligence of the students in English language writing skill. Supportively, Natalia (2019) also conducted a research study on whole brain teaching to enhance writing skill of students. The research was conducted among first grade students of class seven. The researchers concluded that the whole brain teaching had an impact on students' writing skill.

Lockhart (2017) conducted a study among 48 primary school students. The focus was to analyze and investigate the effectiveness of whole brain teaching among primary students. A general English language test was implemented to examine the students' performance. The findings revealed that whole brain teaching enhanced language acquisition and motivated students to learn.

In action research employed by Falls (2016) conducted among 12 grade students in the English classroom. The WBT technique was applied to strengthen the level of

motivation, keep the learners occupied in attaining new knowledge, and make the classroom more cooperative. This study used a phased approach for data analysis to compare the scores obtained from pre- and post-surveys as well as pre and post-interviews. The data indicated that learners who had been trained using WBT techniques were more motivated to learn.

The problem for creating a learning environment in the class is not that the students lack motivation, it is simply that the teachers lack effective teaching strategies. Anthony and Zenaida (2016) conducted a study on WBT approach for enhancement of motivation and academic performance among tenth grade students. The study investigated the effects of the teaching approach on students' motivation and performance in class. The study concluded that the use of WBT approach enhance students' motivation and academic performance from both the group.

Torio and Cabrillas (2016) in their quasi-experimental study established the effectiveness of WBT techniques on motivation and academic performance of students. It was revealed that students had an average learning gain of 20 per cent to motivation and academic performance. The WBT method was found to have positive effects as a teaching strategy.

Supportively, Bawaneh, Zain; Saleh and Abdullah (2012) in their study emphasized the need to create an attractive teaching method within the classroom to make the students feel motivated to learn and grow. With the help of the whole brain teaching, an attempt has been made to enhance the students' motivation. The result obtained reveals that the teaching method continually motivates the students to attain new information. Scott (2014) also administered the whole brain teaching to make more engagement inside the classroom. With the help of whole brain teaching, teachers incorporated different types of strategies. If engagement is increased, then student learning will automatically improve.

Cannon (2014) conducted a research study on implementing whole brain teaching among seven standard students on class discussions. By applying one of the techniques i.e., Teach-Okay, it highlighted the increase in the population of students' engagement in the whole class discussions and the responses given. In another study conducted by Palasigue and Torres (2009) an experimental study was carried out to

integrate the whole brain teaching among 26 fifth grade students to create a more engaging classroom setting. The data were gathered and interpreted and after a week of intervention, the study concluded that the behavior of the students improve tremendously.

Furthermore, Muthukrisknan, Phang; Rui and Ling (2019) also researched on whole brain teaching method on learning Math subject and its impact on the behavior of the student among 30 preschool children. For data analysis the scores were obtained from Math tests and observations. Additional problems were taught before the experiment using traditional method of teaching. After the students were taught the five different fun-filled strategies the whole brain teaching method was implemented. This study revealed that the whole brain teaching enhanced the behavior and the student's performance and engagement also improved.

In a quasi-experimental study conducted by Sontillano (2018) administered the effects of whole brain teaching techniques among grade eight students. Pre-test and post-test were administered in the subject - Algebra. Based on the data obtained the results confirmed that student's achievement increased drastically after teaching through whole brain teaching techniques. This finding was on par with Vanhosen (2015) on examining the impact of whole brain teaching among African-American elementary students. The findings of the study indicated that there is a positive outcome in the students' performance when applied brain-based teaching techniques.

Similar findings have also been reported by Wolken (2017) on identifying the impact of whole brain teaching method among middle school students. The researcher concluded that the whole brain teaching not only advanced the performance of students but also helped the teachers to serve better at different levels. In a research study conducted by Silverstein (2013) titled, 'Experiences of teachers using whole brain teaching in their classrooms' also discussed the detailed improvement and the level of consistency attained using whole brain teaching among teachers.

A quantitative study by Clark (2016) researched on the outcome of using whole brain teaching strategies on enhancement of students' self-concept. The purpose of the study was to examine the relationship between students' self-concept and whole brain teaching strategies. The researcher used a self-made questionnaire and teacher

implementation checklist. The study concluded that the scores obtained from self-concept were lower among students from the control group who are exposed to limited whole brain teaching strategies. Kharsati (2017) also researched the impact of whole brain teaching strategies among 30 class seven students in Shillong. The key idea of the experimental study was identify how whole brain teaching strategies can affect students' performance in science subject. The finding shows that the teaching method helps the students improve their test scores.

In brain research conducted by Boer, Steyn and Toit (2001) explores the whole brain approach; the study highlighted the importance of brain based research study and gave evidence on how it influences the education system. In the study, an in depth study on how we accumulate new information based on the understanding of how our brain functions were explained. The student's academic performance will improve when the whole brain approach is utilized in all the quadrants of the brain based teaching method.

Research study on the human brain has specifically contributed to our understanding and functioning of the brain. Insights gained from extensive research study resulted in the introduction of a brain based teaching approach developed based on how the brain learns and functions. Designed for all ages, from kindergarten through colleges, universities that aim to maximize students' academic achievement (Learning Liftoff, 2018), whole brain teaching is a teaching method that focus on activating every part of the brain (Telang, 2020). However, there is still work to be done on this area of study. The researcher was unable to identify a research study relating to implementing the whole brain teaching method in enhancing all language skills (listening, speaking, reading, and writing) among seven grade students. From the above reviews, it exhibits the positive results from the research study and the researchers are very satisfied with the teaching method. Therefore, the researcher wanted to contribute in the area of research and explore the impact of the new innovative teaching method.

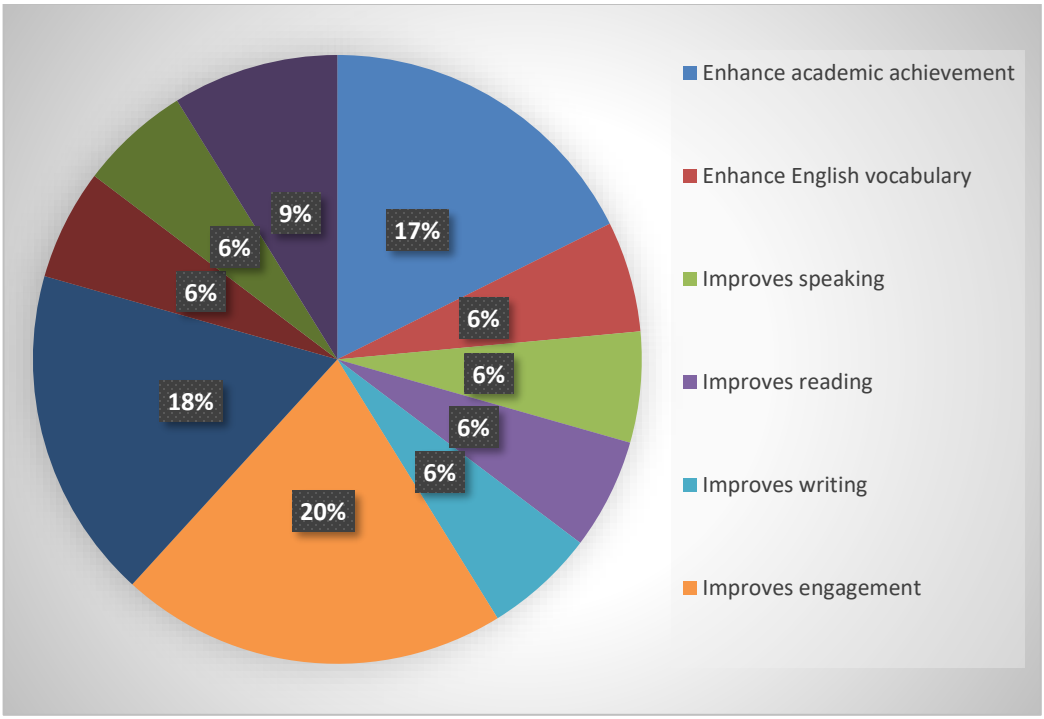

Figure 2.2.0 Reports on Whole Brain Teaching

2.3.0 Studies Related to the Enhancement of English Language Skills

In the contemporary world of first and second language, one biggest challenge for teachers is to help students attain proficiency in English language skills (Hinkel, 2003). In the past several decades, much evidence has emerged that, for learners to improve the language skills, the process of teaching must be student-centered, cooperative, and engaging. We need to find a significant positive model to attain proficiency in English skills (Bleakle, 2003). Enhancement of English language skills received less attention when compared to other areas. As the process of learning involves both teachers and students; interest in the attainment of English language proficiency must be fostered among the students as well as teachers (Sadiku, 2015).

English language is known to be an international common language; proficiency with English is often associated with higher academic performance. It has become de facto international language; as a result, many schools and colleges have begun to focus on enhancing the language skills also known as the 'macro-skills' (Nunan, 2003). These

language skills may include vocal, written forms, and body language (George, 2020). The globalization of the English language and its increasing demand in the education sector led to the establishment of different teaching methods to enhance language skills. An integrated skill-based approach is vital to build up our language skills (Aydogan & Akbarov, 2014).

With the advancement of science and technology, we have witnessed the emergence of innovative teaching methodology; whole brain teaching can be considered as the most fast-growing teaching method practiced nationwide. Language researchers have increasingly focused on the concept of communicative skills i.e., the ability to use language correctly to enhance academic achievement. This often involves the use of language skills in combination (Powers, 2010).To attain proficiency in each of the four language skills allows the students to create and exchange innovative ideas (English Mate, 2017).

A study undertaken by Marlina (2018) dealt with the importance of teaching English language skills. He emphasized on the importance of English Language Teaching (ELT) texts and encouraged the learners to read and write critically. In a study conducted by Subramanian (2009) the level of proficiency in English language skills among graduate students were explored. The findings revealed the various errors identified based on the data obtained. Language games and audiovisual aids are recommended to minimize phonological, grammatical and orthographical errors.

In a study conducted by Joshi (1984) on recognizing various features that influence the learning of language skills. The study was taken among scheduled caste that reveals that students from non-scheduled perform better when compared to test scores of students from schedule caste. The language skills were significantly influenced by caste, intelligence, and socioeconomic status.

Elena, Carolina and Lorena (2011) conducted a research study on the integration of the English language skills and examine its influence on the academic performance of students. The researchers investigated among high school students, it determines if the integrated language skills approach has an impact on the performance of the students. The findings confirmed that an integrated skill approach of teaching influence the performance of students.

Dave and Anand (1971) researched on identifying the connection between language learning and academic performance of students. The study aims to identify the helpfulness of attaining proficiency in language skills. The study reveals that students who practice mother tongue as the medium of instruction achieved higher mean scores. This study is on par with Nair (2012) in his study conducted in Trivandrum district that focuses on the enhancement of language skills and the relationship to their performance. The result of the study reveals that there is a relationship between the language skills and the academic performance of students.

An experimental study researched by Alderson et al. (1997) college students attending English improvement class. The study aims to identify the helpfulness of the language skills intervention conducted. The intervention proves to be a success with concern to the learning response. This study is conforming to the findings of Sindkhedkar (2012) where the main objective of the study is to minimize the production of bookworms or linguistic robots.

In a longitudinal study conducted by Loganand Walter (1963), language competencies of 338 children from different elementary schools were investigated. The study employed a scientific approach – the structural and semantic aspects of language learning and shaped language analysis method. Nisha (1995) also studied language competency of college students and explored the area of hindrance and incompatibility between the process of language teaching and curriculum.

Supportively, Farooque (2005) also examined the performance of students from Kannur district. In this study 108 teachers participated along with 833 primary school students from different schools. The researcher measured the performance of both students and teachers in different subjects –Environmental Science, English, and Math. The results of the study identified that students were taught under the guidance of untrained and incompetent teachers.

In a study conducted by Krashen (2004) the researcher explicated the methods of incorporating free voluntary skills in language skills with emphasis on reading skill. He concluded that model reading was a vital element to enhance the vocabulary development and reading skill among students. Furthermore, Ziegler et al. (2005) attempted to identify the development reading skills. The study relied on the

phonological understanding as all the language skills differed in the consistency represented in orthography. The study established a theoretical framework to clarify the cross-language data obtained from reading skills.

Al-Eideh et al. (2016) researched on enhancement of language skills among junior and senior students. The study focused to enhance the language skills and used a semi-structured question as a tool. The results discussed a range of problems related to language skills and highlighted solutions to overcome varied weaknesses. The researchers emphasized the need to develop proficiency in language skills and contributed to enhancing teaching and learning language. Maliya (2021) had also undertaken a study that focused on the enhancement of language skills, the researcher aimed to provide a new communicative approach for agriculture graduates through role play.

Language can be regarded as the divine blessing from God (Husain, 2015). The process of language teaching and learning is a field of study which consists of essential communication apparatus. It has witnessed numerous shifts in the area of linguistic theory and instructional teaching model over the past few years; there has been a far-reaching movement in the enhancement of language skills with emphasis on transforming teacher-centered to student-centered approach.

A review of available researchers on the enhancement of English language skills confirmed that not much study has been done. It is evident from the perusal of the reviewed research studies on English language skills. There is a dearth of literature on both English language and language skills. Hence, the researcher was motivated to carry out a study to enhance the language skills of seventh grade students, promote a new innovative teaching model (whole brain teaching) that can help the teachers and students in the classroom setting.

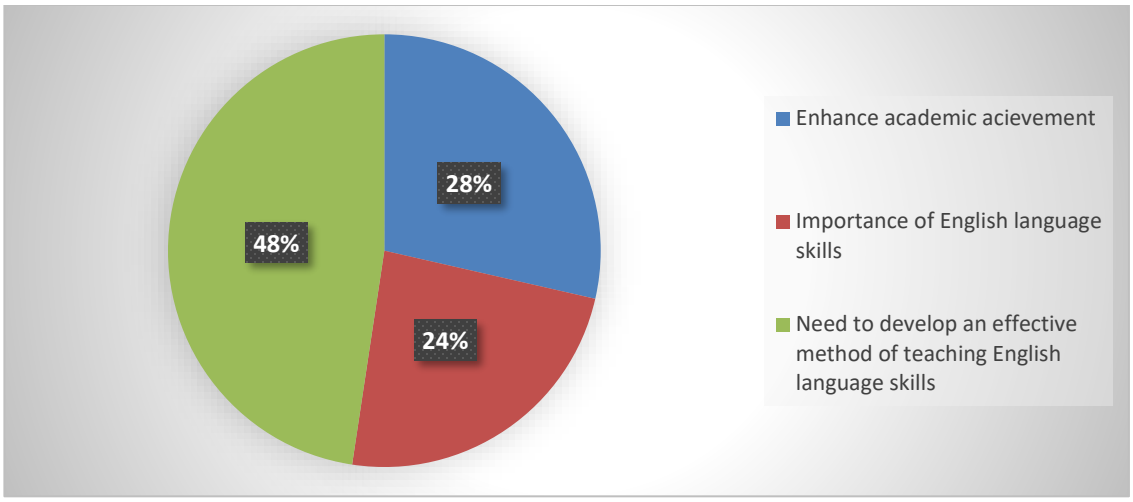

Figure 2.3.0 Reports on Enhancement of English Language Skills

2.4.0 Studies Related to English Language Competency Module

Language competency module is a multifaceted umbrella. The concept of a dedicated language competency module began with the father of modern linguistic Noam Chomsky in his theory of Universal Grammar (Barsky, 2018). It is a linguistic theory that determines that the ability to become skilled at grammar is built into the brain from birth regardless of language. According to Chomsky's theory, the structures of language skills are already encoded in the human brain. The principle of a language module is not a vague proposal but a specific hypothesis about human language (Cook & Newson, 2007).

Ramat et al. (2016) developed an English Instructional Module by B-SLIM Model. The study investigated the level of satisfaction among students from Suratpittaya School. The study concluded that the English instructional module played a significant role in the academic achievement of students, after implementing the B-SLIM model students developed a high level of satisfaction in the class teaching and learning.

Supportively, Ngowananchai (2013) carried out a study using B-SLIM Model. This qualitative study aimed to enhance the learning activities in the classroom with an emphasis on language skills. Based on the findings, the study confirmed that B-SLIM model enhanced the language skills of students. Sonalde (2002) in his study also

developed an English Language Competency Module (ELCM) that aimed to improve students' language skills. From the scores obtained from the language test, the study confirmed that ELCM improved students' language skills to a great extent.

A case study conducted by Lai-kun (2020) attempted to generate a wide communicative language environment in schools. The study explored the theoretical and practical subject of the English language. The study concluded that a project-based module was of a practical value for the development of reliable teaching method in all levels of teaching. A study by Wikjayanti (2012) was conducted among 401 hotel drivers. The main focus was to develop and validate an English language learning module to enhance the speaking ability of hotel drivers. Qualitative data analysis showed that the module employed played a significant role in enhancement of language skills.

Furthermore, an application-independent language module was developed by Marcelo, Bernardes and Giorgette (2000) for language-independence. The language module was implemented in an object-oriented programming form that aimed to enhance the language skills. The variables were defined at the concept level; the study included an application program interface for attaining a communicable edition.

Azwin and Zaman (2014) conducted a study among 63 undergraduate engineering students. This study concluded that Student Centered Learning (SCL) permitted learners to be actively engaged in learning the respective languages. Another study on engineering students was conducted by Ali, Kassim and Osman (2008) that aimed to develop modules to develop speaking skills among 44 students who were engaged in different types of communication events.

The research reviews highlighted the need to develop an English language module to improve the language skills of students. It also revealed the effectiveness of the language module for enhancing different language skills. Language module not only benefits the students but also teachers in understanding the students' academic performance. These studies provided the researcher evidence on the value of English language modules.

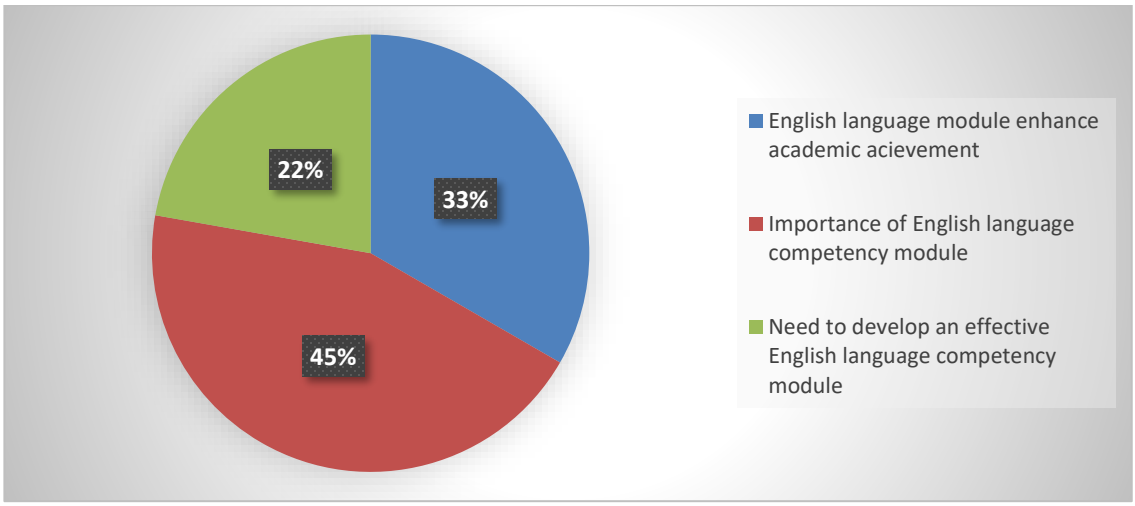

Figure 2.4.0 Reports on English Language Competency Module

2.5.0 Gap Analysis

The review of related literature provides the researcher an overview of researches conducted on brain-based approach to teaching, whole brain teaching, enhancement of English language skills, and English language competency module. It provides an innovative channel concerning problem of the study. The researcher collected the databases from doctoral thesis, meta-analysis research reports and online journals, books.

The above reviews confirm that the whole brain teaching technique is an imperative teaching tool for enhancement of students' language skills. The researcher felt the need to apply whole brain teaching among seventh grade students as not much research has been carried out that give emphasis to improve language skills. To avoid any replication, the researcher deliberated all the available studies conducted.

From the review, the positive significant influence that the brain-based teaching has on students' academic performance has made the researcher becoming interested to conduct an experimental study to confirm the benefits. The review also shows that no study has been conducted in Mizoram among seventh grade students concerning the whole brain teaching method.

The investigator does not declare that the reviews deliberated are complete. However, it is evident that research in the area of whole brain teaching is still at an embryonic stage. This area of research is still very much unexplored and virgin. Therefore, *'Effectiveness of whole brain teaching for enhancement of English language skills: An experimental study'* is a modest endeavor to reveal the significance of enhancing English language skills through proficient teaching and learning method.

CHAPTER - III

METHODOLOGY OF THE STUDY

The present chapter describes the method adopted and the procedure followed in conducting the present study. They are discussed and presented under the following heads:

3.1.0 Method of the Study

3.2.0 Design of the Study

3.3.0 Population and Sample of the Study

3.4.0 Tools Used in the Study

3.5.0 Collection of Data

3.6.0 Organization of Data

3.7.0 Statistical Analysis of Data

3.1.0 Method of the Study

To achieve the objectives, the present study adopted pre-test – post-test, experimental - control group design in an experimental setting. The research method is symbolically illustrated below:

Figure 3.1.0 Research Method (Jaiyeola & Salami, 2006)

O^o	X^1	O^1 (EO)
O^2	X^2	O^3 (CO)

Where,

X^1 = Intervention (Whole Brain Teaching Method)

X^2 = Intervention (Traditional Teaching Method)

O^o O^2 = Pre - test

O^1 O^3 = post-test

EO = Experimental Group

CO = Control Group

3.2.0 Design of the Study

The main focus of the present study is to identify the effectiveness of Whole Brain Teaching for enhancement of English language skills. The investigator underwent training under certified whole brain teaching course before the intervention. The experiment was then conducted among the two sections of seventh grade students of Model school in Aizawl, Mizoram.

To achieve the objectives of the study the investigator developed and validated the English Language Competency Modules (ELCM) and two sets of lesson plans - i) Whole brain teaching lesson plan ii) Traditional Herbartian teaching lesson plan and also constructed and validated an English language competency test.

To find out the equivalency between students from experimental and control group and also to control the intervening variables, pre-test was administered before the experiment. English Language Competency Modules (ELCM) were simultaneously employed to experimental group using the whole brain teaching lesson plansand to control group using the traditional Herbartian lesson plans for duration of six months. After completion of the experiment, a post-test using an English language competency test was conducted.

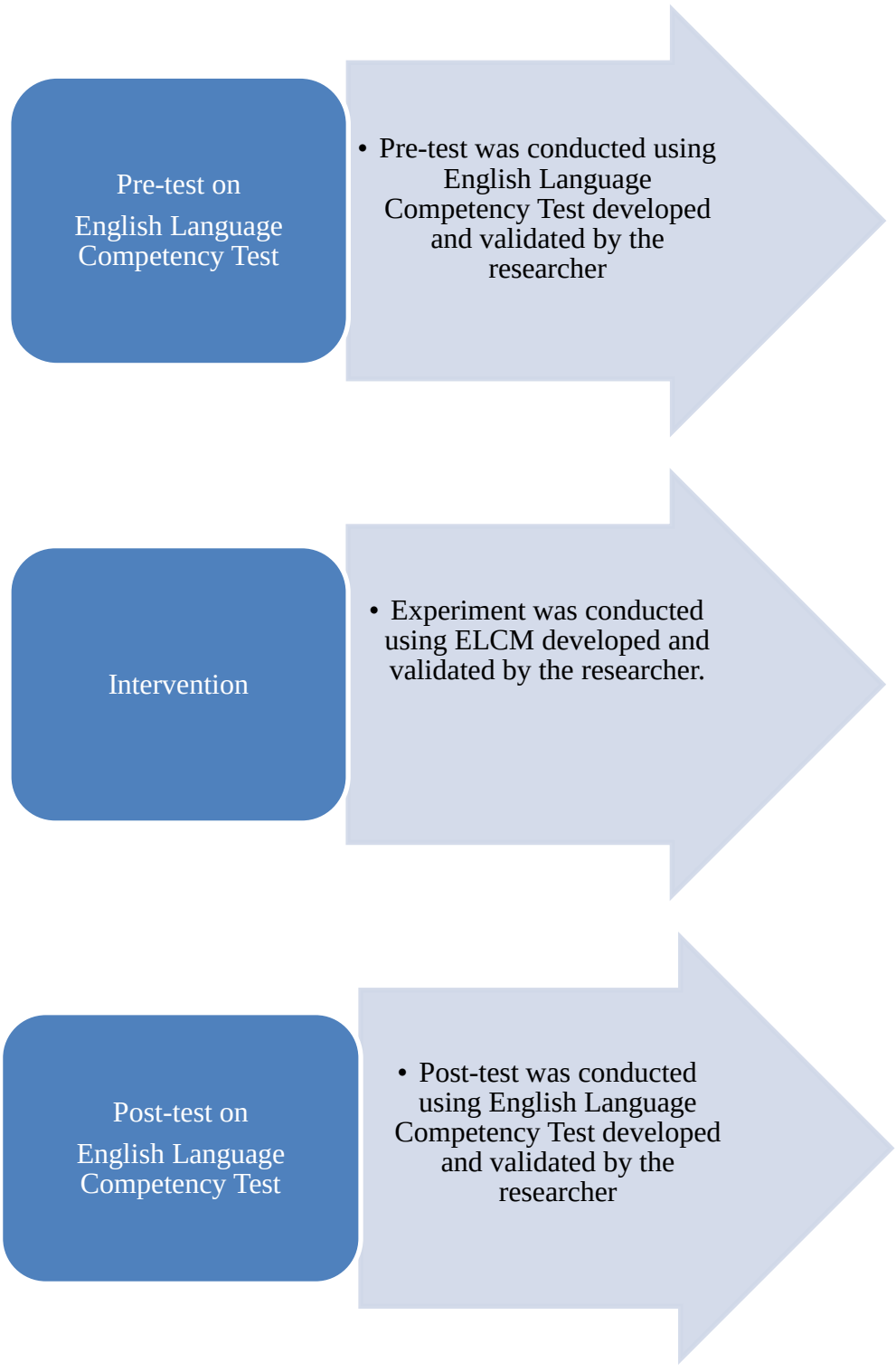

Figure 3.2.0 Design of the Study

3.3.0 Population and Sample of the Study

Population of the present study comprises all the class VII or seventh grade students in Mizoram who study English textbooks prescribed for seventh grade students by SCERT, Mizoram, Aizawl.

Sample selection was done by employing stratified random sampling technique. First of all, the state of Mizoram was stratified into districts. Out of the 11 districts, one district namely Aizawl district was selected randomly. Aizawl district was again stratified into blocks and out of the four blocks existing in the district, Tlangnuam block was randomly selected. Tlangnuam block was further stratified into circles and out of the 11 circles under Tlangnuam block, Venghlui circle was picked out randomly. Out of the middle schools and schools having middle section under Venghlui circle, Model school, Aizawl was lastly selected randomly. Class VII or seventh grade students of this school finally became sample for the present study. The sample composition is given in Table 3.1.0

Table 3.1.0

Sample Composition of the Study

GROUP	Experimental Group	Control Group	Total
N	41	42	83

Figure 3.3.0 Graphical Presentation of the Sample under Reference

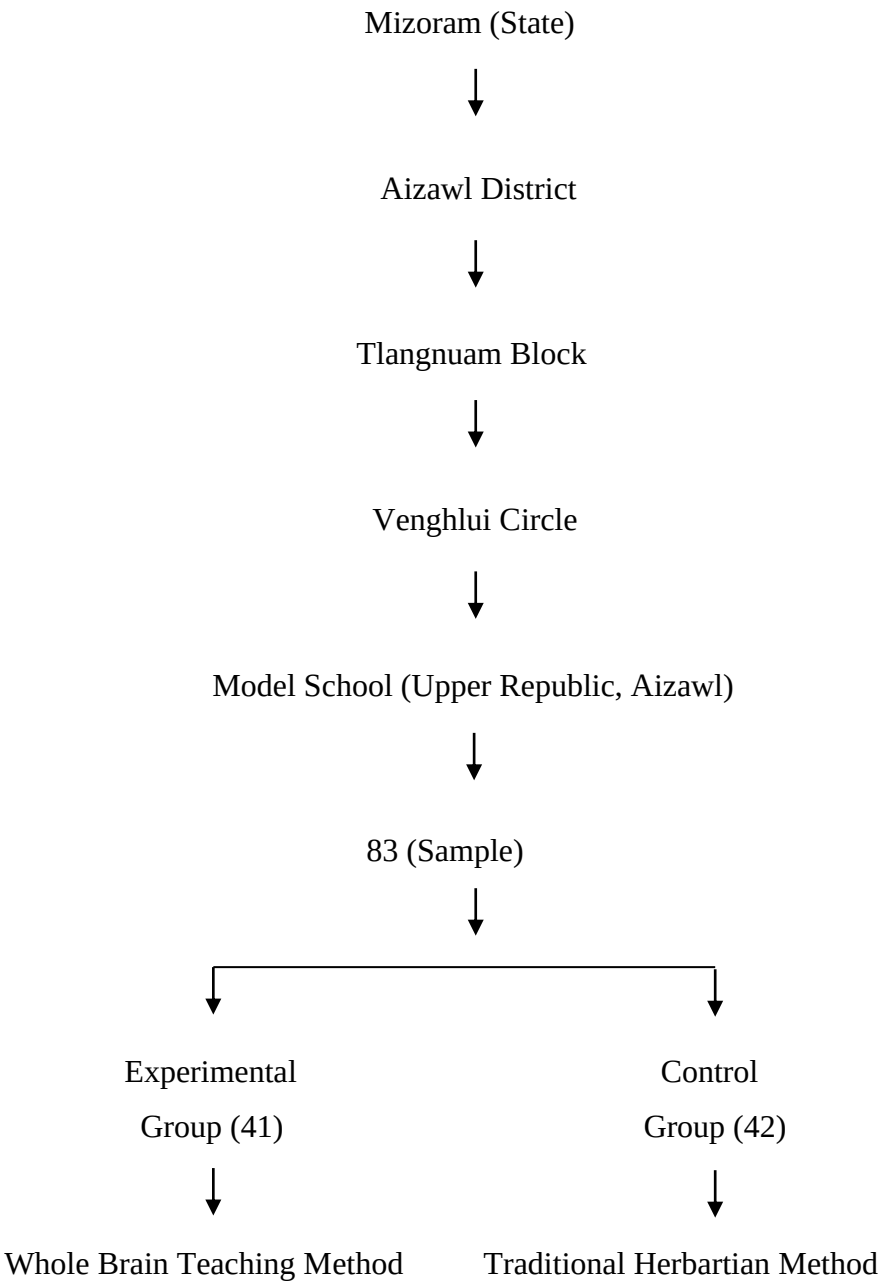

Figure 3.3.0 shows that the sample of 83 students from Model School was bifurcated into two groups. Based on the treatment given to the students, 41 formed an experimental group which was taught through whole brain teaching method and the rest 42 students formed control group, taught through traditional teaching method.

3.4.0 Tools Used in the Study

3.4.1 English Language Competency Modules (ELCM)

English Language Competency Modules (ELCM) were constructed to foster the English language skills of students. The modules were developed and validated based on the contents from seventh grade English textbooks prescribed by SCERT, Mizoram. Ten modules were validated in the light of discussions with experts and English language teachers. The modules consist of four units from prose, three units from the poem, and three units from the grammar section.

To construct comprehensive modules, the investigator did an extensive review of literature in language skills related to language development. The objectives and implications of the language modules were thoroughly studied and various existing programs on language development were weighed and looked into. Bloom's Taxonomy of educational objectives was incorporated.

The teaching aids used for executing class activities for ELCM were mostly easily available materials ranging from charts, flashcards, picture books, educational videos, and activities. The final selection was done based on module validation by experts. The details of validation and editing of the English Language Competency Modules (ELCM) are given in the concerned chapter.

3.4.2 Traditional Herbartian Lesson Plan

The investigator prepared a traditional Herbartian lesson plan. The lesson plan was developed based on English Language Competency Modules (ELCM). It also involved the Herbartian five steps approach that includes the following:

1. Introduction - It is concerned with the task of preparing the learners for attaining new knowledge.

2. Presentation - The lesson is developed and presented with the cooperation of the students.

3. Association- The teacher establishes a relationship between different subjects.

4. Generalization- The students are allowed to think and generate ideas.

5. Application - The teacher verifies the students by recapitulation (Mahaeshwari, 2011).

Ten traditional Herbartian lesson plans were developed that covered four units from prose, three units from the poem, and three units from the grammar section. For the validation of the lesson plans, the investigator had chosen experts from different areas of study. It was given to fifteen experts from different fields. After the initial validation, ten lesson plans were included for the intervention.

3.4.3 Whole Brain Teaching Lesson Plan

The whole brain teaching lesson plan was developed and validated based on the format given by Chris Biffle following textbooks prescribed for class VII by SCERT, Mizoram. The five steps of lesson planning are as follow:

Step 1 – Ask the lesson question.

Step 2 – Answer with a memory gesture.

Step 3 – Critical thinking.

Step 4 – Assess.

Step 5 – Writing

Before developing the lesson plan and starting the experiment, the investigator had undergone a certified online course of 3 months duration under Whole Brain Teachers of America. Ten whole brain teaching lesson plans were thus developed which comprised of four units from prose, three units from the poem, and three units from the grammar section. Lesson plan validation was done by taking feedback of fifteen experts from different fields of study.

3.4.4 Tool to Assess English Language Skills - English Language Competency Test

English language competency test was developed by the investigator. The test carrying 50 marks was constructed based on the language achievement test pattern given by school teachers. The criteria used to test the language skills of the students include – 1) Listening - hearing, sensing, interpreting and remembering; 2) Speaking - pronunciation, grammar, vocabulary, fluency, and comprehension; 3) Reading - pace, phonic, fluency, comprehension and expression; and 4) Writing - spelling, punctuation, vocabulary, knowledge, and creativity.

English language competency test constructed was carefully examined to make sure that the test efficiently covered the contents. The investigator had satisfied the reliability and content validity of the test. Hence, a blueprint of the test items was prepared and developed by the researcher.

3.5.0 Collection of Data

The required data were collected through administration of pre-test or initial test and post-test among class VII students of Model School, Aizawl.

3.5.1 Administration of Pre-test

The pre-test was administered to assess the performance of students in English language skills. The investigator visited the school before the test was conducted and personally conducted an interactive session that focused on developing a good rapport with the students. The pre-test was conducted among 83 students out of which41 students were placed in the experimental group and 42 in the control group.

3.5.2 Administration of Intervention

The intervention was administered among seventh grade students from Model School, Aizawl. Before the intervention, proper guidance was given to the teachers regarding the aim and purpose of the study. The existing school timetable was considered before scheduling the intervention, the time frame was arranged meaningfully for successful complete execution. The length of each session was one

hour. The investigator arranged and supervised these English classes every week. The intervention was administered from the month of June, 2021 till November, 2021.

3.5.3 Administration of Post-test

After the intervention, the researcher conducted a post-test. To determine the effectiveness of whole brain teaching, the test was conducted among seventh grade students from control and experimental groups. Students were approached again after the completion of the evaluation and were eager to see their test results and feedback.

3.6.0 Organization of Data

All the required data collected were organized sequentially for statistical analysis. The data collected from experts through a rating scale developed by the investigator that focuses to find the content validity of the English Language Competency Modules (ELCM) and lesson plans were analyzed and presented. The pre-test and post-test scores were then presented.

3.7.0 Statistical Analysis of the Data

Keeping in view the objectives of the present study, descriptive and inferential statistical techniques were employed for quantitative analysis. The technique and the rationale for using them are given below:

Descriptive Statistics

1. Mean

   The mean was determined as a measure of central tendency which tellsus of the overall performance of the students in pre and posttests.

2. Standard Deviation

   Standard deviation – one of the measures of central tendency was also calculated. It shows us how much the scores of the students are scattered.

3. Percentage

   The percentage was employed to express a number as a part of a whole. It shows the tendency of value concerning the original value.

Inferential Statistics

1. ‘t’-test Analysis

   ‘t’-test as an inferential statistic was calculated and analyzed. It shows whether there was any significant difference between the mean scores of pre-test and post-test or not and also if there was any significant difference across gender.

CHAPTER - IV

DEVELOPMENT AND VALIDATION OF ENGLISH LANGUAGE COMPETENCY MODULES (ELCM), LESSON PLANS AND ENGLISH LANGUAGE COMPETENCY TEST

In the preceding chapter, the methodology of the study was discussed. This chapter has been planned to follow the prerequisites in the previous chapter; it deals with the process of development and validation of learning materials for the intervention. The sequence of the presentation will be rationale for the development of English Language Competency Modules (ELCM) and lesson plans and steps taken for that, principles for selection of material followed by editing and reviewing, establishment of the content validity and reliability, and analysis of responses to the rating scale.

4.1.0 Rationale for Development of English Language Competency Modules (ELCM) and Lesson Plans

One of the innovations in the field of the educational system is the development of language learning modules. English language is a universal language that is connected with all other subjects and various aspects of human life. It has to do with the all-round development of students to enable them to become useful citizens in the society. Sonalde (2002) in his study developed English language competency modules to improve students' language skills. The study concluded that students needed innovative language teaching materials which will enhance the academic performance and professional pursuits.

The importance of introducing inclusive language modules and lesson plans cannot be underestimated in the development of language skills among students at all levels. Since teaching modules and lesson plans are the teaching materials to assist teachers and educators in transmitting a comprehensive knowledge and attitude towards

the students (Nwachukwu, 2006), they are essential tools to promote teachers' efficiency and improve students' academic performance.

Lee (1995) asserts that language proficiency modules are central in the teaching and learning of English language skills because they are used to complement the efficiency of a teacher and effectiveness in lesson delivery. In the same vein, Lalongo (2009) affirmed that language module facilitated learning of new abstract concepts by helping to concretize ideas and integrate learners' interests. Moreover, it helped to enhance active participation in the learning process and to reduce the teacher-centeredness in teaching. The effectiveness of using language modules and lesson plans in promoting students' performance is unquestionable.

The present performance of students in English language skills among school students is not encouraging. Several research studies identify the poor academic performance in the English language because of non-utilization of suitable English language modules. Many teachers teach subjects like liberal arts without providing any materials to assist the learners. Literature in pedagogy has illustrated the effectiveness of using teaching modules and instructional materials as a pivotal instrument for improving students' performance in the process of learning (Ikot, 2008).

In the development of the English Language Competency Modules (ELCM) and lesson plans, extensive materials were previewed and prepared based on the standard of the students. This prepared the students by making sure that the materials to be used will motivate and attract attention and provide the rationale that could be utilized for seventh grade students.

4.2.0 Steps in the Development of English Language Competency Modules (ELCM) and Lesson Plans

After having gone through various available resources, ten modules and twenty lesson plans were developed. The followings steps were taken in the development of the English Language Competency Modules (ELCM) and lesson plan:

1. The investigator originated the problem of the present study after an intricate and extensive study of related literature in the field.
2. She also studied the relevant literature of neuroscience, educational neuroscience, neurobiology, innovations in the brain-based study, materials, journals, etc.
3. The implications of enhancing English language skills through brain-based learning were studied.
4. Discussion sessions were scheduled with experts in teaching English language.
5. Existing teaching and learning materials were collected from different available sources.
6. Available teaching modules and lesson plans (Traditional Herbartian and Whole Brain Teaching) were analyzed and investigated.
7. Co-curricular activities for seventh grade students were studied and the implications were carefully examined.
8. Brain based class activities for language development was added to the teaching material.
9. The factor of the expenditure was diligently measured while preparing class activity.
10. The cultural norms have also been considered during the planning, preparation, and development of the modules and lesson plans.
11. The academic performances of seventh grade students have also been carefully considered.
12. The investigator then selected a set of objectives based on the seventh grade English textbooks as per textbooks prescribed by SCERT, Mizoram.

13. Based on the objectives of the present study, a selection of comprehensive teaching and learning points for teaching and assessment was made.
14. Language modules and lesson plans were then developed and validated based on the selected strategies.
15. The investigator then prepared sample materials for Language Competency Modules (ELCM) and lesson plans.
16. Try-out of the selected sample materials was conducted among seventh grade students.
17. The results of the try-out were evaluated and analyzed by the investigator.
18. The feedback from the experts was considered for the final draft. Hence, the content validity was generated.
19. English teachers were oriented with the rationale and objectives of the modules and lesson plans.
20. The final draft of the modules and lesson plans were then administered for six months.

4.3.0 Selection of Material

The selection of the material for the English Language Competency Modules (ELCM) and lesson plans was based on the laws of learning that are put forward by E.L. Thorndike namely:

1. **Law of Readiness**

   This law of learning is the first law that is indicative of a student's degree of concentration and attention span. As learning stems from readiness, effective teaching and learning take place when students are ready to learn. According to Thorndike, readiness is the key preparation for action. Therefore, when the selection of the material was made, the investigator kept the readiness of the students in mind keeping in view all the circumstances and learning environment. To reinforce the minds of the students to be ready to attain new knowledge and skills, simple brain-based co-curricular activities was conducted before each session.

2. **Law of Exercise**

   This law of learning is divided into two parts: a) law of use b) law of disuse. With practice, the association is strengthened, the new knowledge attained become definite. Extensive opportunities should be given to students to master the given material. In the present study, the investigator emphasized maximizing students' involvement in class which in turn activated the whole brain. It maintained the association for a longer period.

3. **Law of Effect**

   This law highlighted the importance of consequences or outcomes in strengthening or weakening associations. It is a law of reward and punishment which are accompanied by a feeling of pleasure or displeasure. The student will continue doing what provides a feeling of pleasure than those that are unpleasant. In the context of the present study, an enjoyable learning environment was created. The investigator seeks to provide positive praise and encouragement to provide a meaningful and satisfying learning experience.

4.4.0 Development of Modules

Keeping in view the need, importance, and advantages of the English language competency module, the investigator developed ten modules to enhance the language skills of students.

4.4.1 Writing of Modules

Each module was prepared based on the contents given from seventh grade English textbooks prescribed by SCERT, Mizoram. The modules correspond to different components of language skills- listening, speaking, reading, and writing. The investigator selected four units from prose, three from the poem, and three units from the grammar section that were incorporated in the modules. Further, each unit is segregated into different sections under the assistance of seventh grade English teachers.

The selected units were enclosed with images, graphics, and illustrations, figures. Each teaching and learning points are administered with brain-based class activities followed by a set of language test conducted after each class which comprises of calculating and computing puzzles, drawing and naming, poem reading and writing, word completion, and application match the following, etc.

For evaluating the students' language skills there were a set of evaluative questions developed for each module. The questions were designed to examine the students' gradual progress during the intervention period. The modules prepared were brain based and activity based that emphasize on formulating innovative teaching aids in the teaching and learning process.

4.4.2 Editing and Reviewing of the Modules

After the initial draft was prepared by the investigator, editing and revision were made by seeking the experts' opinion. This step is an essential procedure as it helps in eliminating unnecessary learning and teaching material. The investigator makes sure that the experts chosen to validate the modules are from different areas of expertise. The modules were presented to the following experts:

1. Editing by the Subject Matter Experts

This was done to remove inadequacy of contents to enhance the technical accuracy of the subject matter. After the preliminary draft of ten modules was completed, these were presented to senior government English teachers who suggested that some of the subject matter may not be clearly understood by students from seventh grade students. They also rejected some of the activities which were not appropriate at a particular place and suggested some simple and self-explanatory activities which can be easily recognized by the students. The suggestions given by the subject matter experts were duly incorporated in the final draft.

2. Editing by a Language Expert

The second expert in the hierarchy of editing was a language expert. The investigator approached the expert with the preliminary draft who pointed and corrected the mistakes committed in the structure of the language. The expert also simplified the difficult words into easy words which would make them easy for students to comprehend. All the relevant improvements were introduced in the modules based on the recommendations put forward by the language expert.

3. Editing by the Whole Brain Teaching Expert

The third and the final editing was done by a whole-brain teaching expert. The preliminary draft of ten modules was presented and the suggestions were made by the expert to define the instructional objectives and to specify the brain-based activities. Editing and revision by the whole brain teaching expert were considered to be very important and helpful in the process of developing an English Language Competency Modules (ELCM).

4.4.3 Try-out of the Modules

The effectiveness of any language module is analyzed by administering the module and collecting the necessary data for evaluating the academic performance of the students. After editing and reviewing the ten modules in the light of advice and suggestions given by experts from different fields, the next phase, named try-out, was carried out. This phase played a very crucial role to ensure that English Language Competency Modules (ELCM) served the objectives that they were proposed to serve.

For try-out, the modules were conducted among 44 seventh grade students from Model School, Aizawl bifurcated into two groups, where experimental group which was taught through whole brain teaching and the rest 22 students formed control group, taught through traditional method. Almost all the students from both the groups remained active and were attentive in the class.

The students were motivated to learn, and their respective progress reports were given daily. The materials of the modules included all the modifications made by experts from different fields. Feedbacks and suggestions given by the class teachers were also considered for the final draft.

4.4.4 Establishment of the Validity of the Modules

The validity of modules depends upon the fidelity with which it measures what it proposes to measure. A measuring tool is considered to be valid when the performances which it measures correspond to the same performances as otherwise objectively defined. The validity of modules can be studied and analyzed by various methods.

In the present study, to find out the content validity, experts' opinions were taken. The rating scale constructed was given to 10 experts from different fields. The scale consisted of 5 items, a 4-point rating scale where the experts were given 4 options. The options given were -to a great extent, to quite an extent, to some extent, and not at all.

4.4.5 Analysis of Responses to the Rating Scale

1. Do you think the items listed in the modules under reference would be able to measure the English language skills of the students?

   Concerning whether the items in the modules would be able to measure the English language skills, 87 percent of experts were of the opinion that the items in the modules would be able to measure English language skills of the students to a great extent. It was then identified that the given items would be able to measure the English language skills of the students.

2. To what extent do the items cover English language skills at knowledge, comprehension, and application-level?

   On whether the items in the modules covered English language skills at knowledge, comprehension, and application level or not, 81 percent of experts

were of the opinion that the items in the modules would cover English language skills at knowledge, comprehension, and application-level very well. It can therefore, be concluded that the items would cover English language skills at knowledge, comprehension, and application level.

3. Are the items suitable for seventh grade students in terms of the content presented?

    Concerning the suitability of items in terms of the content presented, 51 percent and 33 percent of experts opined that the modules were suitable for seventh grade students to great and quite extents. It can now be concluded that the items were suitable for seventh grade students in terms of the content presented.

4. Are the items suitable for seventh grade students in terms of item difficulty?

    Regarding the suitability of items in terms of item difficulty, 53 percent and 37 percent of experts were of the opinion that the items in the modules were suitable to great and quite extent respectively in terms of difficulty. This shows that the items are suitable for seventh grade students in terms of item difficulty.

5. Are the items suitable for seventh grade students in terms of clarity of language?

    Concerning the items suitability with regard to clarity of language, 87 percent of experts were of the opinion that the items in the modules were suitable in terms of clarity of language. It can thus, be conclude that the items are suitable for seventh grade students in terms of clarity of language.

4.5.0 Development of Lesson Plans

Keeping in view the need, importance, and advantages of the lesson plans, the investigator developed 20 lesson plans consisting of 10 whole brain teaching lesson plans and 10 Herbartian lesson plans.

4.5.1 Writing of Lesson Plans

The researcher prepared traditional Herbartian lesson plans and whole brain teaching lesson plansbased on the English Language Competency Modules (ELCM) also prepared by the researcher. Following the syllabus prescribed by SCERT, Mizoram, 20 lesson plans were developed that covered four units from prose, three units from the poem, and three units from the grammar section.

The traditional Herbartian lesson plans followed the Herbartian five steps approach that includes - 1) Introduction 2) Presentation 3) Association 4) Generalization 5) Application (Mahaeshwari, 2011). For the instructional objectives the researcher had chosen knowledge, comprehension, and application.

The whole brain teaching lesson plans were developed following the standardized format of lesson planning put forward by Chris Biffle. The five steps are as follow –

Step 1 - Ask the lesson question

Step 2 - Answer with a memory gesture

Step 3 - Critical thinking

Step 4 – Assess

Step 5 - Writing (Whole Brain Teaching).

4.5.2 Editing and Reviewing of the Lesson Plans

Editing and reviewing were done by seeking expert's opinions from different fields. The experts that were chosen to validate the lesson plan were from different areas

of expertise carefully selected by the investigator. This step is an essential procedure as it helps in eliminating unnecessary learning and teaching material. The lesson plans were presented to the following experts:

1. Editing done by the Subject Matter Experts

The editing focused on eliminating the insufficiency of contents to enhance the technical accuracy of the subject matter. After the preliminary draft of 20 lesson plans was completed, it was given to senior government English teachers who recommended simplifying the subject matter as it might not be understood by seventh grade students. The suggestions given by the subject matter experts were duly incorporated in the final draft.

2. Editing done by a Language Expert

After the preliminary draft, the second expert in the hierarchy of editing the lesson plan was a language expert. The language expert recommended a change in the structure of the language and the elimination of difficult words. All the significant improvements were introduced in the lesson plans based on the recommendation put forward by the language expert.

3. Editing done by the Whole Brain Teaching Expert

The third and the final editing was done by a whole-brain teaching expert. The preliminary draft of 20 modules was presented and the expert-recommended simplification of the brain-based activities and modification of the teaching techniques.

4.5.3 Establishment of the Validity of the Lesson Plans

For the establishment of the validity of the lesson plans, experts' opinions were taken. The Rating Scale constructed by the investigator was given to 10 experts from different fields of education. The scale consists of 5 different items. It is a 4-point rating scale where the experts were given 4 options.

4.5.5 Analysis of Responses to the Rating Scale

1. Do you think the items listed in the lesson plans under reference would be able to measure the English language skills of the students?

   Concerning whether the items in the lesson plans would be able to measure the English language skills, 85 percent of experts were of the opinion that the items in the lesson plan would be able to measure the language skills. It can thus be said that the items would be able to measure the English language skills of the students.

2. To what extent do the items cover English language skills at knowledge, comprehension, and application-level?

   Regarding whether the items in the lesson plans covered English language skills at knowledge, comprehension, and application level, 82 percent of experts were of the opinion that the items in the lesson plans would cover English language skills at knowledge, comprehension, and application-level. This shows that the items would be able to cover English language skills at knowledge, comprehension, and application level.

3. Are the items suitable for seventh grade students in terms of the content presented?

   Concerning the suitability of items, 61percent of experts were of the opinion that the items were very much suitable for seventh grade students and another 39 percent reported that the items were quite suitable. It can therefore, be concluded that the items are suitable for seventh grade students in terms of the content presented.

4. Are the items suitable for seventh grade students in terms of item difficulty?

With regard to items difficulty, cent percent of the experts were of the view that the items in the lesson plans were very much and quite suitable in terms of difficulty. This confirms the suitability of the items in the lesson plans for seventh grade students in terms of item difficulty.

5. Are the items suitable for seventh grade students in terms of clarity of language?

Concerning the suitability of items in terms of clarity of language, 97 percent of the experts opined that the items in the lesson plans were very much and quite suitable in terms of clarity of language. It can thus, be concluded that the items are suitable for seventh grade students in terms of clarity of language.

A copy of the lesson plans analysis is enclosed in Appendix – III.

4.6.0 Establishment of the Validity and Reliability of the English Language Competency Test

For the establishment of the validity of the English language competency test, experts' opinions were taken. The rating scale constructed by the researcher was given to 10 experts from different fields. It is a 4-point rating scale where the experts were given 4 options for answering the questions in the scale. The options given are - to great extent, to quite extent, to some extent and not at all.

4.6.1 Analysis of Responses to the Rating Scale

1. Do you think the items listed in the test under reference would be able to measure the English language skills (listening, speaking, reading, and writing) of the students?

Concerning whether the items would be able to measure the English language skills, 88 percent of experts were of the opinion that the items in the test would be able to measure language skills very well. This impliesthat the items in the test would be valid to measure the English language skills of seventh grade students.

2. To what extent do the items cover English language skills at knowledge, comprehension, and application level?

On whether the items cover English language skills at knowledge, comprehension, and application level, 85 percent of experts were of the opinion that the items in the test would cover so well English language skills at knowledge, comprehension, and application-level. It can be concluded that the items would be able to cover English language skills at knowledge, comprehension, and application level.

3. Are the items suitable for seventh grade students in terms of the content presented?

Concerning the items suitability, 79 percent of experts opined that the items were suitable for seventh grade students. 21 think that the items represent the same to quite an extent. This shows that the items are suitable for seventh grade students in terms of the content presented.

4. Are the items suitable for seventh grade students in terms of item difficulty?

Concerning the item suitability in terms of item difficulty, 67 percent of experts are of the opinion that the items are suitable. It can be concluded that the items are suitable for seventh grade students in terms of item difficulty.

5. Are the items suitable for seventh grade students in terms of clarity of language?

Concerning the item suitability in terms of clarity of language, 89 percent of experts are of the opinion that the items in the lesson plan are suitable in terms of clarity of language. This shows that the items are suitable for seventh grade students in terms of clarity of language.

Reliability

The most important characteristic of a measuring tool is its reliability. Reliability determines how trustworthy data obtained from a measurement tool are. For the establishment of reliabilityfor the English language competency test, split-half method was employed.

Reliability test was conducted and it generated values between 0 and 1.00, with a high degree of internal consistency signifying a higher value (Gravetter & Forzano, 2006). The reliability for split-half method was found to be **0.83**.

A copy of the English language competency test is enclosed in Appendix – V.

CHAPTER – V

ANALYSIS AND INTERPRETATION OF DATA

Collected data arranged in order of objectives and hypotheses of the study are analyzed and interpreted in this chapter. They are presented as follow:

5.1.0 Progress/Improvement in English Language Skills during Experiment/Intervention

For examining the performance of students' English language skills during the experiment, there were evaluative questions for each module carrying 25 marks. The questions were designed to examine student's progress during the intervention period. Data obtained are presented in tables - 5.1.1, 5.1.2 & 5.1.3).

Table 5.1.1: Performance of Control Group in English Language Skills during Experiment

Module no.	Lowest Score	Highest Score	Mean	SD
1	3	9	5.0952	2.0814
2	5	11	8.95238	1.34259
3	6	13	9.5	2.2003
4	11	13	12.07	0.64
5	11	15	13.8333	1.49661
6	12	16	14.9286	1.33239
7	14	19	16.762	1.8321

8	16	20	18.452	1.8106
9	17	22	19.76	0.983
10	17	22	20.095	1.1001

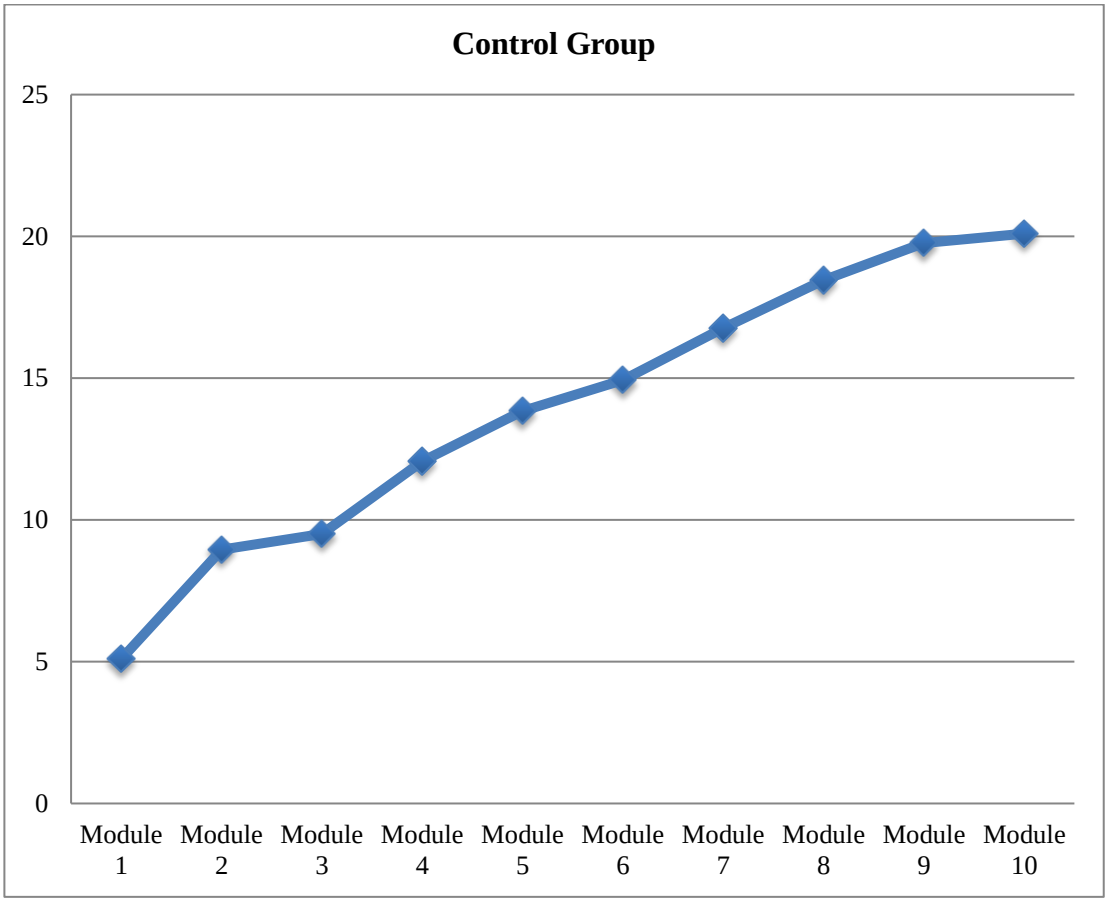

Figure 5.1.1::Line Graph Showing Control Group Mean Scores in Tests on Modules

Table 5.1.1 reveals the ranges of marks and the mean scores of control group students in subsequent English language competency tests conducted during the time the experiment was held as follow:

a) In a test on module 1, the students' marks range from a minimum of 3 to a maximum of 9 and the mean score is 5.0952 with standard deviation of 2.0814.
b) On module 2, the range of students' marks increase to a minimum of 5 to a maximum of 11. The mean score also increases to 8.95238.
c) On module 3, the minimum marks increase from 5 to 6 whereas the maximum mark is 13. The mean score increases from 8.95238 to 9.5.
d) On module 4, the minimum marks increase from 6 to 11 but the maximum marks remain 13. The mean score, however, comes up to 12.07.
e) On module 5, the range of marks comes up to a great extent and that it has become 11 to 15. Marked increase is also found in mean score which has come up to 13.8333.
f) On module 6, the minimum mark is 12 and the maximum mark increase from 15 to 16. The mean score increase further to 14.9286.
g) Marks improvement is found in module 7 that the mark range comes up to 14 - 19 with a mean score of 16.762.
h) The mark range on module 8 comes up to 16 to 20 and the mean score is increased to 18.452.
i) On module 9, test scores continue to improve in that the minimum mark is raised to 17 while the maximum mark is 22. The mean score comes up to 19.76.
j) On the last module – module 10, students' test scores range is 17-22 and the mean score becomes 20.095.

Improvement in test scores among control group on succeeding English language competency modules found in Table 5.1.1 indicates that there was appreciable progress among the students during the experiment.

Table 5.1.2: Performance of Experimental Group in English Language Skills during Experiment

Module no.	Lowest Score	Highest Score	Mean	SD
1	3	9	6.7073	2.3048
2	8	15	11.244	2.6437
3	10	19	13.854	3.2601
4	12	21	15.195	3.0018
5	11	20	16.171	2.6543
6	15	21	18.439	1.7328
7	14	23	19.659	2.4353
8	16	24	21.024	2.5148
9	17	24	22.745	1.745
10	19	25	23.146	1.3521

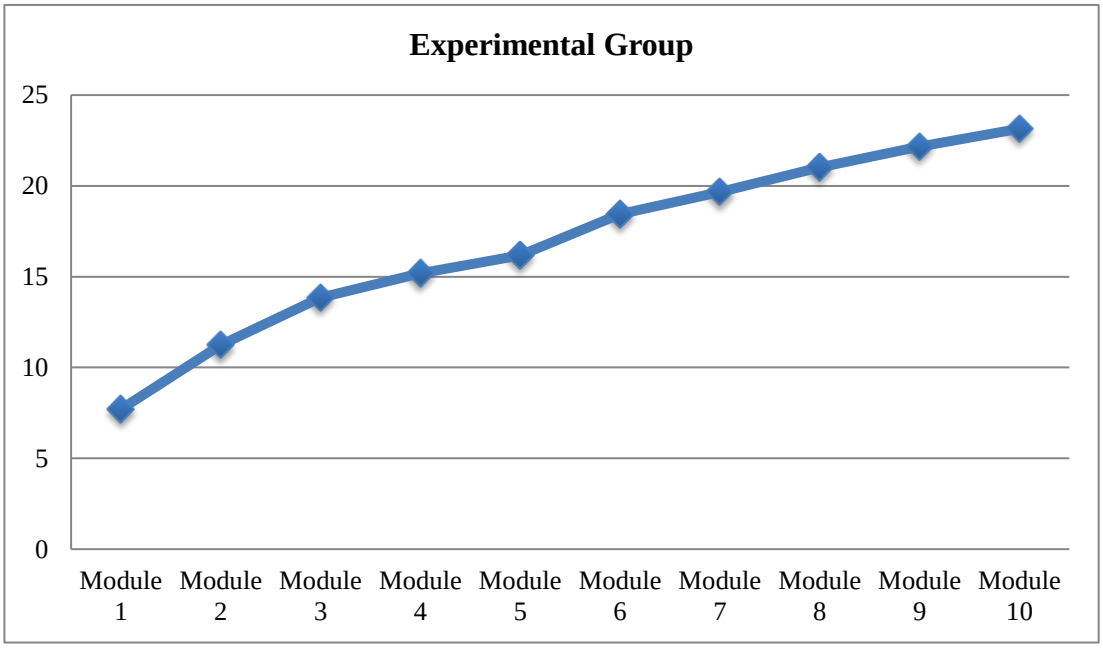

Figure 5.1.2: Line Graph Showing Experimental Group Mean Scores in Tests on Modules

In table 5.1.2 we find the ranges of marks and the mean scores of experimental group students in subsequent English language competency tests held during the intervention as follow:

a) In a test on module 1, the students' marks range from a minimum of 3 to a maximum of 9 and the mean score is 6.7073 with standard deviation of 2.3048.
b) On module 2, the range of students' marks increase to a minimum of 8 to a maximum of 15. The mean score also increase to11.244.
c) On module 3, the minimum mark increases from 8 to 10 whereas the maximum mark is 19. The mean score increases from 11.244 to 13.854.
d) On module 4, the minimum mark increase from 10 to 12 but the maximum mark is 21. The mean score, however, comes up to 15.195.
e) On module 5, the range of marks comes up to 11 to 20. Marks increase is also found in mean score which has come up to 16.171.
f) On module 6, the minimum mark is 15 and the maximum mark increase from 20 to 21. The mean score increase further to 18.439
g) Marks improvement is found in module 7 that the mark range comes up to 14 - 23 with a mean score of 19.659.
h) The mark range on module 8 comes up to 16 to 24 and the mean score is increased to 21.024.
i) On module 9, test scores continue to improve in that the minimum mark is raised to 17 while the maximum mark remains 24. The mean score comes up to 22.745.
j) On the last module – module 10, students' test scores become so high that the range is 19-25 and the mean score becomes 23.146

Improvement in test scores among experimental group on succeeding English language competency modules found in Table 5.1.2 indicates that there was appreciable progress among the students in English language skills during the intervention.

Table 5.1.3: Group-wise Performance of Students during Experiment

Module	Group	Lowest Score	Highest Score	M	SD
1	Control	3	9	5.0952	2.0814
	Experimental	3	9	6.7073	2.3048
2	Control	5	11	8.95238	1.34259
	Experimental	8	15	11.244	2.6437
3	Control	6	13	9.5	2.2003
	Experimental	10	19	13.854	3.2601
4	Control	11	13	12.07	0.64
	Experimental	12	21	15.195	3.0018
5	Control	11	15	13.8333	1.49661
	Experimental	11	20	16.171	2.6543
6	Control	12	16	14.9286	1.33239
	Experimental	15	21	18.439	1.7328
7	Control	14	19	16.762	1.8321
	Experimental	14	23	19.659	2.4353
8	Control	16	20	18.452	1.8106
	Experimental	16	24	21.024	2.5148
9	Control	17	22	19.76	0.983
	Experimental	17	24	22.745	1.745
10	Control	17	22	20.095	1.1001
	Experimental	19	25	23.146	1.3521

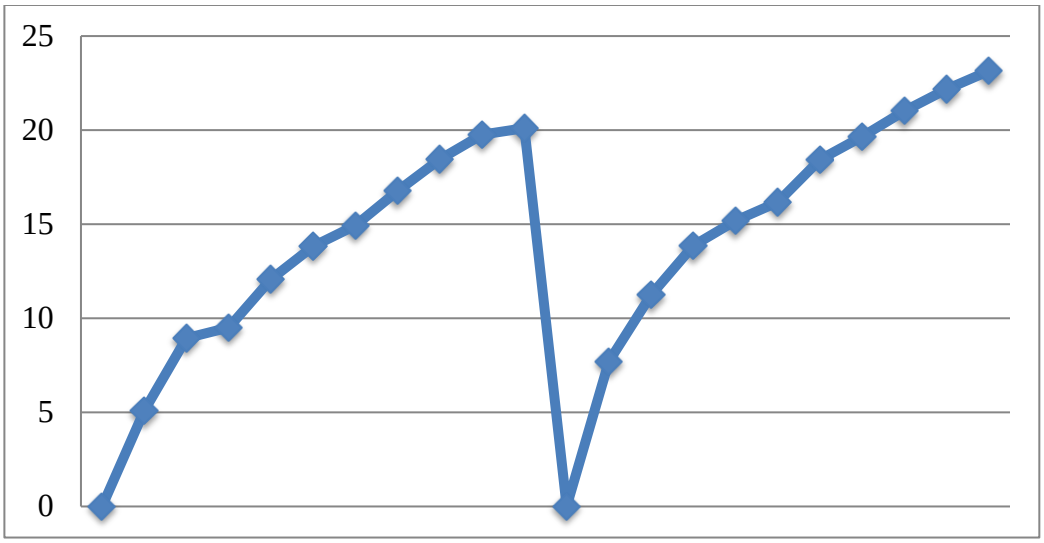

Figure 5.1.3: Line Graph Showing Comparison of Progress between Control and Experimental Groups

Table 5.1.3 shows the students' mark ranges and mean scores from both the groups in subsequent tests on different English language competency modules during the conduct of experiment. The table reveals the following:

a) In a test on module 1, the ranges of students' marks are same for control and experimental groups with minimum of 3 to maximum of 9. However, the mean score, 6.7073 in respect of experimental group is more than 5.0952, i.e., the mean score of control group.

b) In the case of module 2, slight increases are seen in the ranges of marks as well as mean scores but the level of increase is more in the case of experimental group.

c) On module 3, the range of students' marks and the mean scores are increased in both the cases. However, the rates of increase are much higher among experimental group students which imply that the progress in English language skills is more among experimental group than among control group during intervention.

d) The mark ranges and mean scores on module 4 again come up in both the cases. But the rates of increase are more in the case of experimental group which indicate more progress among the experimental group.

e) Minimum marks of students from both the groups become the same in module 5. However, the maximum mark and the mean score are higher among the experimental group which again signify that progress in English languang skills during the experiment is more among the experimental group.

f) On module 6, test scores continue to improve among students of control and experimental groups which results in increase in the mean scores. The higher range of marks and the higher mean score among experimental group indicate that there is more progress among the experimental group than control group.

g) Minimum marks of both the groups again are similar in module 7. However, the maximum mark and the mean score are higher among the experimental group which again implies that progress in English language skills is more among the experimental group than the control group during intervention.

h) On module 8, minimum marks of both control and experimental groups are same again but the maximum mark and the mean score are higher among the experimental group. These show that progress in English language skills is more among the experimental group than the control group during intervention.

i) Again in module 9, minimum marks are same for both the groups but the maximum mark and the mean score are higher among the experimental group. These indicate that students of experimental group have more progress in English language skills than that of the control group during the experiment.

j) On the last module – module 10, there is no increase in the mark range of students from control group whereas the mark range of students from experiment group keeps on increasing. While there is very small and negligible rise of mean score among control group, the mean score as well as the rate of increase among experimental group is higher.

From table 5.1.3, we find improvements in English language skills among the students of both the groups. However, the rate of improvement is found to be more among the experimental group which indicates that there is more progress in English language skills among this group during the experiment period.

5.2.0 Effectiveness of Whole Brain Teaching for Enhancement of English Language Skills

Null Hypothesis 1: *"There exists no significant difference between mean scores of pre-test and post-test in English language listening skill among students from control group".*

Table 5.2.1

Performance in English Language Listening Skill among Students from Control Group

Listening Skill	No	M	S.D.	df	paired t-value	p value
Pre test	42	6.262	2.3276	41	-4.292	.000**
Post test	42	8.310	2.5133			

Table 5.2.1 shows that mean score of students in post test i.e., 8.310 exceeds the mean score in pre test i.e., 6.262. The paired t-value -4.292 also exceeds the critical t-value at 0.01 level. These make it clear that traditional teaching method employed for teaching English language competency modules among the control group has effectiveness for enhancement of English language listening skill. Therefore, the null hypothesis no. 1 stating, *"There exists no significant difference between mean scores of pre-test and post-test in English language listening skill among students from control group"* is rejected.

Null Hypothesis 2: *"There exists no significant difference between mean scores of pre-test and post-test in English language speaking skill among students from control group".*

Table 5.2.2

Performance in English Language Speaking Skill among Students from Control Group

Speaking Skill	No	M	S.D.	df	paired t-value	p value
Pre test	42	6.905	2.1843	41	-3.627	.001**
Post test	42	9.048	2.9628			

Table 5.2.2 reveals that mean score of students in post test (9.048) surpasses the mean score in pre test (6.905) and the paired t-value -3.627 also exceeds the critical t-value at 0.01 level. These clarify that traditional teaching method employed for teaching English language competency modules among the control group has effectiveness for enhancement of speaking skill. Therefore, the null hypothesis no. 2 which states, *"There exists no significant difference between mean scores of pre-test and post-test in English language speaking skill among students from control group"* is rejected.

Null Hypothesis 3: *"There exists no significant difference between mean scores of pre-test and post-test in English language reading skill among students from control group".*

Table 5.2.3

Performance in English Language Reading Skill among Students from Control Group

Reading Skill	No	M	S.D.	df	paired t-value	p value
Pre test	42	7.214	1.6459	41	-4.739	.001**
Post test	42	9.643	3.3845			

Table 5.2.3 tells us that students' mean score in post test (9.643) exceeds the mean score in pre test (7.214) and also that the paired t-value -4.739 exceeds the critical t-value at 0.01 level. These make it clear that traditional teaching method employed for teaching English language competency modules among the control group has effectiveness for enhancement of reading skill. Therefore, the null hypothesis no. 3 which states, *"There exists no significant difference between mean scores of pre-test and post-test in English language reading skill among students from control group"* is rejected.

Null Hypothesis 4: *"There exists no significant difference between mean scores of pre-test and post-test in English language writing skill among students from control group".*

Table 5.2.4

Performance in English Language Writing Skill among Students from Control Group

Writing Skill	No.	M	S.D.	df	paired t-value	p value
Pre test	42	6.810	2.3294	41	-3.566	.001**
Post test	42	8.500	2.8563			

We find from table 5.2.4 that students' mean in post test (8.500) overtakes the mean in pre test (6.810) and calculated t value is -3.566 which surpasses the critical t value at 0.01 level. These lead us to the conclusion that traditional teaching method employed for teaching English language competency modules among the control group has effectiveness for enhancement of writing skill. Therefore, the null hypothesis no. 4 stating, *"There exists no significant difference between mean scores of pre-test and post-test in English language writing skill among students from control group"* is rejected.

Null Hypothesis 5: *"There exists no significant difference between mean scores of pre-test and post-test in English language skills among students from control group".*

Table 5.2.5

Performance in English Language Skills among Students from Control Group

Language Skills	No.	M	S.D.	df	paired t-value	p value
Pre test	42	27.190	7.3326	41	-10.813	.000**
Post test	42	35.500	6.8796			

Data in table 5.2.5 tell that mean score of students in post test (35.500) surpasses the mean in pre test (27.190) and paired t-value, -10.813 rises above the critical t value at 0.01 level. These signify that traditional teaching method employed for teaching English language competency modules among the control group has effectiveness for enhancement of English language skills. Therefore, the null hypothesis no. 5 which states, *"There exists no significant difference between mean scores of pre-test and post-test in English language skills among students from control group"* is rejected.

Null Hypothesis 6: *"There exists no significant difference between mean scores of pre-test and post-test in English language listening skill among students from experimental group".*

Table 5.2.6

Performance in English Language Listening Skill among Students from Experimental Group

Listening Skill	No.	M	S.D.	Df	paired t-value	p value
Pre test	41	7.976	1.6045	40	-3.287	.002**
Post test	41	9.683	2.9021			

Table 5.2.6 shows that the mean in post test exceeds the mean in pre test and the paired t-value, -3.287 rises above critical t value at 0.01 level. We come to know from these that whole brain teaching method employed for teaching English language competency modules among the experimental group has effectiveness for enhancement of English language listening skill. Therefore, the null hypothesis no. 6 which states, *"There exists no significant difference between mean scores of pre-test and post-test in English language listening skill among students from experimental group"* is rejected.

Null Hypothesis 7: *"There exists no significant difference between mean scores of pre-test and post-test in English language speaking skill among students from experimental group".*

Table 5.2.7

Performance in English Language Speaking Skill among Students from Experimental Group

Speaking Skill	No.	M	S.D.	df	paired t-value	p value
Pre test	42	7.024	2.2857	40	-5.819	.000**
Post test	42	10.220	2.6126			

Data shown in table 5.2.7 tell that the students score higher in post test and calculated t value -5.819 surpasses the critical t value at 0.01 level. The data imply that whole brain teaching method employed for teaching English language competency modules among the experimental group has effectiveness for enhancement of English language speaking skill. Therefore, the null hypothesis no. 7 which states, *"There exists no significant difference between mean scores of pre-test and post-test in English language speaking skill among students from experimental group"* is rejected.

Null Hypothesis 8: *"There exists no significant difference between mean scores of pre-test and post-test in English language reading skill among students from experimental group*".

Table 5.2.8

Performance in English Language Reading Skill among Students from Experimental Group

Reading Skill	No.	M	S.D.	df	paired t-value	p value
Pre test	41	6.878	1.9130	40	-7.329	.000**
Post test	41	10.805	2.8037			

From table 5.2.8, we find that students' score in post test outrun the score in pre test and paired t-value, -7.329 also surpasses critical t value at 0.01 level. These make it clear that whole brain teaching method employed for teaching English language competency modules among the experimental group has effectiveness for enhancement of English language reading skill. Therefore, the null hypothesis no. 8 stating, "*There exists no significant difference between mean scores of pre-test and post-test in English language reading skill among students from experimental group"* is rejected.

Null Hypothesis 9: *"There exists no significant difference between mean scores of pre-test and post-test in English language writing skill among students from experimental group".*

Table 5.2.9

Performance in English Language Writing Skill among Students from Experimental Group

Writing Skill	No.	M	S.D.	df	paired t-value	p value
Pre test	41	7.537	1.4849	40	-3.777	.001**
Post test	41	9.000	1.9365			

Table 5.2.9 tells that mean in post test exceeds that of pre test and paired t-value, -3.777 surpasses critical t-value at 0.01 level. The implication of these is that whole brain teaching method employed for teaching English language competency modules among the experimental group has effectiveness for enhancement of English language writing skill. Therefore, the null hypotheses no. 9 stating, *"There exists no significant difference between mean scores of pre-test and post-test in English language writing skill among students from experimental group"* is rejected.

Null Hypothesis 10: *"There exists no significant difference between mean scores of pre-test and post-test in English language skills among students from experimental group".*

Table 5.2.10

Performance in English Language Skills among Students from Experimental Group

Language Skills	No.	M	S.D.	df	paired t-value	p value
Pre test	41	26.610	6.4416	40	-16.947	.000**
Post test	41	39.707	5.2879			

Table 5.2.10 shows that mean in post test surpasses that of pre test and paired t-value, -16.947 highly exceeds critical t-value at 0.01 level. These make it clear that whole brain teaching method employed for teaching English language competency modules among the experimental group has effectiveness for enhancement of English language skills. Therefore, the null hypothesis no. 10 stating, *"There exists no significant difference between mean scores of pre-test and post-test in English language skills among students from experimental group"* is rejected.

Null Hypothesis 11: *"There exists no significant difference between mean scores of control and experiment groups in English language listening skill".*

Table 5.2.11

Performance of Control and Experimental Groups in English Language Listening Skill

Listening Skill	No.	M	S.D.	Df	t-value	p value
Control Grp.	42	8.310	2.5133	81	-2.306	.024*
Experimental Grp.	41	9.683	2.9021			

Table 5.2.11 displays that experimental group with mean score of 9.683 performs better and excels control group but t-value, -2.306 surpasses table t value at 0.05 level. Therefore, the null hypothesis no.11 stating, *"There exists no significant difference between mean scores of control and experimental groups in English language listening skill"* is retained at 0.01 and rejected at 0.05 levels.

Null Hypothesis 12: *"There exists no significant difference between mean scores of control and experimental groups in English language speaking skill".*

Table 5.2.12

Performance of Control and Experimental Groups in English Language Speaking Skill

Speaking Skill	No.	M	S.D.	df	t-value	p value
Control Grp.	42	9.048	2.9628	81	-1.910	.059
Experimental Grp.	41	10.220	2.6126			

Table 5.2.12 depicts that experimental group's mean score surpasses that of control group but t-value, -1.910 falls behind critical t-value at 0.05 and 0.01 levels. Therefore, null hypothesis no. 12 which states, *"There exists no significant difference between mean scores of control and experimental groups in English language speaking skill"* is retained.

Null Hypothesis 13: *"There exists no significant difference between mean scores of control and experimental groups in English language reading skill".*

Table 5.2.13

Performance of Control and Experimental Groups in English Language Reading Skill

Reading Skill	No.	M	S.D.	df	t-value	p value
Control Grp.	42	9.643	3.3845	81	-1.701	.092
Experimental Grp.	41	10.805	2.8037			

From table 5.2.13, we see that experimental group does better as their mean score surpasses that of control group but critical t-value at 0.01 and 0.05 levels exceeds the calculated t-value -1.701. Therefore, the null hypothesis no. 13 which states, "*There exists no significant difference between mean scores of control and experimental groups in English language reading skill"* is retained.

Null Hypothesis 14: *"There exists no significant difference between mean scores of control and experimental groups in English language writing skill".*

Table 5.2.14

Performance of Control and Experimental Groups in English Language Writing Skill

Writing Skill	No.	M	S.D.	df	t-value	p value
Control Grp.	42	8.500	1.9365	81	-.931	.353
Experimental Grp.	41	9.000	6.8796			

A perusal at table 5.2.14 informs us that experimental students rise above students of control group due to their higher mean score in English language writing skill. However, critical t-value at 0.01 and 0.05 levels also exceeds calculated t-value -.931. Therefore, the null hypothesis no. 14 which states, *"There exists no significant difference between mean scores of control and experimental groups in English language writing skill"* is retained.

Null Hypothesis 15: *"There exists no significant effectiveness of whole brain teaching for enhancement of English language skills".*

Table 5.2.15

Performance of Control and Experimental Groups in English Language Skills

Language Skill	No.	M	S.D.	df	t-value	p value
Control Grp.	42	35.500	6.8796	81	-2.306	.002*
Experimental Grp.	41	39.707	5.2879			

Table 5.2.15 tells us that experimental students rise above students of control group due to their higher mean score in English language skills. The critical t-value at 0.01 level exceeds the calculated t-value -2.306 but not in the case of 0.05 level. These make it clear that experimental students who were taught English language competency modules through whole brain teaching method are better in English language skills than that from control group.

Therefore, null hypothesis no. 15 which states, *"There exists no significant effectiveness of whole brain teaching for enhancement of English language skills"* is rejected at 0.05 level but retained at 0.01 level.

5.3.0 Effectiveness of Whole Brain Teaching for Enhancement of English Language Skills across Gender.

Null Hypothesis 16: *"There exists no significant difference between the pre-test scores of boys and girls in English language listening skill".*

Table 5.3.1

Gender-wise Comparison of Students in Pre test on Listening Skill

	Gender	No.	M	S.D.	df	t value	p value
Pre test	**Boys**	49	4.711	1.6871	81	-.797	.461
	Girls	34	5.000	1.5939			

As shown by table 5.3.1, girls are better in English language listening skill as their mean score surpasses that of boys in pre test. Since critical t-value at 0.01 and 0.05 levels exceeds calculated t-value -.797, significant difference is not found between boys and girls in pre-test in listening skill at both levels. Thus, the null hypothesis no.16 that states, "*There exists no significant difference between the pre-test scores of boys and girls in English language listening skill"* is retained.

Null Hypothesis 17: *"There exists no significant difference between the post-test scores of boys and girls in English language listening skill".*

Table 5.3.2

Gender-wise Performance of Students in Post test in English Language Listening Skill

	Gender	No.	M	S.D.	df	t value	p value
Post test	**Boys**	49	8.400	.8090	81	1.338	.057
	Girls	34	8.132	1.0180			

Table 5.3.2 presents mean scores of boys and girls and paired sample t-test calculated to compare them in English language listening skill. Boys' score is little bit higher than girls' score but the critical t-value at 0.01 and 0.05 levels also exceeds calculated t-value - 1.338 which implies that the difference is not significant. Therefore, the null hypothesis no.17 that states, "*There exists no significant difference between the post-test scores of boys and girls in English language listening skill"* is retained.

Null Hypothesis 18: *"There exists no significant difference between the pre-test scores of boys and girls in English language speaking skill".*

Table 5.3.3

Gender-wise Comparison of Students in Pre test on Speaking Skill

	Gender	No.	M	S.D.	df	t value	p value
Pre test	**Boys**	49	4.533	1.4863	81	-.969	.555
	Girls	34	4.868	1.6631			

Table 5.3.3 reveals that mean score of girls in pre test on English language speaking skill is higher than that of boys. However, the critical t-value at 0.01 and 0.05 levels exceeds the calculated t-value -.969 which implies that the difference is not statistically significant. Therefore, the null hypothesis no.18 that states, "*There exists no significant difference between the pre-test scores of boys and girls in English language speaking skill"* is retained.

Null Hypothesis 19: *"There exists no significant difference between the post-test scores of boys and girls in English language speaking skill".*

Table 5.3.4

Gender-wise Performance of Students in Post test in English Language Speaking Skill

	Gender	No.	M	S.D.	df	t value	p value
Post test	**Boys**	49	8.644	1.1708	81	.365	.896
	Girls	34	8.553	1.1076			

Table 5.3.4 shows that mean score of boys in post-test on English language speaking skill is higher than that of girls. However, the critical t-value at 0.01 and 0.05 levels exceeds the calculated t-value .365 which indicates that the difference is not statistically significant. Therefore, the null hypothesis no.19 that states, "*There exists no significant difference between the post-test scores of boys and girls in English language speaking skill"* is retained.

Null Hypothesis 20: *"There exists no significant difference between the pre-test scores of boys and girls in English language reading skill".*

Table 5.3.5

Gender-wise Comparison of Students in Pre test on Reading Skill

	Gender	No.	M	S.D.	df	t value	p value
Pre test	**Boys**	49	6.156	1.4453	81	.238	.821
	Girls	34	6.079	1.4774			

Table 5.3.5 reveals that mean scores of boys and girls in pre test on English language reading skill are almost same and that the critical t-value at 0.01 and 0.05 levels exceeds the calculated t-value -.238. Therefore, the null hypothesis no. 20 that states, "*There exists no significant difference between the pre-test scores of boys and girls in English language reading skill"* is retained.

Null Hypothesis 21: *"There exists no significant difference between the post-test scores of boys and girls in English language reading skill".*

Table 5.3.6

Gender-wise Performance of Students in Post test in English Language Reading Skill

	Gender	No.	M	S.D.	df	t value	p value
Post test	**Boys**	49	9.022	1.0343	81	.620	.206
	Girls	34	8.895	1.3382			

Table 5.3.6 exhibits that boys' mean score is higher than that of girls in post-test on English language reading skill. However, the critical t-value at 0.01 and 0.05 levels exceeds the calculated t-value .620. Therefore, the null hypothesis no. 21 that states, "*There exists no significant difference between the post-test scores of boys and girls in English language reading skill"* is retained.

Null Hypothesis 22: *"There exists no significant difference between the pre-test scores of boys and girls in English language writing skill".*

Table 5.3.7

Gender-wise Comparison of Students in Pre test on Writing Skill

	Gender	No.	M	S.D.	df	t value	p value
Pre test	**Boys**	49	4.156	1.5948	81	1.338	.057
	Girls	34	4.395	1.4619			

Table 5.3.7 tells that boys' and girls' mean scores in pre-test on English language writing skill are almost same and that the critical t-value at 0.01 and 0.05 levels exceeds the calculated t-value 1.338. Therefore, the null hypothesis no. 22 that states, "*There exists no significant difference between the pre-test scores of boys and girls in English language writing skill"* is retained.

Null Hypothesis 23: *"There exists no significant difference between the post-test scores of boys and girls in English language writing skill".*

Table 5.3.8

Gender-wise Performance of Students in Post test in English Language Writing Skill

	Gender	No.	M	S.D.	df	t value	p value
Post test	**Boys**	49	8.067	1.3382	81	-.784	.649
	Girls	34	8.289	1.2282			

In table 5.3.8, we find that boys' and girls' mean scores in post test on English language writing skill are almost same and that the critical t-value at 0.01 and 0.05 levels exceeds the calculated t-value 1.338. Therefore, the null hypothesis no. 23 that states, "*There exists no significant difference between the post-test scores of boys and girls in English language writing skill"* is retained.

Null Hypothesis 24: *"There exists no significant difference between the pre-test scores of boys and girls in English language skills".*

Table 5.3.9

Gender-wise Comparison of Students in Pre test on English Language Skills

	Gender	No.	M	S.D.	df	t value	p value
Pre test	**Boys**	49	26.204	7.1414	81	1.115	.259
	Girls	34	27.912	6.4308			

Table 5.3.9 reveals that mean score of girls in pre-test on English language skills is higher than that of boys. However, the critical t-value at 0.01 and 0.05 levels exceeds the calculated t-value, i.e., 1.115 which implies that the difference is not statistically significant. Therefore, the null hypothesis no.24 that states, "*There exists no significant difference between the pre-test scores of boys and girls in English language skills"* is retained.

Null Hypothesis 25: *"There exists no significant difference between the post-test scores of boys and girls in English language skills".*

Table 5.3.10

Gender-wise Performance of Students in Post test in English Language Skills

	Gender	No.	M	S.D.	df	t value	p value
Post test	**Boys**	49	36.898	6.9169	81	1.153	.236
	Girls	34	38.559	5.7059			

Table 5.3.10 shows that mean score of girls in post-test on English language skills is higher than that of boys. However, the critical t-value at 0.01 and 0.05 levels exceeds calculated t-value 1.153. Therefore, the null hypothesis no.25 that states, "*There exists no significant difference between the post-test scores of boys and girls in English language skills"* is retained.

Null Hypothesis 26: *"There exists no significant difference between mean scores of control and experimental groups in English language listening skill across gender".*

Table 5.3.11

Group-wise and Gender-wise Performance of Students in English Language Listening Skill

Group	Gender	M	S.D.	N
Control	**Boys**	8.091	3.2500	22
	Girls	9.783	2.7954	23
Experimental	**Boys**	8.550	1.3563	20
	Girls	9.556	3.1102	18
Total	**Boys**	8.310	2.5133	42
	Girls	9.683	2.9021	41
	Total	8.988	2.7828	83

Table 5.3.12

Analysis of Variance (Two-way ANOVA) on Mean Scores in English Language Listening Skill

Sources of Variances	Partial Sums of Squares	df	M. Sq. Variance	F-value	Sig.
Control/Experimental	37.407	1	37.407	4.982	.028
Gender	.277	1	.277	.037	.848
Control/Experimental*Gender	2.421	1	2.421	.322	.572
Error	593.126	79	7.508		
Total	7340.000	83			

Table 5.3.11 tells us that girls from both control and experimental groups are better than boys in their respective groups in English language listening skill.

The above table, 5.3.12 presents that the difference between students of control and experimental groups in their scores on listening skill (F- 4.982) is not significant. Similarly, no difference is found between girls and boys in their scores on listening skill (F - .037). Again, significant difference is not found between gender and the groups (control & experimental) in their scores on English language listening skill (F - .322) (table 5.3.12). Thus, the null hypothesis no. 26 that states, "*There exists no significant difference between mean scores of control and experimental groups in English language listening skill across gender*" is accepted.

Null Hypothesis 27: *"There exists no significant difference between mean scores of control and experimental groups in English language speaking skill across gender".*

Table 5.3.13

Group-wise and Gender-wise Performance of Students in English Language Speaking Skill

Group	Gender	M	S.D.	N
Control	**Boys**	8.773	3.4217	22
	Girls	8.773	2.4487	23
Experimental	**Boys**	9.350	2.4121	20
	Girls	10.778	2.7771	18
Total	**Boys**	9.048	2.9628	42
	Girls	10.220	2.6126	41
	Total	9.627	2.8401	83

Table 5.3.14

Analysis of Variance (Two-way ANOVA) on Mean Scores in English Language Speaking Skill

Sources of Variances	Partial Sums of Squares	df	M. Sq. Variance	F-value	Sig.
Control/Experimental	30.553	1	30.553	3.897	.052
Gender	12.713	1	12.713	1.621	.207
Control/Experimental*Gender	.898	1	.898	.115	.736
Error	619.438	79	7.841		
Total	8353.000	83			

Table 5.3.13 indicates that boys and girls from control group are equally good in English language speaking skill as their mean scores are exactly same. In the case of experimental group, girls are better as their mean score is higher than that of boys. Thus, the overall performance of girls is slightly better.

Table 5.3.14 depicts that no significant difference is found between girls and boys in their scores on English language speaking skill (F - 1.621) as the calculated value of F between boys and girls is lower than the table value. The difference between students of control and experimental groups in their scores on speaking skill (3.897) is not significant. Similarly, significant difference is not found between gender and groups (control & experimental) in their scores on English language speaking skill (F - .115). Therefore, null hypothesis no. 27 that states, *"There exists no significant difference between mean scores of control and experimental groups in English language speaking skill across gender" is retained.*

Null Hypothesis 28: *"There exists no significant difference between mean scores of control and experimental groups in English language reading skill across gender".*

Table 5.3.15

Group-wise and Gender-wise Performance of Students in English Language Reading Skill

Group	Gender	M	S.D.	N
Control	**Boys**	9.591	3.0025	22
	Girls	10.565	3.0425	23
Experimental	**Boys**	9.700	3.8402	20
	Girls	11.111	2.5179	18
Total	**Boys**	9.643	3.3845	42
	Girls	10.805	2.8037	41
	Total	10.217	3.1470	83

Table 5.3.16

Analysis of Variance (Two-way ANOVA) on Mean Scores in English Language Reading Skill

Sources of Variances	Partial Sums of Squares	df	M. Sq. Variance	F-value	Sig.
Control/Experimental	30.553	1	30.553	3.897	.052
Gender	12.713	1	12.713	1.621	.207
Control/Experimental*Gender	.898	1	.898	.115	.736
Error	619.438	79	7.841		
Total	8353.000	83			

Table 5.3.15 shows that in both the groups, girls score better than boys in English language reading skill. The gaps, however, are so small that it is 0.974 in the case of control group and 1.411 in the case of experimental group students.

We find from the table 5.3.16 that the difference between girls' score and boys' score in English language reading skill is not significant as F- value 1.621 is lower than the table value. Similarly, the difference between control and experimental groups with F- value of 3.897 is not significant. Besides, the difference between gender and groups (control & experimental) in English language reading skill indicated by F-value, .115 is not significant. Therefore, the null hypothesis no. 28 that states, "*There exists no significant difference between mean scores of control and experimental groups in English language reading skill across gender"* is retained.

Null Hypothesis 29: *"There exists no significant difference between mean scores of control and experimental groups in English language writing skill across gender".*

Table 5.3.17

Group-wise and Gender-wise Performance of Students in English Language Writing Skill

Group	Gender	M	S.D.	N
Control	**Boys**	8.136	2.5127	22
	Girls	8.696	2.1199	23
Experimental	**Boys**	8.900	3.2102	20
	Girls	9.389	1.6499	18
Total	**Boys**	8.500	2.8563	42
	Girls	9.000	1.9365	42
	Total	8.747	2.4437	83

Table 5.3.18

Analysis of Variance (Two-way ANOVA) on Mean Scores in English Language Writing Skill

Sources of Variances	Partial Sums of Squares	df	M. Sq. Variance	F-value	Sig.
Control/Experimental	5.649	1	5.649	.942	.335
Gender	10.913	1	10.913	1.821	.181
Control/Experimental*Gender	.025	1	.025	.004	.948
Error	473.538	79	5.994		
Total	6840.000	83			

Table 5.3.17 tells us that in an overall performance, girls are better than boys in English language writing skill. The gaps, however, are so small that it is 0.560 in the case of control group and 0.489 in the case of experimental group students.

We find from table, 5.3.18 that the difference between students from both the groups (control and experimental) in writing skill is not significant (F - .942). Similarly, no difference is found between girls and boys in their scores on writing skill (F - 1.821). Again, no significant difference is observed between gender and the group (control & experimental) in their scores on English language writing skill (F - .004) (table 5.3.18). Therefore, the null hypothesis no. 29 that states, "*There exists no significant difference between mean scores of control and experimental groups in English language writing skill across gender*" is retained.

Null Hypothesis 30: *"There exists no significant effectiveness of whole brain teaching for enhancement of English language skills across gender".*

Table 5.3.19

Group-wise and Gender-wise Performance of Students in English Language Skills

Group	Gender	M	S.D.	N
Control	**Boys**	8.091	3.2500	22
	Girls	9.783	2.7954	23
Experimental	**Boys**	8.550	1.3563	20
	Girls	9.556	3.1102	18
Total	**Boys**	8.310	2.5133	42
	Girls	9.683	2.9021	41
	Total	8.988	2.7828	83

Table 5.3.20

Analysis of Variance (Two-way ANOVA) on Mean Scores in English Language Skills

Sources of Variances	Partial Sums of Squares	df	M. Sq. Variance	F-value	Sig.
Control/Experimental	377.500	1	377.500	10.007	.002
Gender	78.862	1	78.862	2.091	.152
Control/Experimental*Gender	.050	1	.050	.001	971
Error	2980.123	79	37.723		
Total	120633.000	83			

We can find from table 5.3.19 that girls score higher than boys in their respective groups in English language skills as a whole which indicates that in general, girls from both the groups are little better than their counterparts, i.e., boys. Their mean difference, however, are so small that it is 1.692 in the case of control group and 1.006 in the case of experimental group students.

Table 5.3.20 depicts that no significant difference is found between girls and boys in their scores on English language skills (F - 2.091). Between control and experimental group also, there is no significant difference. Again, no significant difference is found between gender and the group (control & experimental) in their scores on English language skills (F - .001). Therefore, the null hypothesis no. 30 that states, "*There exists no significant effectiveness of whole brain teaching for enhancement of English language skills across gender*" is retained.

CHAPTER-VI

FINDINGS AND CONCLUSIONS, DISCUSSION, RECOMMENDATIONS AND SUGGESTIONS

The present chapter deals with the major findings and conclusions of the study followed by discussion and recommendations for enhancement of English language skills. Suggestions for further studies are also presented. These are arrangedunder the following heads:

6.1.0 Findings and Conclusions

6.1.1 Findings and Conclusions on Progress in English Language Skills during Intervention

6.1.2 Findings and Conclusions on Effectiveness of Whole Brain Teaching for Enhancement of English Language Skills

6.1.3 Findings and Conclusions on Effectiveness of Whole Brain Teaching for Enhancement of English Language Skills across Gender.

6.2.0 Discussion of Findings

6.3.0 Recommendations of the Study

6.4.0 Suggestions for Further Studies

6.1.0 Findings and Conclusions

6.1.1 Findings and Conclusions on Progress/Improvement in English Language Skills during Experiment/Intervention

1. In each test conducted on each English language competency module among control group of students during the period the experiment was being conducted, progresses were found as follow:

a) In a test on module 1, the students' marks ranged from a minimum of 3 to a maximum of 9 and the mean score was 5.0952.
b) On module 2, the range of students' marks increased to a minimum of 5 to a maximum of 11. The mean score also increased to 8.95238.
c) On module 3, the minimum marks increased from 5 to 6 whereas the maximum mark is 13. The mean score increased from 8.95238 to 9.5.
d) On module 4, the minimum marks increased from 6 to 11 but the maximum marks remained 13. The mean score, however, came up to 12.07.
e) On module 5, the range of marks came up to a great extent and that it had become 11 to 15. Marked increase was also found in mean score which had come up to 13.8333.
f) On module 6, the minimum mark was 12 and the maximum mark increased from 15 to 16. The mean score increased further to 14.9286.
g) Marks improvement was found in module 7 that the mark range came up to 14 - 19 with a mean score of 16.762.
h) The mark range on module 8 came up to 16 to 20 and the mean score was increased to 18.452.
i) On module 9, test scores continued to improve in that the minimum mark was raised to 17 while the maximum mark was 22. The mean score came up to 19.76.
j) On the last module – module 10, students' test scores range was 17 - 22 and the mean score became 20.095.

Conclusion: Among control group students, mark range increased in every succeeding test conducted on every English language competency module. Mean scores also increased in succeeding tests during the period the experiment was being conducted. It is, therefore, concluded that there was appreciable progress in English language skills among control group students who were taught English language competency modules through traditional teaching method during the intervention.

2. Among experimental group students, progresses in English language skills found during the time the experiment was being conducted were as follow:

a) In a test on module 1, the students' marks ranged from a minimum of 3 to a maximum of 9 and the mean score was 6.7073.
b) On module 2, the range of students' marks increased to a minimum of 8 to a maximum of 15. The mean score also increased to11.244.
c) On module 3, the minimum mark increased from 8 to 10 whereas the maximum mark was 19. The mean score increased from 11.244 to 13.854.
d) On module 4, the minimum mark increased from 10 to 12 but the maximum mark was 21. The mean score, however, came up to 15.195.
e) On module 5, the range of marks came up to 11 to 20. Marks increase was also found in mean score which had come up to 16.171.
f) On module 6, the minimum mark was 15 and the maximum mark increased from 20 to 21. The mean score increased further to 18.439
g) Marks improvement was found in module 7 that the mark range came up to 14 - 23 with a mean score of 19.659.
h) The mark range on module 8 came up to 16 to 24 and the mean score was increased to 21.024.
i) On module 9, test scores continued to improve in that the minimum mark was raised to 17 while the maximum mark remained 24. The mean score came up to 22.745.
j) On the last module – module 10, students' test scores became so high that the range was 19 - 25 and the mean score became 23.146

Conclusion: Among experimental group students, mark range increased in every succeeding test conducted on every English language competency module. Mean scores increased in succeeding tests during the period the experiment was being conducted. It is, therefore, concluded that there was appreciable progress in English language skills among experimental group students who were taught English language competency modules through **whole brain teaching** during the intervention.

3. Findings on the relative progresses of students from control and experimental groups were as follow:

a) In a test on module 1, the ranges of students' marks were same for both the groups (control and experimental) with minimum of 3 to maximum of 9. However, the mean score, 6.7073 in respect of experimental group is more than 5.0952, i.e., the mean score of control group.
b) In the case of module 2, slight increases were seen in the ranges of marks as well as mean scores but the increase was more in the case of experimental group.
c) On module 3, the range of students' marks and the mean scores were increased in both the cases. However, the rates of increase were much more among students of experimental group which imply that the improvement in English language skills was more among experimental group than among control group during intervention.
d) The mark ranges and mean scores on module 4 again came up in both the cases. But the rates of increase were more in the case of experimental group which indicate more progress among the experimental group.
e) Minimum marks of both the groups became the same in module 5. However, the maximum mark and the mean score were higher among the experimental group which again signifies that progress in English language skills during the experiment was more among the experimental group.
f) On module 6, test scores continued to improve among students of control and experimental groups which resulted in increase in the mean scores. The higher range of marks and the higher mean score among experimental group indicate that there was more progress among the experimental group than control group.
g) Minimum marks of both the groups again became the same in module 7. However, the maximum mark and the mean score were higher among the experimental group which again implies that progress in English language skills was more among the experimental group than the control group during intervention.
h) On module 8, minimum marks of both the groups were same again but the maximum mark and the mean score were higher among the experimental group.

These show that progress in English language skills was more among the experimental group than the control group during intervention.

i) Again in module 9, minimum marks of both the groups were same but the maximum mark and the mean score were higher among the experimental group. These indicate that experimental group had more progress in English language skills during the experiment.

j) On the last module – module 10, there was no increase in the mark range of students from control group whereas the mark range of students from experiment group kept on increasing. While there was very small and negligible increase in the case of students from control group, the mean score as well as the rate of increase among experimental group was higher.

Conclusion: Improvements in English language skills are noticed among students of both the groups. However, the rate of improvement is found to be more among the experimental group which indicates that there is more progress in English language skills among them during the period the experiment was conducted. This, at the same time, implies that whole brain teaching is more effective than traditional teaching for enhancement of English language skills.

6.1.2 Findings and Conclusions on Effectiveness of Whole Brain Teaching for Enhancement of English Language Skills

1. **In control group,** mean score of students in post test on English language **listening skill** exceeded the mean score in pre test and the paired t-value also exceeded the critical t-value at 0.01 level. Null hypothesis no. 1 stating, *"There exists no significant difference between mean scores of pre-test and post-test in English language listening skill among students from control group"* was rejected.

2. Among control group students, mean score in post test on English language **speaking skill** surpassed the mean score in pre test and the paired t-value also exceeded the critical t-value at 0.01 level. Null hypothesis no. 2 which stated, *"There exists no significant difference between mean scores of pre-test and post-test in English language speaking skill among students from control group"* was rejected.

3. Among control group students, mean score in post test on English language **reading skill** exceeded the mean score in pre test and also that the paired t-value surpassed critical t-value at 0.01 level. Null hypothesis no. 3 which stated, *"There exists no significant difference between mean scores of pre-test and post-test in English language reading skill among students from control group"* was rejected.

4. Among control group students, mean score in post test on English language **writing skill** overtook the mean score in pre test and also that the paired t-value surpassed critical t-value at 0.01 level. Null hypothesis no. 4 which stated, *"There exists no significant difference between mean scores of pre-test and post-test in English language writing skill among students from control group"* was rejected.

5. Among **control group** students, mean score in post test on **English language skills** surpassed the mean in pre test and paired t-value rose above the critical t value at 0.01 level. Traditional teaching method employed for teaching English language competency modules among the control group has effectiveness for enhancement of English language skills. Null hypothesis no. 5 stating, *"There exists no significant difference between mean scores of pre-test and post-test in English language skills among students from control group"* was rejected.

6. Among students from **experimental group,** mean score in post test on English language **listening skill** rose above the mean score in pre test and the paired t-value also exceeded the critical t-value at 0.01 level. Null hypothesis no. 6 which stated, *"There exists no significant difference between mean scores of pre-test and post-test in English language listening skill among students from experimental group"* was rejected.

7. Mean score of **experimental group** students in post test on English language **speaking skill** surpassed the mean score in pre test and the paired t-value also exceeded the critical t-value at 0.01 level. Null hypothesis no. 7 which stated, "*There exists no significant difference between mean scores of pre-test and post-test in English language speaking skill among students from experimental group"* was rejected.

8. Mean score of **experimental group** students in post test on English language **reading skill** exceeded the mean score in pre test and also that the paired t-value surpassed critical t-value at 0.01 level. Null hypothesis no. 8 which stated, "*There exists no significant difference between mean scores of pre-test and post-test in English language reading skill among students from experimental group"* was rejected.

9. Mean score of **experimental group** students in post test on English language **writing skill** overtook the mean score in pre test and also that the paired t-value surpassed critical t-value at 0.01 level. Null hypothesis no. 9 which stated, *"There exists no significant difference between mean scores of pre-test and post-test in English language writing skill among students from experimental group"* was rejected.

10. Among **experimental group** students, mean score in post test on **English language skills** surpassed the mean in pre test and paired t-value rose above the critical t value at 0.01 level. Whole brain teaching employed for teaching English language competency modules among the experimental group has effectiveness for enhancement of English language skills. Null hypothesis no. 10 which stated, *"There exists no significant difference between mean scores of pre-test and post-test in English language skills among students from experimental group"* was rejected.

11. Experimental students excelled control students due to their higher mean score in English language **listening skill** and calculated t-value surpassed table t-value at 0.05 level but not at 0.01 level. Null hypothesis no.11 stating, *"There exists no significant difference between mean scores of control and experimental groups in English language listening skill"* is retained and rejected at 0.01 and 0.05 levels respectively.

12. Experimental students excelled control students due to their higher mean score in English language **speaking skill** but calculated t-value fell behind critical t-value at 0.05 and 0.01 levels. Null hypothesis no. 12 which stated, *"There exists no significant difference between mean scores of control and experimental groups in English language speaking skill"* was retained.

13. Experimental group did better in English language **reading skill** as their mean score surpassed that of control group but critical t-value at 0.01 and 0.05 levels exceeded the calculated t-value. Null hypothesis no. 13 which stated, *"There exists no significant difference between mean scores of control and experimental groups in English language reading skill"* was retained.

14. Experimental students rose above students of control group due to their higher mean score in English language **writing skill**; however, critical t-value at 0.01 and 0.05 levels also exceeded calculated t-value. The null hypothesis no. 14 which stated, *"There exists no significant difference between mean scores of control and experimental groups in English language writing skill"* was retained.

15. Experimental students rose above students of control group due to their higher mean score in **English language skills**. The critical t-value at 0.01 level exceeded calculated t-value but not in the case of 0.05 level. Students from experimental group who were taught English language competency modules through whole brain teaching method were little better in English language skills than that from control group. Null hypothesis no. 15 which stated, *"There exists no significant effectiveness of whole brain teaching for enhancement of English language skills"* was rejected at 0.05 level but retained at 0.01 level.

Conclusions:

1. Students of control group were taught ten English Language Competency Modules through traditional teaching method using Herbartian lesson plan by the investigator with the main objective of enhancing their English language skills. Their scores in post test on each of the skills (listening, speaking, reading and writing) and overall skill surpassed those in pre test. It is, thus, concluded that traditional teaching method is effective for enhancement of English language skills among students.

2. Experimental group students were taught the same English Language Competency Modules through **whole brain teaching method** using whole brain lesson plan simultaneously by the investigator with the main objective of enhancing their English language skills. Their scores in post test on each of the skills (listening, speaking,

reading and writing) and overall skill surpassed those in pre test. It is, therefore, concluded that whole brain teaching method is effective for enhancement of English language skills among students.

3. On the question which one- traditional teaching method or whole brain teaching method is more effective for enhancement of English language skills among students, the following are the conclusions:

    1) Based on the findings that students of experimental group had higher rates of improvements in English language skills, experimental group are better than control group which implies that whole brain teaching is more effective.
    2) Based on the performance in post test covering different English language skills which reveals higher mean scores in favour of the experimental group, whole brain teaching is more effective than traditional teaching method. However, the difference between the two methods is statistically not significant which may indicate that whole brain teaching method is little better than traditional teaching method for enhancement of English language skills among students.

6.1.3 Findings and Conclusions on Effectiveness of Whole Brain Teaching for Enhancement of English Language Skills across Gender

1. Girls were better in English language listening skill as their mean score surpassed that of boys in pre test. However, significant difference was not there between their mean scores. The null hypothesis no. 16 which stated, *"There exists no significant difference between the pre-test scores of boys and girls in English language listening skill"* was retained.

2. Boys scored little bit higher than girls in post test on English language listening skill but the difference was not significant. The null hypothesis no. 17 which stated, *"There exists no significant difference between the post-test scores of boys and girls in English language listening skill"* was retained.

3. Mean score of girls in pre test on English language speaking skill was higher than that of boys. However, the difference was not statistically significant. The null hypothesis no. 18 which stated, *"There exists no significant difference between the pre-test scores of boys and girls in English language speaking skill"* was retained.

4. Mean score of boys in post-test on English language speaking skill was higher than that of girls. However, the difference was not statistically significant. The null hypothesis no. 19 which stated, *"There exists no significant difference between the post-test scores of boys and girls in English language speaking skill"* was retained.

5. Mean scores of boys and girls in pre test on English language reading skill were almost same and the small difference was not statistically significant. The null hypothesis no. 20 which stated, "*There exists no significant difference between the pre-test scores of boys and girls in English language reading skill"* was retained.

6. Boys' mean score was higher than that of girls in post-test on English language reading skill. However, the difference was not statistically significant. The null hypothesis no. 21 which stated, *"There exists no significant difference between the post-test scores of boys and girls in English language reading skill"* was retained.

7. Boys' and girls' mean scores in pre-test on English language writing skill were almost same and the small difference was not statistically significant. The null hypothesis no. 22 which stated, "*There exists no significant difference between the pre-test scores of boys and girls in English language writing skill"* was retained.

8. Boys' and girls' mean scores in post test on English language writing skill were almost same and the small difference was not statistically significant. The null hypothesis no. 23 which stated, "*There exists no significant difference between the post-test scores of boys and girls in English language writing skill"* was retained.

9. Mean score of girls in pre-test on English language skills was higher than that of boys. However, the difference was not statistically significant. The null hypothesis no. 24 which stated, *"There exists no significant difference between the pre-test scores of boys and girls in English language skills"* was retained.

10. Girls scored higher than boys in post-test on English language skills. However, the difference was not statistically significant. The null hypothesis no. 25 which stated, *"There exists no significant difference between the post-test scores of boys and girls in English language skills"* was retained.

11. a) Girls from both control and experimental groups were better than boys in their respective groups in English language **listening** skill. However, statistically significant difference was not found between their scores on listening skill (F - .037).

    b) The difference between students of control and experimental group in their scores on listening skill (F- 4.982) was not significant.

    c) Significant difference was not found between gender and the groups (control & experimental) in their scores on English language listening skill (F - .322).

    d) The null hypothesis no. 26 stating, *"There exists no significant difference between mean scores of control and experimental groups in English language listening skill across gender"* was retained.

12. a) Boys and girls from control group were equally good in English language **speaking** skill. In the case of experimental group, girls were better than boys. However, the difference between them was not significant as the calculated value of F between boys and girls was lower than the table value.

    b) The difference between students of control and experimental group in their scores on speaking skill (F - 3.897)) was not significant.

    c) Significant difference was not found between gender and the groups (control & experimental) in their scores on English language speaking skill.

    d) The null hypothesis no. 27 stating, *"There exists no significant difference between mean scores of control and experimental groups in English language speaking skill across gender"* was retained.

13.a) In both the groups (control and experimental), girls scored better than boys in English language reading skill but the gaps were small and statistically not significant as F- value 1.621 was lower than the table value.

b) The difference between control and experimental groups with F- value of 3.897 was not significant.

c) The difference between gender and groups (control & experimental) in English language reading skill indicated by F-value, .115 was not significant.

d) The null hypothesis no. 28 which stated, *"There exists no significant difference between mean scores of control and experimental groups in English language reading skill across gender"* was retained.

14. a) In an overall performance, girls were better than boys in English language writing skill. The gaps, however, were so small that they were not significant and F-value was only 1.821.

b) The difference between students from both the groups (control and experimental) in writing skill was not significant (F - .942).

c) No significant difference was observed between gender and the group (control & experimental) in their scores on English language writing skill (F - .004).

d) The null hypothesis no. 29 which stated, *"There exists no significant difference between mean scores of control and experimental groups in English language writing skill across gender"* was retained.

15. a) Girls scored higher than boys in their respective groups in English language skills as a whole. However, statistically significant difference was not found between them in their scores on English language skills.

b) Statistically significant difference was not found between control and experimental groups.

c) Significant difference was not found between gender and the groups (control & experimental) in this regard.

d) Null hypothesis no. 30 which stated,"*There exists no significant effectiveness of whole brain teaching for enhancement of English language skills across gender"* was retained.

Conclusion: The mean scores of girls from control group were higher than that of boys in listening, reading and writing skills whereas in experimental group, girls scored higher than boys in all the English language skills. However, the mean differences were not statistically significant which indicate that girls were not much better or little better than boys in English language skills.

6.2.0 Discussion of Findings

Effectiveness of whole brain teaching

The present study establishes the effectiveness of whole brain teaching for enhancement of English language skills mainly based on the following grounds:

1) The experimental group had more progresses and higher rates of progresses than the control group in English language skills during the period the experiment was being conducted which implies that whole brain teaching is more effectiveness for enhancement of English language skills than traditional teaching method.
2) When the performances of students in tests (pre and post tests) were compared, experimental group were better than control group which implies that whole brain teaching is more effective.
3) When group-wise comparison was made on the performances of students in post test on different English language skills, the experimental group were found to be better which indicates that whole brain teaching is more effective.

The present findings have the support of other studies. The findings are in agreement with that of Melani (2005) who investigated the impact of whole brain teaching technique in enhancing English language vocabulary among 60 SMP Sultan Agung seventh grade students. The findings of the study confirmed that whole brain teaching has a significant impact on the students' mastery in English vocabulary.

In an action research study carried out by Asmayanti and Amalia (2014) examining the effectiveness of the whole brain teaching technique in improving speaking skill among college students. The study concluded that the mean score of students in speaking skill improved. This is further supported by the finding of Dwintan and Aulia (2016) who worked on improving speaking skill through whole brain teaching among eleventh grade students and who reported that experimental group showed better scores and improvement in their speaking achievement.

The use of the whole brain teaching approach to improve reading skills of students was also investigated by Rimatika and Miladiyah (2015) where the study concluded that the students were more engaged and focused on the lecture when the whole brain teaching method was administered in class. Lahita, Mujiyanto and Sutopo (2018) employed the same method to improve the reading skill of grade eight students.

The findings of the study are again confirmed by Santoso (2016) who focused on improving spiritual intelligence in English language inscription by formulating whole brain teaching approach. The quantitative data were analyzed and the result shows that there was an improvement found in spiritual intelligence of the students in English language writing skill. Supportively, Natalia (2019) came out with the finding that the whole brain teaching has an impact on students' writing skill.

Furthermore, Cannon (2014) in his study on implementing whole brain teaching on class discussions exhibited the impact of whole brain teaching by applying one of the techniques i.e., Teach-Okay which enhanced students' engagement in class discussions. Another study which is in agreement with the present ones is an experimental study conducted by Palasigue and Torres (2009) which concluded that after implementing the whole brain teaching method, the behavior of the students improve tremendously.

The finding of Lockhart (2017) which revealed that whole brain teaching enhanced language acquisition and motivated primary school students to learn is in agreement with the results of the present study. The study reporting the positiveimpact in the academic performance of African-American elementary male students when brain-based teaching technique was applied (Vanhosen, 2015) has the support of the present study.

Kharsati (2017) also researched the impact of whole brain teaching strategies among 30 class seven students in Shillong. The key idea of the experimental study was to identify how whole brain teaching strategies can affect students' performance in science subject. The finding shows that the teaching method helps the students improve their test scores.

Torio and Cabrillas (2016) also undertook a quasi-experimental study that aimed to establish the effectiveness of whole brain teaching techniques on academic performance and motivation of students. A set of six lesson plans were executed to two groups of tenth grade students. The analysis confirmed that students had an average learning gain of 20% to academic performance and motivation. The finding that whole brain teaching method proved to have positive effects as a teaching strategy is in agreement with the present study.

Muthukrisknan, Phang; Rui and Ling (2019) also researched on whole brain teaching method on learning Math subject and its impact on the behavior of the student among 30 preschool children. Additional problems were taught before the experiment using traditional method of teaching. After the students were taught the five different fun-filled strategies the whole brain teaching method was implemented. This study revealed that the whole brain teaching enhanced the behavior and the students' performance and engagement also improved.

Thus, studies mentioned above support the present study as they all reported the effectiveness of whole brain teaching for enhancement of English language skills or some other academic skills.

Effectiveness of traditional teaching

The result that control group, exposed to traditional teaching with Herbatian lesson plan had progresses in English language skills in succeeding English language Competency modules confirms that the traditional teaching method, if accompanied by proper lesson plan with teaching aid is still effective for teaching students. The teacher's preparation for the class, his/her skill in teaching and other factors play a very important role in successful teaching.

Effectiveness of English language competency modules

Again, the findings that both control and experiment group witnessed progresses in English language skills throughout the experiment and that both the groups had scored better in post-test in comparison with pre-test may lead us to the possible important role that the English language competency modules themselves play for enhancement of English language skills. In this regard, there are some studies that support and confirm the effectiveness of this kind of modules.

Sonalde (2002) who developed English Language Competency Modules (ELCM) that aimed to improve the English language competency of students concluded that the teaching and learning materials provided for the study helped improve the students' language skills. Ali, Kassim and Osman (2008) also developed modules to enhance language skills among students. The findings exhibited the effectiveness of using English language modules. Lee (1995) asserted that language module played a fundamental role in the enhancement of English language skills. In the same vein, Lalongo (2009) affirmed that language module facilitated learning of new abstract concepts by helping to concretize ideas and integrate learners' interests.

Modules for language enhancement will help students attain proficiency in various language skills. In a qualitative study conducted by Ngowananchai (2013), B-SLIM Model was used that aimed to enhance language skills among students taking Business English II. Based on the findings, B-SLIM model proved to be enhancing the

language skills of students. Supportively, Ramat et al. (2016) developed an English Instructional Module among students from Suratpittaya School. The study concluded that the English instructional module had impact on academic achievement of students; after implementing the B-SLIM model, students developed a high level of satisfaction in the class teaching and learning.

The advantage of executing language modules in promoting students' learning is indisputable. They are meant to enhanceactiveparticipation in thelearningprocess, reducingtheteacher-centeredness in teachingandlearning. The principle of a language module is not a vague proposal but a specific hypothesis about human language (Cook & Newson, 2007).Language module not only benefits the students but also teachers in understanding the academic performance of students.

In view of the above research findings, we can conclude that the English language competency modules taught to students of both the groups played a very important role in enhancing English language skills.

Educational implications

Findings of the present study have implications for different stakeholders of education particularly at school level.

Firstly, the findings that whole brain teaching has effectiveness for enhancement of English language skills among students and that it is more effective than Herbartian traditional teaching approach have the implications that educational planners, administrators, managers, headmasters, teachers, students, parents and community at large need to be aware of this method. They should think on how to make it popular and how to start introduction of it in our teaching-learning process.

Secondly, the finding that traditional teaching method also has some effectiveness for enhancement of English language skills among students, if accompanied by proper lesson plan with teaching aids, has important educational implications. What it mainly implies is that introduction or implementation of new

teaching method may require time and that for the time being, efforts should be made to improve the teaching methods being used through different means. Teachers need to prepare themselves well in time by preparing lesson plans and need to prepare or collect relevant teaching aids for different topics to make the teaching-learning process more effective.

Since English language competency modules are considered to be playing important role for enhancement of English language skills among seventh grade students, the modules may be used for the relevant class and many other modules may be prepared by the teachers for their respective subjects and classes. These will help students in acquiring many important skills necessary for different subjects.

6.3.0 Recommendations of the Study

6.3.1 Specific Recommendations

1. Arrangements could be made for school teachers to undergo training or short term course on whole brain teaching.
2. The whole brain teaching could be recommended for school teachers to improve teaching, learning and academic achievement as it combines instructional strategies and direct instruction while the respective teachers facilitate the lesson’s core concept.
3. The whole brain teaching method could be adopted for use in any type of schools for the attainment of pedagogically sound curriculum and effective classroom management.
4. The whole brain teaching method could be introduced and adopted in different educational institutions.
5. The whole brain teaching could be employed to foster memory and retention of students at all levels as it focuses to take full advantage of students' involvement by activating the whole brain.

6. The whole brain teaching method could be implemented to develop the relationship between students and teachers.
7. The whole brain teaching method could be implemented to keep the students engaged and motivated.
8. Teachers should attempt to explore the whole brain teaching approach as the brain will not operate on the command by a rigid pre-designed curriculum but has its unique rhythms. A teacher must know nature's engine run to maximize learning.
9. There could be a fundamental shift from traditional form of teaching to brain-based teaching and learning approach. To improve students' performance the teacher and educator must be well versed on the function of the brain.
10. Given the findings on the effectiveness of the whole brain teaching, it could be introduced in teacher training institutions.
11. The whole brain teaching lesson plan could be used for enhancing students' language skills – listening, speaking, reading and writing.

6.3.3 General Recommendations

1. The educational planners, administrators, managers, headmasters, teachers, students, parents and community at large should be made aware of whole brain teaching techniques.
2. Apart from the teaching method adopted, teachers' preparation plays a very important role for successful teaching. Thus, teachers should prepare themselves for the classes well in time by preparing lesson plans, teaching aids etc. They should follow the right procedure of teaching with meaningful closure.
3. Implementation of whole brain teaching can begin by insisting school teachers to attend workshops and seminars that are related to brain-based teaching methodology and educating them about the importance of teaching method.
4. Comprehensive educational programmes on brain-based teaching must be planned by the state Government opening opportunities for teachers to attend sessions that are freely accessible and reachable.

5. Execution of financial aid for teachers would be a practical solution. For example – implementing a monthly training on brain-based teaching approaches for all teachers.
6. The School Education Department could examine the quality of teaching methodology used in schools.
7. Teachers could try to study the brain-based teaching and learning process and explore the different techniques involved in the teaching method.
8. Teachers should not only aim to complete the syllabus given in the textbooks but try to create interest and motivate the students to learn new knowledge.
9. Curriculum construction and enhancement could be prepared under the supervision of academically trained personnel.
10. Classroom environment could be revamped. It could be made more interactive and activity oriented. The seven techniques put forward by the whole brain teaching could be employed in the class.
11. Availability of efficient infrastructure, offline and online learning facilities could be ensured for improved teaching and learning environment. In this regard, Minimum Requirements of Infrastructures and Learning Facilities (MRILF) could be employed for practical implementation.
12. The English Language Competency Modules (ELCM) could be adopted as a remedial teaching tool for enhancing the language skills.
13. The English Language Competency Modules (ELCM) could be recommended for use to enhance the academic achievement of the students.

6.4.0 Suggestions for Further Studies

1. Effectiveness of whole brain teaching for learning subjects other than English may be studied.

2. Effectiveness of whole brain teaching on academic achievement of students at middle or below level may be studied.

3. Competency modules for different subjects may be prepared and their effectiveness may be studied.

4. Teachers' perception or attitude or opinion about whole brain teaching can be studied in relation to their school management and teaching experience.

5. Parents' perception or attitude or opinion about whole brain teaching can be studied in relation to their socio-economic and education level.

6. Research on any of the above mentioned topics may be conducted in other states of the country or among students of other classes or among students attending schools under different managements.

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APPENDICES

APPENDIX - I: WHOLE BRAIN TEACHING LESSON PLAN

Unit : 1	**Subject : English**	**Date :**
School : Model School	**Topic : Chawngmawii and Hrangchhuana**	**Time : 80 Minutes**

Teaching Points	Instructional objectives
Vocabulary: ash; humiliate; torture; behead; fearless. **Content**: Chawngmawii and Hrangchhuana **Teaching Aids**: Pictures; Blackboards; Flash Cards. **Reference Books**: Oxford English Pronunciation Dictionary, Wren and Martin Grammar.	**Knowledge:** a) To know the content of the lesson. b) To know the context of characters involved. **Comprehension:** c) To distinguish the spelling of the words - ash; humiliate; torture; behead; fearless. d) To recognize pronunciation of the words - ash; humiliate; torture; behead; fearless. e) To explain the meaning of the words - ash; humiliate; torture; behead; fearless. **Application:** f) To use the words ash; humiliate; torture; behead; fearless in framing sentences of their own. g) To show correct pronunciation, intonation and stress in reading the story. h) To demonstrate the true meaning of Love.

LEGEND	
TECHNIQUE	**OBJECTIVES**
CY – Class Yes **CR** – Classroom rules **H & E** – Hands and Eyes **TO** – Teach Okay **MW** – Mirror Words **S** – Switch **S-/S+** – Scoreboard ****** – Critical Thinking	**K** – Comprehension **E** – Expression

Attention Getter	Optional	Previous Knowledge	Teacher's Activity	Pupil's Activity
CY : 'Say Class'	**S-/S+**	Recite the **CR**		
CY : 'Say Class' **CY** : 'Say Class Class' **CY** : 'Say Classy Class'	**S-/S+** **H&E**	**Introduction :** Teachers use the following techniques.	Have you ever undergone the pain of losing someone/something very dear to you? Persons - Who are they? Things - What are they? What are some of the advices you get and from whom? Give a brief introduction about Love.	Yes/No **Persons:** brother; sister; mother; father; grandparents. **Things:** money; cell phones; watches; earring etc. Be good and do good; don't be naughty; do not come home late; do not forget to do your homework etc. Pupils listen
Statement of Aim: Today we shall study about '**Chawngmawii and Hrangchhuana**' **MW (Repeat)**				

CONTENT ANALYSIS	EXPECTED LEARNING OUTCOMES	LEARNING EXPERIENCE		EVALUATION	Pair Share
		TEACHER'S ACTIVITY	PUPIL'S ACTIVITY		
Development of the lesson. Vocabulary: Ash (n): the powdery residue left after the burning of a substance.	Spell the word and grasp the meaning. Recognize the meaning.	(Teacher illustrates a sentence through a picture.) E.g. The villagers had to remove the ash from the burner.	**MW (Repeat)**	Ash (n): the powdery residue left after the burning of a substance.	Clap twice say '**TO/S'**
Humiliate (v): to make someone feel ashamed.	Recognize the meaning.	(Teacher illustrates a sentence) E.g.: The people accused her of trying to humiliate the village.	**MW (Repeat)**	Humiliate (v): to make someone feel ashamed.	Clap twice say '**TO/S'**
Torture (n): the act of causing great physical pain. Behead (v) : cut off the head of (someone)	Express idea Recognize the meaning.	(Teacher illustrates a sentence by showing a picture) E.g.: She died under torture, which she bore with fortitude. (Teacher illustrates a sentence by showing a picture) E.g.: She watched him behead at the village.	**MW (Repeat)** **MW (Repeat)**	Torture (n): the act of causing great physical pain. Behead (v) : cut off the head of (someone)	Clap twice say '**TO/S'** Clap twice say '**TO/S'**
Fearless (adj): showing a lack of fear.	Express idea	(Teacher illustrates a sentence by showing a picture) E.g.: She was bold and fearless in her attacks to public figures.	**MW (Repeat)**	Fearless (adj): showing a lack of fear.	Clap twice say '**TO/S'**

CONTENT ANALYSIS	EXPECTED LEARNING OUTCOMES	LEARNING EXPERIENCE		EVALUATION
		TEACHER'S ACTIVITY	PUPIL'S ACTIVITY	
CONTENT Model reading by the teacher.	Recognize pronunciation, intonation & stress.	Teacher reads the lesson with proper punctuation, intonation and stress.	Pupils listen carefully.	**S-/S+**
Students reading aloud.	C/read the passage with reasonable speed & clarity.	Teacher corrects wherever requires.	Read the passage with proper pronunciation and intonation	**S-/S+**
Silent reading	C/pupils comprehend the meaning of the passage.	Instructs to read the passage silently. Time - 3 minutes. Without moving fingers across and vocalizing the sounds.	Read the passage silently	**S-/S+**

CONTENT ANALYSIS	EXPECTED LEARNING OUTCOMES	LEARNING EXPERIENCE		EVALUATION	Pair Share
		TEACHER'S ACTIVITY	PUPIL'S ACTIVITY		
Comprehension Questions Asking questions about what they have learnt.	C/Recall	1. Why did Chawngmawii and Hrangchhuana have to meet secretly? 2. How did they catch Hrangchhuna?	Chawngmawii and Hrangchhuana had to meet secretly because it was dangerous to meet openly as both their villages were at war with each other. The villagers caught Hrangchhuana because he had become more carless and left his footprints on the ashes which were spread at the foot of the wall.	**S-/S+** **S-/S+** **S-/S+**	Clap twice say '**TO/S'** Clap twice say '**TO/S'** Clap twice say '**TO/S'**
Concluding Statement : So today we have learned about the tragic love story of Chawngmawii and Hrangchhuana.					

APPENDIX – II: HERBERTIAN LESSON PLAN

<table>
<tr><td>Attention
Getter</td><td colspan="2">EVALUATION
S-/S+</td></tr>
<tr><td>CY: ‘Say Class’</td><td>RECAPTULATION</td><td>BLACK BOARD WORK</td></tr>
<tr><td>CY: ‘Say Class Class’</td><td>Describe the love of Chawngmawii and Hrangchuana in your own words.</td><td>Chawngmawii and Hrangchuana truly loved each other even when both their villages were at war Hrangchuana still manage to meet his love Chawngmawii secretly.</td></tr>
<tr><td colspan="3">Home Assignment
Textual: What did Chawngmawii do to take Hrangchuana’s head to his parents?
Activity: Give a pictorial representation of the word ‘LOVE’ and bring to the next class.</td></tr>
</table>

Unit : 1	**Subject : English**	**Date :**
School : Model School	**Topic : Chawngmawii and Hrangchhuana**	**Time : 80 Minutes**

Teaching Points	Instructional objectives
Vocabulary: Ash; humiliate; torture; behead; fearless. **Content**: Chawngmawii and Hrangchhuana **Teaching Aids**: Pictures; Blackboards; Flash Cards. **Reference Books**: Oxford English Pronunciation Dictionary, Wren and Martin Grammar.	**Knowledge:** a) To know the content of the lesson. b) To know the context of characters involved. **Comprehension:** c) To distinguish the spelling of the words - ash; humiliate; torture; behead; fearless. d) To recognize pronunciation of the words - ash; humiliate; torture; behead; fearless. e) To explain the meaning of the words - ash; humiliate; torture; behead; fearless. **Application:** f) To use the words ash; humiliate; torture; behead; fearless in framing sentences of their own. g) To show correct pronunciation, intonation and stress in reading the story. h) To demonstrate the true meaning of Love.

Previous Knowledge	Teacher's Activity		Pupil's Activity
Introduction : Teachers use the following techniques.	Have you ever undergone the pain of losing someone/something very dear to you? Persons - Who are they? Things - What are they? What are some of the advices you get and from whom? Give a brief introduction about Love.		Yes/No **Persons:** brother; sister; mother; father; grandparents. **Things:** money; cell phones; watches; earring etc. Be good and do good; don't be naughty; do not come home late; do not forget to do your homework etc.
	Statement of Aim: Today we shall study about '**Chawngmawii and Hrangchhuana**'		

CONTENT ANALYSIS	EXPECTED LEARNING OUTCOMES	LEARNING EXPERIENCE		EVALUATION
		TEACHER'S ACTIVITY	PUPIL'S ACTIVITY	
Development of the lesson. Vocabulary: Ash (n): the powdery residue left after the burning of a substance.	Spell the word and grasp the meaning. Recognize the meaning.	(Teacher illustrates a sentence through a picture.) E.g. The villagers had to remove the ash from the burner.	(Pupils listen & frame sentences)	Ash (n): the powdery residue left after the burning of a substance.
Humiliate (v): to make someone feel ashamed.	Recognize the meaning.	(Teacher illustrates a sentence) E.g.: The people accused her of trying to humiliate the village.	(Pupils listen & frame sentences)	Humiliate (v): to make someone feel ashamed.
Torture (n): the act of causing great physical pain. Behead (v) : cut off the head of (someone)	Express idea Recognize the meaning.	(Teacher illustrates a sentence by showing a picture) E.g.: She died under torture, which she bore with fortitude. (Teacher illustrates a sentence by showing a picture) E.g.: She watched him behead at the village.	(Pupils listen & frame sentences) (Pupils listen & frame sentences)	Torture (n): the act of causing great physical pain. Behead (v) : cut off the head of (someone)
Fearless (adj): showing a lack of fear.	Express idea	(Teacher illustrates a sentence by showing a picture) E.g.: She was bold and fearless in her attacks to public figures.	(Pupils listen & frame sentences)	Fearless (adj): showing a lack of fear.

CONTENT ANALYSIS	EXPECTED LEARNING OUTCOMES	LEARNING EXPERIENCE		EVALUATION
		TEACHER'S ACTIVITY	PUPIL'S ACTIVITY	
CONTENT Model reading by the teacher.	Recognize pronunciation, intonation & stress.	Teacher reads the lesson with proper punctuation, intonation and stress.	Pupils listen carefully.	
Students reading aloud.	C/read the passage with reasonable speed & clarity.	Teacher corrects wherever requires.	Read the passage with proper pronunciation and intonation	
Silent reading	C/pupils comprehend the meaning of the passage.	Instructs to read the passage silently. Time - 3 minutes. Without moving fingers across and vocalizing the sounds.	Read the passage silently	

CONTENT ANALYSIS	EXPECTED LEARNING OUTCOMES	LEARNING EXPERIENCE		EVALUATION
		TEACHER'S ACTIVITY	PUPIL'S ACTIVITY	
Comprehension Questions Asking questions about what they have learnt.	C/Recall	1. Why did Chawngmawii and Hrangchhuana have to meet secretly? 2. How did they catch Hrangchhuana?	Chawngmawii and Hrangchhuana had to meet secretly because it was dangerous to meet openly as both their villages were at war with each other. The villagers caught Hrangchhuana because he had become more carless and left his footprints on the ashes which were spread at the foot of the wall.	
Concluding Statement: So today we have learned about the tragic love story of Chawngmawii and Hrangchhuana.				

EVALUATION	
RECAPTULATION	**BLACK BOARD WORK**
1. Describe the love of Chawngmawii and Hrangchuana in your own words.	Chawngmawii and Hrangchuana truly loved each other even when both their villages were at war Hrangchuana still manage to meet his love Chawngmawii secretly.
Home Assignment **Textual:** What did Chawngmawii do to take Hrangchuana's head to his parents? **Activity:** Give a pictorial representation of the word **'LOVE'** and bring to the next class.	

APPENDIX – III: Lesson Plans Analysis

1. Weightage to Content

Sl. No.	Content	No. of questions	Marks	Percentage
1.	LP 1	2	6	15
2.	LP 2	3	7	17.5
3.	LP 3	2	4	10
4.	LP 4	2	8	20
5.	LP 5	2	2	5
6.	LP 6	2	2	5
7.	LP 7	1	2	5
8.	LP 8	2	2	5
9.	LP 9	2	4	10
10.	LP 10	2	3	7.5
	TOTAL	**17**	**40**	**100**

2. Weightage to Objectives

Objectives	Marks	Percentage
Knowledge	8	20
Comprehension	20	50
Application	12	30
Total	**40**	**100**

3. Weightage to Language Skills

Language skills	Percentage
Listening skill	10
Speaking skill	10
Reading skill	40
Writing skill	40
Total	**100**

4. Weightage to Type of Questions

Objectives	Knowledge			Comprehension			Application			Total
Lesson Plan	OT	SA	LA	OT	SA	LA	OT	SA	LA	
LP1	1					1				2
LP2	1					1				2
LP3							1			2
LP4					1					1
LP5	1									1
LP6	2									2
LP7					1					1
LP8	1									1
LP9							2			2
LP10	1				1					2
Total	7				3	2	4			16

5. Blueprint of the Items

Type	No. of questions	Marks	Percentage
Objective Type	12	24	60
Short Answer	3	6	15
Long Answer	2	10	25
Total	**17**	**40**	**100**

6. Test Items

Lesson Plan: 1			
Objective:	Knowledge and Comprehension		
Unit:	1		
Teaching Point:	Chawngmawii and Hrangchhuana		
Type of Item:	Objective and Long answer		
The Items:	1. Mention one thing that you learn from Chawngmawii and Hrangchhuana. 2. Why did Chawngmawii and Hrangchhuana have to meet secretly?		
Key:	1. The one thing that I learned from Chawngmawii and Hrangchhuana is that true love exists. 2. Chawngmawii and Hrangchhuana had to meet secretly because it was dangerous to meet openly as both their villages were at war with each other.		
Marks:	6		

Lesson Plan: 2			
Objective:	Knowledge and Comprehension		
Unit:	2		
Teaching Point:	The Rebel		
Type of Item:	Objective and Long Answer		
The Items:	1. Disturbance 2. If someone doesn't wear a uniform to school, what do you think the teacher will say? 3. Why it is not good to have rebels?		
Keys:	1. Disturbance (n): the interruption of a settled condition. 2. The teacher would talk to the student who would not be dressed in the school uniform while coming to the School; write a note in the diary. 3. It is not good to have rebels because very few people have the power to oppose the decision of the majority. They think differently and fearlessly stand with their choices which can be beneficial.		
Marks:	7		

Lesson Plan: 3			
Objective:	Application		
Unit:	3		
Teaching Point:	Grammar: Nouns		
Type of Item:	Objective type		
The Items:	1. Match the following: A B 1. a team of a. dancers 2. a bunch of b. soldiers. 3. a battalion of c. chicks 4. a brood of d. keys 5. a fleet of e. players 6. a troupe of f. birds 2. Pick out the Noun, Verb, and Adverb from the given statements. He is a mischievous boy. Noun - Verb - Adverb -		
Keys:			
	1. 1-e; 2-d; 3-b; 4-c;5-f;6-a. 2. Boy; Is; Mischievous		
Mark:	8		

Lesson Plan: 4			
Objective:	Comprehension		
Unit:	4		
Teaching Point:	Gopal and the Hilsa Fish		
Type of Items:	Short answer and Story (Comprehension)		
The Items:	1. Read carefully the following short story given in a box and construct at least three questions out of the story which could be answered from the story itself. There was a stag, he lives in a jungle. One day he went to drink water in a pond. He saw his reflection in the pond. He felt proud of his beautiful antlers. Then he saw his legs, he was upset because they were thin and ugly. Suddenly, there were hunters behind him. The stag ran to save his life. He wanted to hide in the bushes, but couldn't as his antlers were stuck in them. He found the hunters just behind him. He ran for his life and was finally saved. In the end, he realized that he was feeling proud of his antlers, but he would		

	have been killed because of them. He felt ashamed of his legs but was able to save his life ultimately because of them. The title is 'The Stag and his Beautiful Horns'. 2. What did the king ask Gopal to do to prove that he was clever?
Keys:	1. a)Where is the stag? The stag is standing by the side of a pond. b) What is the stag doing? The stag is about to drink water when he saw his reflection in the pond. c) Does he like his antlers (horns)? Yes, he finds them beautiful. d) Does he like his legs? No, the stag finds his legs to be thin and ugly. e) Why is the stag running? The Stag is running because he is being chased by the hunters. f) Is he able to hide in the bushes? No, he is not able to hide in the bushes because his horns got a stick in them. g) Is the Stag free? The Stag was able to run fast because of his legs and is free now. h) What does the Stag say about his horns and his legs? The Stag says that he was proud of his horns, but he would have been killed because of them. He was ashamed of his legs, but they saved his life. 2. The king asked Gopal to buy hilsa-fish and bring it to the court without letting anybody talk a single word about the hilsa-fish throughout the way.
Marks:	8

Lesson Plan: 5			
Objective:	Comprehension and Knowledge		
Unit:	5		
Teaching Point:	Chivvy		
Type of Item:	Short answer		
The Items:	1. Stare 2. When are you likely to be told this? Say thank you.		
Keys:	1. Stare (v): look fixedly or vacantly. 2. The children are likely to be reminded to say thank you when they receive a gift or a favor from someone.		
Mark:	2		

Lesson Plan: 6			
Objective:	Application and Comprehension		
Unit:	6		
Teaching Point:	Grammar: Verbs		
Type of Item:	Objective type		
The Items:	1. Define Verbs. Give example. 2. Pick out the Noun, Verb, and Adverb from the given statements. He is a mischievous boy. Noun - Verb - Adverb -		
Keys:	1. Verbs are words that define action – an action word. It will tell what the subject of a sentence is doing or what will happen. 2. Boy; Is; Mischievous		
Marks:	4		

Lesson Plan: 7			
Objective:	Comprehension		
Unit:	7		
Teaching Point:	The Desert		
Type of Item:	Short answer		
The Item:	In a desert, the temperature rises during the day and falls rapidly at night. Why?		
Key:	In humid climates, the moisture in the air acts like a blanket and protects the earth's surface from the hot rays of the sun. The absence of this blanket in desert lands causes the desert to heat up rapidly during the day and to cool off rapidly at night.		
Marks:	2		

Lesson Plan: 8			
Objective:	Comprehension and Knowledge		
Unit:	8		
Teaching Point:	Trees		
Type of Item:	Objective		
The Items:	1. Rake 2. Name the author of the poem Trees?		
Keys:	1. Rake (v): to draw together. 2. The author of the poem Trees is Shirley Bauer.		
Mark:	2		

Lesson Plan: 9			
Objective:	Application		
Unit:	9		
Teaching Point:	Grammar: Adverbs		
Type of Item:	Objective Type		
The Items:	1. Place the adverbs in the brackets within the sentences. Mark the place with an inverted v (^) 1. Deborah recited the poem (beautifully) 2. The college is not far. I walk the distance. (very, usually) 3. This story, in particular, is well - written. (extremely) 2. Pick out the Noun, Verb, and Adverb from the given statement. He is a mischievous boy. Noun - Verb - Adverb -		
Keys:	1) 1. Deborah recited the poem ^ (beautifully) 2. The college is not ^ far. I ^ walk the distance. (very, usually) 3. This story, in particular, is ^ well - written. (extremely) 2) Boy; Is; Mischievous		
Mark:	4		

Lesson Plan: 10			
Objective:	Knowledge		
Unit:	10		
Teaching Point:	Fire: Friend and Foe		
Type of Items:	Objective and Short Answer		
The Items:	1. What are the ways in which a fire can be put out? 2. What are the common uses of fire?		
Keys:	1. Fire can be put out by taking away the fuel, stopping the supply of oxygen, or lowering down the temperature around the fuel. 2. Fire is used in cooking, to keep our homes warm during winter; it is also used to produce electricity.		
Mark:	6		

7. Question Paper Analysis

Item No.	Objective	Teaching Points	Type of Question	Marks allotted
1.	Application	Nouns and Collective Nouns	Objective	5
2.	Knowledge	Verbs	Objective	3
3.	Application	Adverbs	Objective	5
4.	Knowledge	Trees	Objective	1
5.	Knowledge	Chivvy	Objective	1
6.	Knowledge	Chawngmawii and Hrangchhuana	Objective, Long answer	6
7.	Knowledge	Fire: Friend and Foe	Objective, Short answer	3
8.	Knowledge	Rebel	Objective, Long answer	6
9.	Comprehension	Gopal and the Hilsa Fish	Short answer	2
10.	Comprehension	Desert	Short answer	2
11.	Comprehension	Story	Objective	

APPENDIX – IV

MODULE 1

CHAWNGMAWII AND HRANGCHHUANA

About the Module

This unit is the love story of Chawngmawii and Hrangchhuana, a touching tale. It is a story of two young lovers who fought against all odds. It is said that the souls of Hrangchhuana and Chawngmawii changed into stars believed to be Jupiter and Venus. These two stars come together every now and then in their journey through space, and at such times, folklore has it that the souls of Hrangchhuana and Chawngmawii unite. It also brings out the brutality of Mizo life in those days.

Pre-requisites: It is assumed that:

1. Students are aware of Mizo folktale.
2. They know the general concept of Love.

Objectives

Knowledge:

a) To know the content of the lesson.

b) To know the context of characters involved.

Comprehension:

a) To distinguish the spelling of the words - ash; humiliate; torture; behead; fearless.

b) To recognize pronunciation of the words - ash; humiliate; torture; behead; fearless.

c) To explain the meaning of the words - ash; humiliate; torture; behead; fearless.

Application:

a) To use the words ash; humiliate; torture; behead; fearless in framing sentences of their own.

b) To show correct pronunciation, intonation and stress in reading the story.

c) To demonstrate the true meaning of Love.

Assignment

Textual: What did Chawngmawii do to take Hrangchhuana's head to his parents?

Activity: Give a pictorial representation of the word **'LOVE'** and bring to the next class.

APPENDIX - V

ENGLISH LANGUAGE COMPETENCY TEST

SUBJECT: ENGLISH

CLASS: VII

Time : 1.5 Hours **Marks:**50

Instructions: (please read)

1. **There are two parts to this question paper. Section A - Grammar and section B - Literature.**
2. **Read the questions carefully and write the answers in full sentences, taking note of all punctuation marks.**
3. **All the answers have to be written on the question paper only.**

SECTION A

1. Rewrite as directed:

Match the nouns to the most suitable collective nouns: **½ x6=3**

A	B
1.a team of	a. dancers
2.a bunch of	b. soldiers
3.a battalion of	c. chicks
4.a brood of	d. keys
5.a fleet of	e. players
6.a troupe of	f. birds

II. Define Verb. Give examples. 1x1=1

III. Place the adverbs in the brackets within the sentences. Mark the place with an inverted v (^) 1x3=3

1. Deborah recited the poem. (beautifully)

2. The college is not far. I walk the distance. (very, usually)

3. This story, in particular, is well - written. (extremely)

IV. Pick out the Noun, Verb and Adverb from the given questions. 1x3=3

1. He is a mischievous boy.

Noun - Verb - Adverb -

V. Make sentences. 1x3=3

1. Disturbance - 2. Stare - 3. Rake -

VI. Read carefully the following short story given in a box and construct at least three questions out of the story which could be answered from the story itself. 1x6=6

There was a stag who lives in a jungle. One day he went to drink water in a pond. He saw his reflection in the pond. He felt proud of his beautiful antlers. Then he saw his legs, he was upset because they were thin and ugly. Suddenly, there were hunters behind him. The stag ran to save his life. He wanted to hide in the bushes, but couldn't as his antlers were stuck in them. He found the hunters just behind him. He ran for his life and was finally saved.

At the end he realised that he was felling proud of his antlers, but he would have been killed because of them. He felt ashamed of his legs, but was able to save his life ultimately because of them. The title is 'The Stag and his Beautiful Horns'.

SECTION B

VII. Answer all the following questions in one or two sentences each. 1X5 = 5

1. Name the author of the poem Trees?
2. When are you likely to be told this? Say thank you.
3. Mention one thing that you learn from Chawngmawii and Hrangchhuana?
4. What are the ways in which a fire can be put out?
5. If someone doesn't wear a uniform to school, what do you think the teacher will say?

VIII. Answer the following questions in three to four sentences: 2x3=6

1. What did the king ask Gopal to do to prove that he was clever?
2. In a desert the temperature rises during the day and falls rapidly at night. Why?
3. What are the common uses of fire?

IX. Answer the following questions in four to five sentences 5x2=10

1. Why did Chawngmawii and Hrangchhuana have to meet secretly?
2. Explain why it is not good to have rebels

SECTION C

X. The teacher will tell a short story and each student will be required to answer the questions given based on the story.1x10=10

The Shepherd's Boy

There was once a young Shepherd Boy who tended his sheep at the foot of a mountain near a dark forest. It was rather lonely for him all day, so he thought upon a plan by which he could get a little company and some excitement. He rushed down towards the village calling out 'Wolf, Wolf,' and the villagers came out to meet him, and some of them stopped with him for a considerable time. This pleased the boy so much that a few days afterwards he tried the same trick, and again the villagers came to his help. But shortly after this a Wolf actually did come out from the forest, and began to worry the sheep, and the boy of course cried out 'Wolf, Wolf,' still louder than before. But this time the villagers, who had been fooled twice before, thought the boy was again deceiving them, and nobody stirred to come to his help. So the Wolf made a good meal off the boy's flock, and when the boy complained, the wise man of the village said:

'A liar will not be believed, even when he speaks the truth'

1. What did the boy say that was not true?
2. Why didn’t the villagers help the boy when the wolf was about to eat the flock?
3. How would you explain what the wise man of the village said about the incident?
4. Identify one character trait that would describe the Shepherd boy?
5. What is the moral of the story?

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DEPARTMENT	: EDUCATION
TITLE OF THE THESIS	: EFFECTIVENESS OF WHOLE BRAIN TEACHING FOR ENHANCEMENT OF ENGLISH LANGUAGE SKILLS: AN EXPERIMENTAL STUDY

PARTICULARS OF THE CANDIDATE

PARTICULARS OF THE CANDIDATE

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1. DRC	:	24.09.2018
2. BOS	:	28.09.2018
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CONTENTS

Whole Brain Teaching: A World Leader in Brain Based Teaching

Lal Rem Siami*
Lalhmasai Chuaungo**

Abstract

Whole Brain Teaching is an instructional approach drawn from a neuro-linguistic picture that focuses on direct instruction and cooperative learning by activating the whole brain. In the early 90s, a movement began that attempted to link neuroscience and education known as 'brain-based learning' which later led to the establishment of the whole brain teaching method. Whole Brain Teaching attempts to break away from conventional norms and allow students to engage, involve, and activate the whole brain in learning. Based on the scientific brain research study, Chris Biffle puts forward a selection of powerful whole brain teaching techniques known as the 'Big Seven'. It is the seven key techniques or elements to effective teaching and learning that activate the brain. Advocates from different fields affirm that teachers can incorporate these techniques into their everyday classroom to enhance the students' academic achievement. Whole Brain Teaching is still a virgin area of research. Conducting researches on it and its effectiveness is an urgent matter of concern.

Keywords: Whole Brain Teaching (WBT), Brain Based Teaching (BBT), Techniques, Research

Introduction

Student academic performance has become the main focus of every teacher today. One of the biggest challenges faced by many teachers is to keep students actively engaged in class. While several researchers continue to search for ways to overcome the challenges, one phrase repeatedly rises to the surface is whole brain teaching that is regarded as the world leader in brain-based learning also known as 'power teaching'. Whole brain teaching is an instructional approach drawn from a neuro-linguistic picture that focuses on direct instruction and cooperative learning by activating the whole brain (Biffle, 2010). Educational neuroscience is an emerging scientific field, an empirical study of the brain for education reform (Zadina, 2015). During the past decade, numerous researches have connected the fields of neuroscience

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with education. Education focuses on the enhancement of learning while neuroscience is about understanding the mental processes involved in the teaching and learning process (Royal Society, 2011). Researches in this area may link to comprehensive findings in cognitive neuroscience along with educational technology to help in the curriculum implementation for different subjects. The main aim of educational neuroscience is to generate new trans-disciplinary accounts through applied research which is capable of developing a comprehensive pace in areas greatly relevant to education (Goswami, 2006). At present, teachers are at the receiving end of a brain-based teaching method that leads to research and development of teaching techniques that can activate the whole brain in the classroom setting. Brain-based education considers how the brain learns best. The human brain is plastic, organizes, and reorganizes by learning; in other words learning changes the physical structure of the brain (Dam, 2013). The brain does not learn on-demand by school's rigid, inflexible schedule (Jensen, 2000). If we want to maximize learning, we first need to understand the rhythms and structure of the brain. This singular realization alone has fueled an urgent movement to redesign learning.

Brain Based Learning (BBL)

In the early 90s, a movement began that attempted to link neuroscience and education known as 'brain based learning' (Zadina, 2015). The relationship between the brain and learning is established. BBL is best understood as a multidisciplinary approach that is built on the fundamental question: What is good for the brain? (Jensen, 2000). It focuses on accepting the set of rules on how the brain processes, and then arranges teaching techniques to achieve meaningful learning (Caine & Caine, 1994). Based on the findings of neuroscience, BBL functions based on the workings of the brain to develop the best method to enhance academic achievement, and provide equal opportunities for individual differences. Every teacher has to identify the working system of the brain for an effective and efficient teaching method (Dafford, 2004). Without knowing how the brain works, it is impossible to understand the nature of learning. According to Duman (2006), a teaching approach based on neuroscience increases the speed of learning and produces long-term learning. Brain based education improves the teaching and learning process, improves resiliency, and creates a better learning environment for the students (Swan, 2019). With such an extensive range of scientific findings, it is clear that the implications of Brain Based Learning are far-reaching. As a result, the Whole Brain Teaching method was established by Chris Biffle and his colleagues in the year 1999. It started with one teacher problem which led to comprehensive research and development of teaching techniques that could activate the whole brain.

Techniques of Whole Brain Teaching (WBT)

The first law of whole brain teaching is "the longer we talk the more students we lose". The founder Chris Biffle explains that students have the passion to learn more when they are emotionally engaged and are required to see, to say, to hear, and to move around. Supportively, a research finding by Jensen (2000) confirmed that there was a relationship between the brain and human emotions. In whole brain teaching, students are given inclusive freedom to

participate in all the classroom activities conducted. This creates a student-centered classroom environment, a flexible teaching method that is enjoyable for students and teachers as well as sound teaching pedagogy (Biffle, 2013). In most classrooms, teachings remain stand and deliver lecture method transferring knowledge leading to a test. However, WBT attempts to break away from these conventional norms and allow students to engage, involve, and activate the whole brain in learning. Hart (1999) rightly pointed out that developing a teaching and learning method without the knowledge of the brain is like designing a glove without the knowledge of the hand. The teacher must understand how the brain retrieves and retains information.

Based on the scientific brain research study, Biffle puts forward a selection of powerful techniques known as the 'Big Seven'. It is the seven key elements to effective teaching and learning that activate the brain (Biffle, 2013). Advocates from different fields affirm that teachers can incorporate into their everyday classroom to enhance the students' academic achievement (Biffle, 2010).

Technique 1: Class-Yes: 'Attention Grabber' – Class-Yes grabs the attention of students instantly. It is like a readiness switch that prepares the students for the daily lesson. It helps the teacher to achieve students' attention by using the saying 'Class' and the students respond 'Yes'. The attention-getter activates the Prefrontal cortex which is the brain boss (Biffle, 2013).

Technique 2: Classroom Rules: 'The Organizer' – Before beginning the actual informative lesson, the teacher goes over the five classroom rules. Each given rule corresponds to its gestures that activate the students' Motor cortex which is considered as one of the most powerful area of the brain; these gestures make learning fun which again helps in activating the Limbic system (Biffle, 2013). The five classroom rules and one diamond rule are given below:-

1. Follow directions quickly. (Make your hand shoot forward like a fish)
2. Raise your hand for permission to speak. (Raise one hand and bring down to head by making a talking motion)
3. Raise your hand for permission to leave your seat. (Raise one hand and make a walking motion with fingers).
4. Make smart choices – Glorious kindness, positive leadership, selfless courage, invincible grit, and brainy creativity. (Tap one finger to your temple as you say each word).
5. Make our dear team stronger. (Hold up each thumb and index finger out like an "L" framing your face; bob your head back and forth with each word)

❖ The Diamond rule: Keep your eyes on the target. (Pointing your eyes with your index finger).

Technique 3: Hands and Eyes: 'The Focuser' – This technique helps the teacher attain maximum attention from the students (Clark, 2016). When the main topic is needed to be

addressed to the students, the teacher said, 'Hands and eyes' and the students will immediately respond 'Hands and eyes'. It gives an instant focusing by eliminating all distractions in the class (Biffle, 2013). This technique can be utilized whenever the teacher wants the students to pay extra attention.

Technique 4: Teach-Okay: 'Whole Brain Activator' – In this technique, the teacher engages in direct verbal instruction using gesture. Research indicates that students learn best when they are active and involved in the teaching and learning process (Biffle, 2013). This technique is where students can form groups and the teacher addresses each group by using charts, poems, songs, and body movement. The student then mimics the teacher to teach the pupil sitting next to him or her. Five areas of the brain are activated as – the Visual cortex when the students look and follow, Motor cortex when the students mimic the teacher, Broca's area when the students start teaching and Wernicke's area when the students learn, and the Limbic system when the students exhibit their emotions to the lesson taught (Biffle, 2013).

Technique 5: Mirror Words: 'The class unifier' – This technique is the simplest yet most powerful as it helps the students in retaining the information, it keeps the student energized. It is used when the teacher wants the student to mimic exactly what they say or do. A mirror word is effective for explaining a procedure and process, giving instruction and steps, telling a story, mostly for capturing attention. The students mirror both the words and gestures of the teacher; their Motor cortex and Visual cortex which is the most reliable memory area are automatically engaged. Several research studies have proved that learning accompanied by gestures results in better memory (Jones, 2014).

Technique 6: Switch: 'The involver' – This technique Switch gets everyone involved in class, it allows each student to speak and listen, one teaches and the others listen, the teacher gives a cue to switch and the students' response 'okay' then the role is exchanged. They are using the gestures and words the teacher modeled, the class is being divided into two groups – Brocaians (speaker) and the Wernikites (listener), this improves listening and speaking skills (Biffle, 2013).

Technique 7: Scoreboard game: 'The Motivator' – To reinforce the students the teacher creates the scoreboard so that the students get to receive feedback on the performance. This technique is an important motivating force and involves the Limbic system in learning to perform better in the class. A simple t-chart is drawn on the board that makes the class interesting. The main focus is not to transform the students' behavior but to unify as many students as possible behind the teacher's leadership (Biffle, 2013).

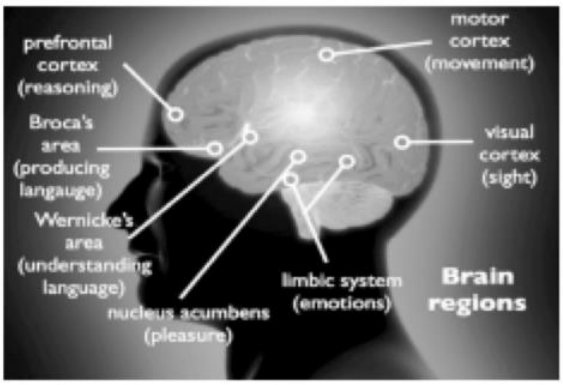

Figure 1: Image 1 Brain Regions retrieved from https://wholebrainteaching.com/brain-course/

Theoretical Framework

Albert Bandura's Social Learning Theory

In social learning theory, Bandura (1977) theorizes that learning cannot be maximized until and unless cognitive processes are activated. He strongly believes that mental factors intervene in the attainment of knowledge; individuals do not automatically imitate the given educational model if there is no meditation before imitation. He further states that students attain knowledge from each other with the help of observation, imitation, and modeling. Bandura's theory moves ahead of behavioral theories, which advocate that all behaviors are attained with the help of cognitive theories and conditioning which take into consideration the psychological influences such as memory and attention (Cherry, 2019). The social learning theory is often described as the 'bridge' between cognitive psychology and traditional learning theory (behaviorism) because it encompasses attention, memory, and motivation (McLeod, 2016). According to Bandura, satisfaction and pleasure (Nucleus acumbens) affect the learners' academic performance. Another important mechanism is the imitation by which a child develops and grows. Imitation follows principles such as skills, competency, and familiarity with the given information.

Hermann Whole Brain Theory

William Ned Hermann puts forward a brain based learning theory, a metaphorical model to illustrate that each individual has four quadrants that are characterized by different learning or thinking skills. Each of these quadrants can be significantly different depending on the level of learning and thinking processes (Inocian, 2015). Hermann (2000) describes that every individual brain has four quadrants in the process of thinking and learning. Each of these quadrants is distinguished by different learning and thinking styles. The four different styles are: A) Analytical (Upper or Cerebral left brain) B) Practical (Lower or Limbic left brain) C) Relational (Lower or Limbic right brain) D) Experimental (Upper or Cerebral right brain). Hermann's Whole Brain Theory focuses on optimizing the strengths and attending to

weaknesses by introducing all the four learning styles (A, B, C, and D) in a single class (Bawaneh, Md Zain & Saleh, 2011). By using varied teaching methods and techniques every four quadrants can be activated (Hermann, 2002) Whole Brain Teaching (WBT) is anchored on this brain based theory as it supports the theory that student attains optimal knowledge when his/her whole brain is activated. With the help of a whole-brain approach students' achievement improves and delivers memorable learning experiences.

Research on Whole Brain Teaching

In the modern age of technology, it is getting harder and harder to keep the students engaged in the classroom setting. It is a challenge to teach effectively. Teachers are expected to teach optimally by identifying the best teaching and learning methods. The best of teaching method is a brain based teaching method that activates the whole brain (Handayani & Corebima, 2017). Understanding the diversified spectrum of the brain will facilitate teachers in developing an effective and efficient teaching method. Therefore, it is imperative to execute a brain based learning and teaching method to enhance the academic achievement of students.

Whole Brain Teaching, a brain-based teaching approach is the most current teacher-researcher integrated educational reform. It has become the fastest-growing teaching technique around the nation. The model of WBT is learning with instructional approaches that are derived from neurolinguistic pictures based on the left and right brain (Lee & Hung, 2009). An action research study was carried out by Asmayant and Amalia (2014) on examining the effectiveness of the whole brain teaching method among 30 college students from SMP Negeri 1 Baraka. The main objective was to find out the level of improvement in speaking accuracy. The study concluded that the students' speaking skills improved with the help of the whole brain teaching method.

The problem for creating a learning environment in the class is not that the students lack the motivation to learn, it is simply that the teachers lack effective teaching strategies. Anthon and Zenaida (2016) researched whole brain teaching in the Philippines for examining students' motivation. The purpose of the study was to explore the effectiveness of the whole brain teaching method among tenth-grade students. The findings of the study confirmed a positive significant result.

The use of the whole brain teaching method to enhance students' skills was also investigated by Lockhart (2017) in research conducted among 48 primary school students. The findings revealed that whole brain teaching enhanced language acquisition and also motivated students to learn. In another research conducted by Falls (2016) among 12-grade students on the whole brain teaching method that focused on increasing the level of motivation, the result indicated that students who were taught based on the whole brain teaching method were more motivated to learn.

The review of the literature reveals that research in the area of Whole Brain Teaching is still at an embryonic stage, there are still several ongoing researches on the connection between education and neuroscience. Researchers conducted are less in number and narrow in scope

or coverage. Even though there is an extensive lack of research study but the idea of making learning active by direct instruction and cooperative learning by activating the whole brain is very remarkable. Conducting more researches on it and its effectiveness is an urgent matter of concern.

Conclusion

Research findings on the human brain have extensively contributed to our understanding of the brain. Insights gained from the research study led to the development of the whole brain teaching method which is based on how the brain learns. As described by Biffle (2010), the whole brain teaching method is a teaching technique where students' brain is activated and they are constantly engaged in seeing, hearing, doing, and speaking in the classroom. This is supported by Dales's (1969) 'Cone of experiences', where he describes that learning should be accompanied by memorable experiences where students have the opportunities to see, hear, touch, and try. At present, most students do not receive the chance to discover and think. Rather, they are conditioned to memorize based on the rigid lecture method (Lee & Reeves, 2007). Teachers must be willing to adopt a brain-based teaching method as learning does not occur through lectures alone.

Brain- based teaching and learning is a way of stimulating all the important parts of the brain. Educational institutions that have implemented a Whole Brain Learning have shown improvements in the academic performance of the students. Numerous research studies have shown the brain based teaching approach to be an active tool to increase learning over some time. Given the foregoing shortcomings in the teaching method, one of the vital tasks that faces us today is to remodel the teaching methodology. The education sector calls for a radical change for it is on the reconstruction of the education system that the development of the country depends. Zull (2004) rightly pointed out that the art of teaching must be the art of changing the structure of the brain. Therefore, priority must be credited to achieving standard qualitative modification by introducing brain based teaching method as this area of study is still very much unexplored and unidentified.

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A Study on the English Language Competency among Model English School Students in Aizawl City

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Abstract
Today's children are living in a globalized world where English is a lingua franca. The majority of school children in cities and towns are educated in English medium schools right from their preschool age. In spite of this, teachers at higher education level often complain the weakness of students in English. The present study was conducted to find out English language competency among class VII students of Model English medium school in Aizawl and to compare the English language competency in relation to their gender. English language competency test constructed by the investigators was administered to 83 students. The statistical analysis revealed that 57% of class VII students showed unsatisfactory results in English language competency, 23% possessed an average level and only 6% showed a satisfactory level of English language competency.

Key words: English Language Competency, English language.

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I. INTRODUCTION

Language plays a central role in teaching and learning, without it, we cannot make sense of or communicate our understanding of a subject (The Open University, 2021)[13]. The students' academic competency is enhanced when they are proficient in language and it also helps them adapt more easily to a different learning environment. With the advancement of teaching and learning, there is a mushroom growth in the use of English Language in schools. However, the majority of students are not able to express themselves with proper language competency which surely affects their academic development leading to dullness of intelligence. As teaching-learning can be more effective when children and teachers possess command over the language of instruction, there is a need to enhance the English Language Competency of students.

Keeping the above context in view, the present study was conducted to administer the English Language Competency among Model English school students in Aizawl city. This study was done with the hope of providing insights for teachers and educators who wish to promote students' English language competency as well as to fill the gap that exists in the current literature.

II. RELATED LITERATURE

We cannot make any kind of achievement in the study of language if we do not consider language 'competency' (Information Processing Language, 2021)[5]. The notion of language competency was first developed in the mid -1960 by Naom Chomsky, an American linguist. Chomsky identified language competency as an idealized linguistic ability to understand and comprehend words and sentences (Belletti & Rizzi, 2003)[1] The student's language competency can be examined through conducting a systematic research study so that teachers will have a general knowledge of students' errors (Xie & Jiang, 2007)[14]. The study on Language Competency proved to be an important tool as it sheds light on the areas of problems faced and by providing comprehensive results upon which teaching module of remediation can be erected as given by Keshavarz (2008)[6]. Thus, there is a need to identify the source of problems in the process of attaining proficiency in language competency.

Existing research contributing to the language competency of students reveals various problems in the teaching and learning process. In a study conducted by Farooque (2005)[3]. the language competency in different subjects is measured and identified and that almost every teacher working at an English medium school in Kannur district are not trained and lack adequate proficiency in English language which highly affect the academic performance of the students. In another study conducted by Subramanian (2009)[12] where the linguistic skills of the graduate students in English Language are examined, all the language competency skills namely-listening, speaking, reading, and writing have been evaluated where he identified various errors as -

grammatical, phonological, and orthographical errors. The researcher recommended language games and audiovisual teaching aids for language teaching and learning. In an analysis conducted by Qureshi (2012)[9] titled 'Language planning in higher education: A case study of Pakistan', the investigator analyzed the teaching and learning process of the English language and examined the interest of the students in understanding English language in the context of Pakistan. To make language learning interesting language games were developed by the researcher. Supportively, Sindkhedkar (2012)[11] researched the objectives of teaching and learning the English language in India. The researcher emphasizes that the main focus of teaching English language in the Indian context should not be linguistic robots or producing bookworms.

The review of literature gives the researchers insight into studies related to English language competency and has led the investigators to conduct a study in Aizawl city as no study has been conducted which emphasized the development of English language competency. The researcher considered all the respective research studies and used them as guidelines to prepare English Language Competency modules. The reviews have clearly shown that student's language competency could be enhanced when effective teaching aid is used.

Existing research on the English Language Competency of students is still at an embryonic stage. The continuing failure to provide comprehensive information on students' language competency leads to drawbacks in an academic setting. Considering various research studies on language competency - listening, speaking, reading and writing skills, the main purpose of this study was to investigate the language competency of class VII students from Model English School.

The research questions addressed in this study are:

1. What is the language competency among students of Model English School in Aizawl city?
2. Is there any significant difference in the language competency between boys and girls?

Objectives of the Study

1. To study English language competency among students of Model English School in Aizawl city.
2. To compare English language competency among students of Model English School in Aizawl city in relation to their gender.

III. MATERIAL AND METHODS

A between group design study was used in this study to examine the English language competency among class VII students of Model English School in Aizawl. The study aims to find out English language competency among class VII students and to identify the language competency in which the students need improvement most so that remedial measures could be suggested. English language competency test constructed by the investigators was administered to 83 students with 45 (boys) and 38 (girls). Random sampling was used. The study was administered in a regular classroom and students were seated apart.

Study Design: Between group design study

Study Location: This was a conducted in a government aided school called Model English School located in Aizawl, Mizoram, India.

Study Duration: January 2021 to September 2021

Sample size: 83 students

Sample size calculation: The sample size was estimated on the basis of Random sampling design

Data Analysis

Microsoft Excel software (2010) was utilized to analyze the data. Students' performance was the dependent variable while English Language Competency Test was the independent variable. Descriptive statistics of the sample and paired sample t-test inferential statistics were applied to analyze the data.

Section 1: Descriptive Analysis

Section 2: Inferential Analysis

Section 1: Language Competency among class VII Students of Model English School in Aizawl City (Descriptive Analysis).

Table 1.1 Indicating the Language competency level-wise distribution of Model English School Class VII students

Level	Marks	Frequency	Percentage
Very Poor	**<10**	**18**	**22**
Poor	**10-20**	**29**	**35**
Average	**20-30**	**19**	**23**

Good	**30-45**	**12**	**14**
Excellent	**>45**	**5**	**6**
Total	**50**	**83**	**100**

Figures in parentheses indicate percentages

IV. RESULTS

Descriptive statistics were computed to learn about the characteristic of the sample. Out of the 83 responses received, analyses were conducted based on the responses. There were 83 students with 45 (54%) boys and 38 (46%) girls. The students were of diverse economic backgrounds. Some of them are first-generation learners who are likely to receive less support from their families in their quest for higher education.

The Language competency level-wise distribution of Model English School Class VII students presented in Table 1.1 gives a clear picture of descriptive statistics. As per Table 1.1, the statistical analysis revealed that 57% of class VII students have shown unsatisfactory results in English language competency, 23% possess an average level and only 6% have shown a satisfactory level of English language competency.

Table 1.2 Indicating the Language competency components - wise distribution of Model English School Class VII students

Components	Max	Min	MD	SE	SD
Listening	12	1	5.79	0.87	3.05
Speaking	11	1	3.88	0.58	2.26
Reading	12	2	5.93	0.89	2.79
Writing	12	2	4.77	0.71	2.27

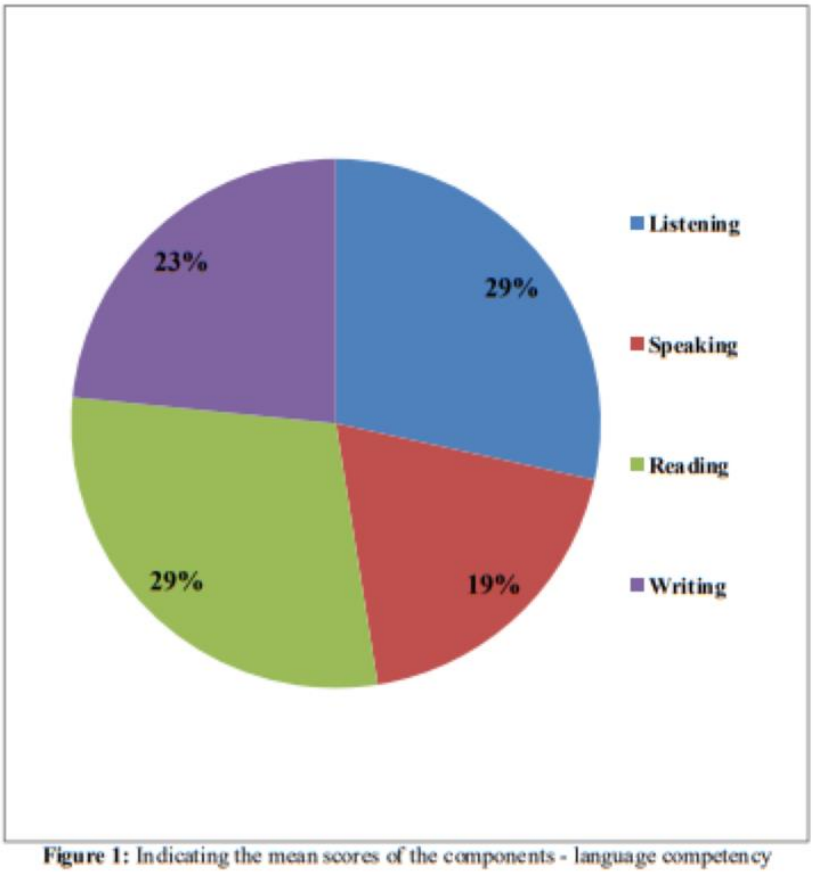

Figure 1: Indicating the mean scores of the components - language competency

Listening

Listening is regarded as the mother of al four skills. It involves the process of making meaning out of a spoken language, constructing and processing sounds into words. Table 1.2 reveals the component-wise descriptive analysis of the language competency of class VII Model English school students. The components that are measured in Listening include hearing, sensing, interpreting, and remembering. The calculated mean score for Listening is 5.79. This shows that students need improvement. In today's technological age, it is a challenge to keep students' attention therefore educational technology that is available today can be carefully selected and used that will teach students about what they are learning.

Speaking

When compared to listening, speaking is a much more complex skill. It is often regarded as an act of creativity. Speaking involves the consciousness of the lexical and grammatical, the ability to present understandably and speak without any grammatical errors. The components that are analyzed in Speaking include pronunciation, grammar, vocabulary, fuency, and comprehension. The calculated mean score for Speaking is 3.88. Students need a remedial class in speaking that will allow the student to advocate for themselves. Making students attain proficiency in speaking demands a good model syntactic structure and incorporates questions that lboost comprehension. Therefore, a comprehensive language competency module must be developed to develop oral language for the students.

Reading

Reading is said to be a conscious and complex activity, it is considered as a gateway to getting extensive worldly knowledge. Traditionally, reading was considered as a passive skill however, today it is considered as an active skill and also one's reading ability decides his academic achievement (Fulcher, 1998)[4]. The components that are measured in Reading include the pace of reading, expression, phonic, fluency, and comprehension. Table 1.2 depicts a mean score of 5.93 for reading among class VII students from Model English School. In a reviewed research conducted by Slavin, Cheung, Groff, & Lake (2008)[10] on the approaches to improving the reading of middle school students includes: (a) reading curricula, (b) mixed-method models (methods that combine large and small-group instruction with computer activities), (c) computer-assisted instruction, and (d) instructional-process programs.

Writing

Writing is considered an alternative medium of language. It is the ability to express one's thoughts and wishes and present them in a written form without any grammatical errors. The components that are analyzed in Reading include spelling, punctuation, vocabulary, knowledge, and creativity. The calculated mean score of Class VII students in writing is 4.77. A closer look at the table reveals that there is a need to provide an extensive guidance and tutorial program that offer necessary services to help students attain proficiency in writing, it may also require the involvement of parents (Chang, 2001)[2].

Table 1.3 Indicating the Language competency components - wise distribution of Model English School Class VII students across gender

Components	Gender	Max	Min	MD	SE	SD
Listening	Boys	10	1	5.75	1.17	2.78
	Girls	12	1	5.85	1.30	3.42
Speaking	Boys	8	1	3.58	0.73	1.79
	Girls	11	1	4.25	0.95	2.73
Reading	Boys	11	2	5.79	1.13	2.73
	Girls	12	3	6.1	1.36	2.91
Writing	Boys	9	2	4.5	0.91	1.84
	Girls	12	2	5.1	1.14	2.71

Listening

The component 'Listening' which measures varied listening competency of the students given in table 1.3 reveals that the calculated mean score for boys is 5.75 and girls is 5.85 respectively. This shows that there is not much of a difference between the mean scores of boys and girls.

Speaking

The calculated mean score on 'Speaking' which measures pronunciation, grammar, vocabulary, fluency, and comprehension is 3.58 for boys and 4.25 for girls. At the same time, the scores reveal that girls have a higher mean score which means that they are better at speaking.

Reading

The calculated mean score for boys concerning their 'Reading' is 5.79 and girls is 6.1. It can be seen that the mean score of the girls is higher than boys. The component included in Reading includes the pace of reading, expression, phonic, fluency and comprehension.

Writing

The component – 'Writing' that measures spelling, punctuation, vocabulary, knowledge, and creativity shown in table 1.3 depicts a mean score of 4.5 for boys and 5.1 for girls. This shows that girls scores higher than boys.

Section 2: Difference in the Language Competency for Demographic Variable – Gender (Inferential Analysis)

Table 1.4 Inferential statistics on the level of English language competency between boys and girls students

Variable	Gender	SED	Paired 't' value	Df	Levels of significance 0.05 & 0.01
English language competency	Boys	3.01	0.15	83	Significant
	Girls				

Results

Table 1.4 represents a paired sample t-test conducted to compare the English Language Competency between boys and girls students of class VII students from Model English School. It is found that there is a significant difference between boys and girls students Df (83) = 0.15, t value >.05. Boys (M=20.86, SD=8.65) and Girls (M=21.3, SD=11.29).

V. SUMMARY OF FINDINGS AND DISCUSSION

This study is intended to contribute to existing research on finding the language competency among class VII students from Model English School, Aizawl, and to fill the research gap on the significant difference between boys and girls. Based on the results and the research questions addressed in this case study, it is concluded that a) Majority 57% of class VII students have shown unsatisfactory results in language competency, 20% possess an average level and only 5% has shown a satisfactory result b) There is a significant difference in the English language competency across gender.

Results on the language competency were consistent with a previous research study conducted by Nisha (1995)[9] that explored the language competency of first-year degree students. The investigator concluded there is a hindrance between language teaching and language syllabus that resulted in poor English Competency. The communication strategies of the students are also examined based on the problems exhibited by the learner in the process of attaining proficiency in the language. Findings on gender differences were also supported by a study conducted by Naderi, Abdullah, Aizan & Sharir (2010)[8] that confirmed that there was a significant difference between boys and girls.

The findings of the present case study greatly exhibit the role of teachers and educators in enhancing the language competency of students. More focus is needed in the areas of speaking and writing competency. At the same time, from the calculated means, it is also evident that student's listening and reading competency needs improvement too. It is apparent from this study that an effective curriculum and structured modules are needed to be introduced to enhance the language competency of students. An intelligence profile must be maintained to remain aware of students' potential and capabilities. Hence, maintaining a unique record of students' academic performance will help both the teachers and parents in understanding the specific strengths and weaknesses of the student.

VI. IMPLICATIONS FOR PRACTICE

The findings of this study lead to several educational implications for future practices that may bring about changes in the teaching and learning process. The implications provided could be useful for schools in Aizawl city when addressing the language competency of students. Moreover, implementing these

recommendations put forward by the investigator would not only help the students but will also have a positive impact on teachers on the overall curriculum planning and development on all levels.

This present study revealed that the majority 57% of class VII students from English Model School have shown unsatisfactory results in English language competency. To increase the level of academic performance, the education department of the state may look into the quality and consistency of the teaching process and may attempt to introduce a comprehensive curriculum framework based on modern technology. Providing competent and consistent teaching aids will help students to develop an interest in learning and also motivate them to enhance their language competency. Therefore, a practical solution would be to identify effective and efficient teaching pedagogy.

Implementation can start with the state government insisting all the school teachers attend more courses that are related to the development of language competency. A useful solution would be to call upon the central or state to raise financial aid on educational programs by implementing periodical training for the teachers on all levels. Schools may put forward resourceful curricula with emphasis on the attainment of proficiency in the English language. The process of education could improve more rapidly if monitored and executed by the state authority more proficiently, and not as a routine method.

VII. LIMITATIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

This study had several limitations. Firstly, it was limited to only one city, Aizawl. A similar case study can be conducted in other cities and states. Secondly, this research was limited to only one method – between group design. Future research could employ a mixed research methodology to obtain more widespread information on language competency. Thirdly, the sample of the study was limited in terms of the variable considered. It is suggested for further studies to include more variables. Finally, more research study is needed on seeing the language competency at all levels.

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This is to Certify that ***Ms. Lal Rem Siami,*** Research Scholar, Department of Education, Mizoram University, Aizawl, presented a paper titled "***English Language Competency among Class VII Students: A Case Study of Model English School, Aizawl***" in the One Day National Webinar on '***Contemporary Issues and Trends in Indian Education – III***', Organized by Mizoram Educational Foundation on 27th April, 2021.

(Dr.LALZARMAWII)
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This is to Certify that ***Ms.Lal Rem Siami,*** Research Scholar, Department of Education, Mizoram University, Aizawl, has presented a paper titled "***Whole Brain Teaching: An Emerging Trend in Education***" in the Two Day National Webinar on '***Contemporary Issues and Trends in Indian Education – II***', Organized by Mizoram Educational Foundation on 18th and 19th November, 2020.

(Dr.LALZARMAWII)
Gen. Secretary

(Prof. LALBIAKDIKI HNAMTE)
President

ANNEXURE-I

MIZORAM UNIVERSITY (A Central

University)Ph.D.Thesis/M.Phil.DissertationCertificateonPlagiarism

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NameofResearchScholar/Student	LAL REM SIAMI	
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TitleofPhDthesis/MPhildissertation	Effectiveness of Whole Brain Teaching for Enhancement of English Language Skills : An Experimental Study	
Name&InstitutionalAddressofthe Supervisor/JointSupervisor	Prof. Lalhmasai Chuaungo Mizoram University, Tanhril	
Nameofthe DepartmentandSchool	Department of Education	
Dateofsubmission	02.09.2022	
Dateofplagiarismcheck	17.08.2022	
Nameofthe softwareused	TURNITIN	
Percentageof similaritydetected bythe Turnitinsoftware	**CoreAreas**	4%
	Non-Coreareas	5%
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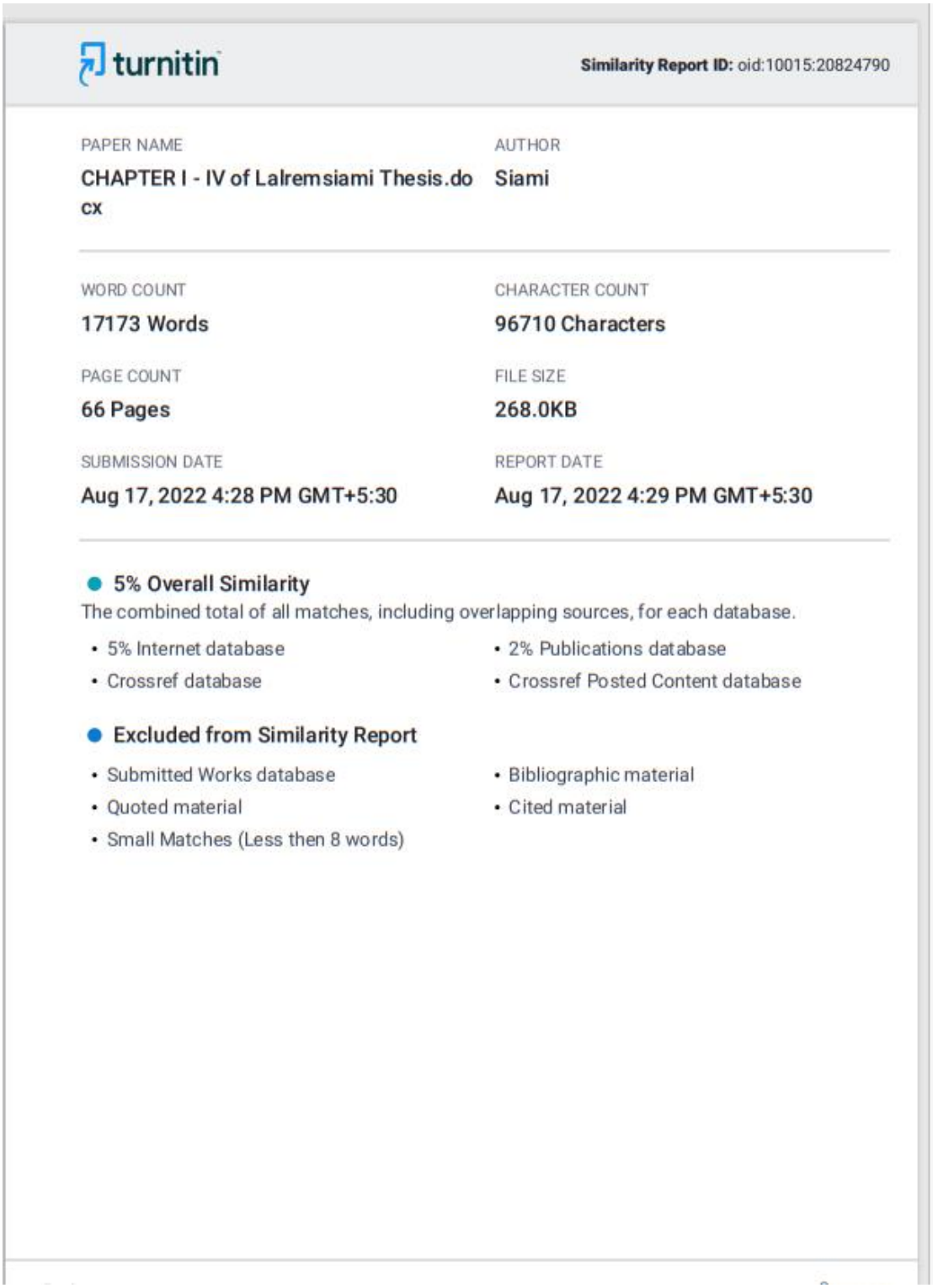

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EFFECTIVENESS OF WHOLE BRAIN TEACHING FOR ENHANCEMENT OF ENGLISH LANGUAGE SKILLS: AN EXPERIMENTAL STUDY

ABSTRACT

OF THE THESIS SUBMITTED IN PARTIAL FULFILLMENT

OF THE REQUIREMENTS FOR THE DEGREE

OF DOCTOR OF PHILOSOPHY

LAL REM SIAMI

MZU REGN. No.: 1807302

Ph.D REGN. No.: MZU/Ph.D./ 1167 OF 30.10.2018

DEPARTMENT OF EDUCATION

SCHOOL OF EDUCATION

SEPTEMBER, 2022

ABSTRACT

EFFECTIVENESS OF WHOLE BRAIN TEACHING FOR ENHANCEMENT OF ENGLISH LANGUAGE SKILLS: AN EXPERIMENTAL STUDY

BY

LAL REM SIAMI

DEPARTMENT OF EDUCATION

SUPERVISOR

PROF. LALHMASAI CHUAUNGO

SUBMITTED

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS OF THE DEGREE OF DOCTOR OF PHILOSOPHY IN EDUCATION OF MIZORAM UNIVERSITY, AIZAWL

Introduction

Whatmoush (1967) defines language as an unwritten figurative system where individuals share knowledge and distribute information. Language skills are a code employing symbols, signs, and gestures that are used for communicating interests and ideas. To excel in all walks of life, a comprehensive language skills foundation is needed for the students as language is regarded as a non-instinctive system of communication (Sapir, 1921). The methodologies of teaching English language skills should include - communicative teaching, grammar-translation and structural technique (Robinson, 1995). The main goal of teaching language is not to blindly achieve the skills but to commune efficiently in daily activities. A shift from a rigid structural method to an interactive method of teaching and learning is a pressing need today.

The development of English language skills is formulated by the National Policy on Education (1968 & 1986) where importance is given to implementing English language skills in letter and in spirit. With the growing demand and change in the education sector, the Government of India has put forward a wide range of proposals like the RTE Act, 2009 that aims to provide a comprehensive education structure in all stages of education. RTE integrated with SSA provides a clear thrust on education for students belonging to disadvantaged groups. RMSA and RUSA are another two major flagship innovative programmes for educational development.

The National Curriculum Framework (NCF) 2005 highlights how language teaching is one of the most neglected areas in schools, and how it has become the most unchallenging site of education. It emphasizes that language teaching should be multilingual wherein schools should follow a three-language formula. Educators must be aware of this inconsistency and provide effective intervention in the hope to change the education system. Thus, there is a need to modify the method of teaching and learning language among school students. What is needed is a brain-based teaching approach since all teaching and learning activities are connected to the brain in some way or the other. Brain-based learning maybe put in three basic words: strategies, co-operative learning and principles (Jensen, 2000).

Hart (1999) compares teaching without understanding the functions of the brain as making a glove that has no sensation of the hand. He further puts forward his argument in order to drive home his key point; the brain ‘the organ of learning’ should be accommodated

in the classrooms if they are to be places of teaching and learning. Shifting from rote memorization to collaborative learning is the foremost aim of brain-based teaching and learning. Brain-based teaching and learning has given us extensive research evidence which suggests that adoption of teaching and learning method based on the formation of the brain can enhance learners' academic performance (Sontillano, 2018; Wolken, 2017; Palasigue & Torres, 2009; Sousa, 1998). Functioning of the brain and its effect on learning outcome provides a scope for change and improvement of teaching method.

The method of teaching paves the way towards the attainment of a certain goal or reaches a new dimension (Rowley, 1945). According to Webster's dictionary, the method is defined as a well-ordered purpose to be accomplished to present the materials effectively. Whole brain teaching (WBT) also called 'power teaching' is a brain-based teaching method that focuses on stimulating the whole brain in teaching and learning (Alford, 2014). It combines instructional strategies and directs instruction while the respective teachers facilitate the lesson's core concept (Alaniz, 2015). WBT is a teaching method that focuses on how the brain is intended to attain information; it is a flexible approach which can be employed for all age groups. It is recognized as the world's fastest-growing reformative movement in the education sector (Biffle, 2010). The longer we talk, the more students we lose – is the first law of WBT (Bajak, 2014).

The philosophy of Whole brain teaching is surrounded by seven core techniques of teaching known as the 'Big Seven' (Biffle, 2010). It breaks learning into small segments with direct instructions which leads to cooperative learning, direct instruction and constant feedback. The techniques are briefly described below:

1. The first technique is called Class - Yes - Attention Getter. It helps the teacher to achieve students' attention by saying 'Class' and the students answer with 'Yes'. The attention-getter stimulates the prefrontal cortex (Biffle, 2013).

2. The second technique is Classroom Rules - The Organizer used to manage the classroom discipline. Five classroom rules are utilized to help manage the students. Each given rule corresponds to its gestures that activate the students' **motor cortex** and **limbic system** (Biffle, 2013).

3. The third technique is Hands and Eyes - The Focuser. This teaching technique facilitates the teacher to achieve maximum attention from the students (Clark, 2016).

4. The fourth technique is called Teach - Okay - Whole Brain Activator. In this technique the **visual cortex**, **motor cortex**, **broca's area**, **wernicke's area and limbic system** are activated (Biffle, 2013).

5. The fifth technique is Mirror Words - The Class Unifier. This technique helps the students in retaining the information. The students mirror the words and gestures that activate the **motor cortex** of the brain**.** Several research studies have proved that learning accompanied by gestures help in the attainment of better recollection (Jones, 2014).

6. The sixth technique is Switch - The Involver. Switch allows all the students to get involved in the classroom, one teaches and the others listen, the teacher gives a cue to switch and the students respond okay then the role is exchanged. The class is divided into two groups - Brocaians (speaker) and the Wernikites (listener), this improves listening and speaking skills (Biffle, 2013).

7. The seventh technique is known as The Scoreboard - The Motivator. To reinforce the students the teacher creates the scoreboard. The main aim is not to change the students' behavior but to unify students' attention (Biffle, 2013).

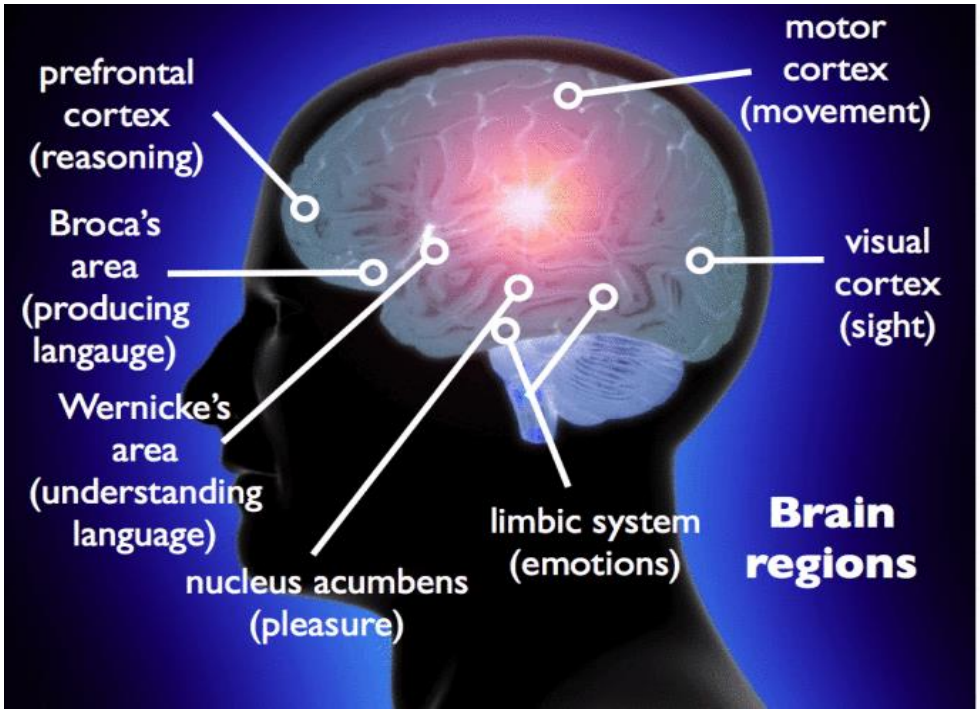

Figure 1.1.0 Image 1 Brain Regions Retrieved September 18, 201 from https://wholebrainteaching.com/brain-course/

Rationale of the Study

National Curriculum Framework (2005) precisely points out how language learning is the most neglected and unchallenging sites of education. The significant outcome of enhancing language skills may possibly be undermined by educationists and linguistics. A competent educator may recognize the existing gap in language teaching and learning (NCF, 2005). Therefore, there is a need to formulate effective and efficient teaching method; students must be given opportunity to attain proficiency in English language.

UNICEF's State of the World Children 1999 addressed that the convention on rights of children leads us in the direction of a child-centered model of teaching, where children are independent and actively involved, share their ideas and interests which in turn enhance students' sense of worth. The programme of study may be customized based on the need and requirements in order to enhance the language skills (listening, speaking, reading and writing) of students.

Effectiveness of the present teaching methods must be assessed to facilitate the students to move from rote memorizing to concept mastery where students can freely apply their knowledge and experience achieved (Sindhu, 2013). Many researchers confirm that teaching method has an extensive influence on students' academic performance, and further identify that students' academic performance depends upon the teaching method a teacher adopted since effective learning takes place when there is efficient and effective teaching (Karami, Pakmehr & Aghili, 2012; Adewale & Ogunshola, 2012; Ganyaupfu, 2013).

Until recently, one of the common observations is that most students learn language with no in depth understanding of the basic grammar and comprehension; this can occur due to absence of an effective language teaching method. The magnitude of formulating English language in the programme of study is extensively acknowledged and there has been an extensive effort taken at various levels. However, these steps taken may possibly fail because of incompetent administration and organization. Non-availability of effective teaching methods appears to be one of the most crucial factors. We need an innovative steer to reconstruct the teaching method at all levels.

Multiple researches recognize that creating joy is an essential element to boost students' involvement in learning (Elias, 2016). This is one of the most common challenges faced by teachers to incorporate joyful teaching and learning in the class. Teachers are incorporating the whole brain teaching method to improve students' readiness to attain new knowledge and information, for teachers who have been practicing this teaching method say that whole brain teaching has made a massive difference in students' academic achievement (Szott & Molitoris, 2010).

Reviews show that impact study on whole brain teaching method is quite a new area of research in our country and abroad. It is a virgin area of research not yet thoroughly explored particularly in Mizoram. Moreover, no study is found to have been researched on experimenting effectiveness of whole brain teaching on enhancement of English language skills. The questions that may be raised in this regard are:

1. Will whole brain teaching be more effective than traditional teaching for the enhancement of English language skills among students?
2. Will the effectiveness of whole brain teaching using the English Language Competency Modules (ELCM) be the same or different among boys and girls?

Questions of this type cannot be provided with meaningful answers unless the research is conducted. To address this type of research questions and fill the research gap in this regard, an experimental study on the effectiveness of whole brain teaching for enhancement of English language skills has been undertaken. The study is an earnest attempt to enhance the English language skills by applying the whole brain teaching method among seventh grade students.

Statement of the Problem

The central purpose of the present study is to assess the effectiveness of whole brain teaching for enhancement of English language skills among students. The problem of the study is thus stated as:

'Effectiveness of Whole Brain Teaching for Enhancement of English Language Skills: An Experimental Study'

Objectives of the Study

The present study was conducted with the following objectives:

1. To develop the English Language Competency Modules (ELCM) for the enhancement of English language skills.
2. To prepare a traditional Herbartian lesson plan based on English Language Competency Modules (ELCM).
3. To prepare whole brain teaching lesson plan based on English Language Competency Modules (ELCM).
4. To construct English Language Competency Test.
5. To find out the progress in English language skills during intervention.
6. To find out the effectiveness of whole brain teaching for the enhancement of English language skills.
7. To find out the effectiveness of whole brain teaching for the enhancement of English language skills across gender.

Null Hypotheses of the study

1. There exists no significant difference between mean scores of pre-test and post-test in English language listening skill among students from control group.
2. There exists no significant difference between mean scores of pre-test and post-test in English language speaking skill among students from control group.
3. There exists no significant difference between mean scores of pre-test and post-test in English language reading skill among students from control group.
4. There exists no significant difference between mean scores of pre-test and post-test in English language writing skill among students from control group.
5. There exists no significant difference between mean scores of pre-test and post-test in English language skills among students from control group.
6. There exists no significant difference between mean scores of pre-test and post-test in English language listening skill among students from experimental group.

7. There exists no significant difference between mean scores of pre-test and post-test in English language speaking skill among students from experimental group.
8. There exists no significant difference between mean scores of pre-test and post-test in English language reading skill among students from experimental group.
9. There exists no significant difference between mean scores of pre-test and post-test in English language writing skill among students from experimental group.
10. There exists no significant difference between mean scores of pre-test and post-test in English language skills among students from experimental group.
11. There exists no significant difference between mean scores of control and experiment groups in English language listening skill.
12. There exists no significant difference between mean scores of control and experimental groups in English language speaking skill.
13. There exists no significant difference between mean scores of control and experimental groups in English language reading skill.
14. There exists no significant difference between mean scores of control and experimental groups in English language writing skill.
15. There exists no significant effectiveness of whole brain teaching for enhancement of English language skills.
16. There exists no significant difference between the pre-test scores of boys and girls in English language listening skill.
17. There exists no significant difference between the post-test scores of boys and girls in English language listening skill.
18. There exists no significant difference between the pre-test scores of boys and girls in English language speaking skill.
19. There exists no significant difference between the post-test scores of boys and girls in English language speaking skill.
20. There exists no significant difference between the pre-test scores of boys and girls in English language reading skill.
21. There exists no significant difference between the post-test scores of boys and girls in English language reading skill.

22. There exists no significant difference between the pre-test scores of boys and girls in English language writing skill.
23. There exists no significant difference between the post-test scores of boys and girls in English language writing skill.
24. There exists no significant difference between the pre-test scores of boys and girls in English language skills.
25. There exists no significant difference between the post-test scores of boys and girls in English language skills.
26. There exists no significant difference between mean scores of control and experimental groups in English language listening skill across gender.
27. There exists no significant difference between mean scores of control and experimental groups in English language speaking skill across gender.
28. There exists no significant difference between mean scores of control and experimental groups in English language reading skill across gender.
29. There exists no significant difference between mean scores of control and experimental groups in English language writing skill across gender.
30. There exists no significant effectiveness of whole brain teaching for enhancement of English language skills across gender.

Method of the Study

To achieve the objectives, the present study adopted pre-test – post-test, experimental - control group design in an experimental setting. The research method is symbolically illustrated below:

Figure 1.2.0 Research Method (Jaiyeola & Salami, 2006)

O^o	X^1	O^1 (EO)
O^2	X^2	O^3 (CO)

Where, X^1 = Intervention (Whole Brain Teaching Method)

X^2 = Intervention (Traditional Teaching Method)

O^o O^2 = Pre - test

O^1 O^3 = Post - test

EO = Experimental Group

CO = Control Group

Population and Sample of the Study

Population of the present study comprises all the class VII or seventh grade students in Mizoram who study English textbooks prescribed for seventh grade students by SCERT, Mizoram, Aizawl.

Sample selection was done by employing stratified random sampling technique. First of all, the state of Mizoram was stratified into districts. Out of the 11 districts, one district namely Aizawl district was selected randomly. Aizawl district was again stratified into blocks and out of the four blocks existing in the district, Tlangnuam block was randomly selected. Tlangnuam block was further stratified into circles and out of the 11 circles under Tlangnuam block, Venghlui circle was picked out randomly. Out of the middle schools and schools having middle section under Venghlui circle, Model school, Aizawl was lastly selected randomly. Class VII or seventh grade students of this school finally became sample for the present study. The sample composition is given in Table 1.1.0

Table 1.1.0

Sample Composition of the Study

GROUP	Experimental Group	Control Group	Total
N	41	42	83

Figure 1.3.0 Graphical Presentation of the Sample under Reference

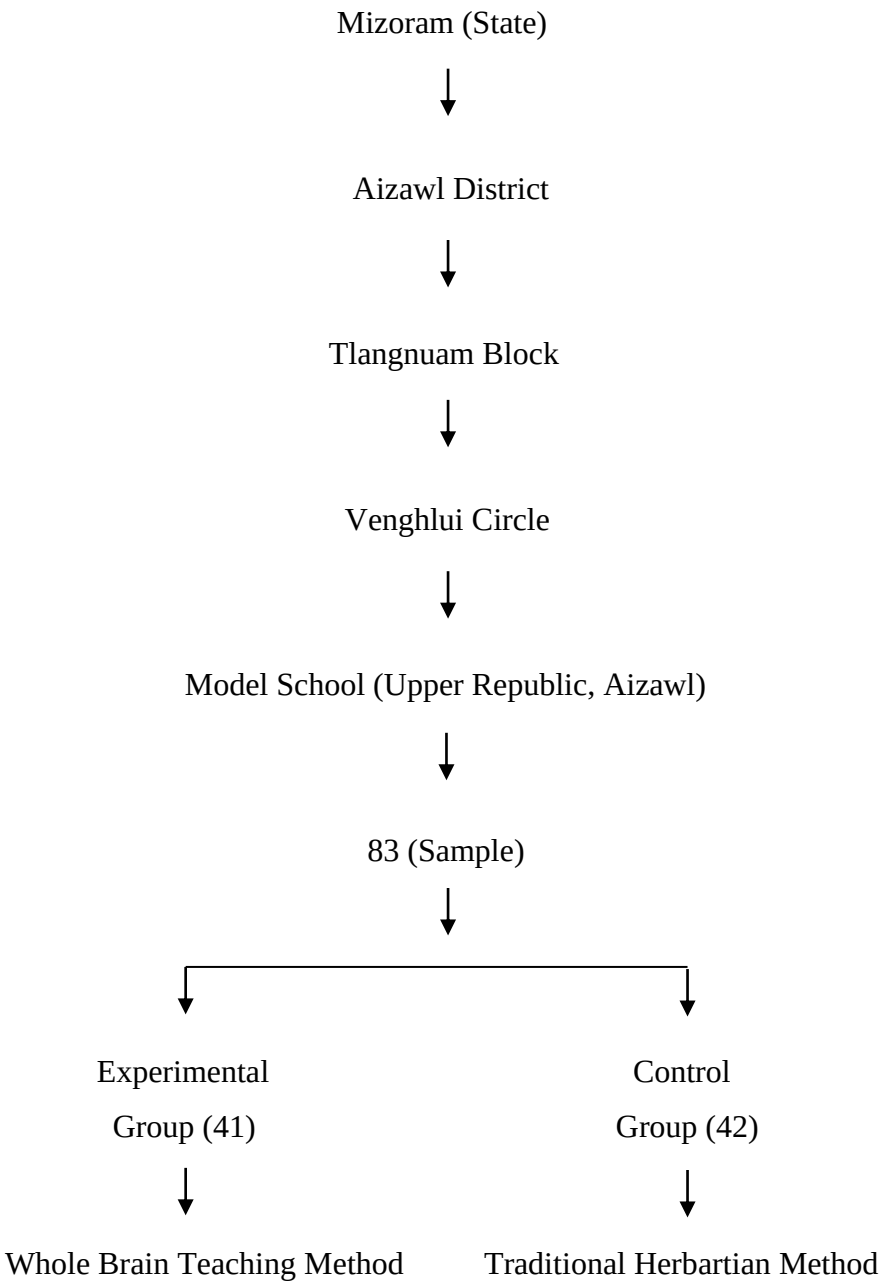

Figure 1.3.0 shows that the sample of 83 students from Model School was bifurcated into two groups. Based on the treatment given to the students, 41 formed an experimental group which was taught through whole brain teaching method and the rest 42 students formed control group, taught through traditional teaching method.

Tools Used in the Study

1. English Language Competency Modules (ELCM)

English Language Competency Modules (ELCM) were constructed to foster the English language skills of students. The modules were developed and validated based on the contents from seventh grade English textbooks prescribed by SCERT, Mizoram. Ten modules were validated in the light of discussions with experts and English language teachers. The modules consist of four units from prose, three units from the poem, and three units from the grammar section.

To construct comprehensive modules, the investigator did an extensive review of literature in language skills related to language development. The objectives and implications of the language modules were thoroughly studied and various existing programs on language development were weighed and looked into. Bloom's Taxonomy of educational objectives was incorporated.

The teaching aids used for executing class activities for ELCM were mostly easily available materials ranging from charts, flashcards, picture books, educational videos, and activities. The final selection was done based on module validation by experts. The details of validation and editing of the English Language Competency Modules (ELCM) are given in the concerned chapter.

2. Traditional Herbartian Lesson Plan

The investigator prepared a traditional Herbartian lesson plan. The lesson plan was developed based on English Language Competency Modules (ELCM). It also involved the Herbartian five steps approach that includes the following:

1. Introduction - It is concerned with the task of preparing the learners for attaining new knowledge.

2. Presentation - The lesson is developed and presented with the cooperation of the students.

3. Association- The teacher establishes a relationship between different subjects.

4. Generalization- The students are allowed to think and generate ideas.

5. Application - The teacher verifies the students by recapitulation (Mahaeshwari, 2011).

Ten traditional Herbartian lesson plans were developed that covered four units from prose, three units from the poem, and three units from the grammar section. For the validation of the lesson plans, the investigator had chosen experts from different areas of study. It was given to fifteen experts from different fields. After the initial validation, ten lesson plans were included for the intervention.

3. Whole Brain Teaching Lesson Plan

The whole brain teaching lesson plan was developed and validated based on the format given by Chris Biffle following textbooks prescribed for class VII by SCERT, Mizoram. The five steps of lesson planning are as follow:

Step 1 – Ask the lesson question

Step 2 – Answer with a memory gesture

Step 3 – Critical thinking

Step 4 – Assess

Step 5 – Writing

Before developing the lesson plan and starting the experiment, the investigator had undergone a certified online course of 3 months duration under Whole Brain Teachers of America. Ten whole brain teaching lesson plans were thus developed which comprised of four units from prose, three units from the poem, and three units from the grammar section. Lesson plan validation was done by taking feedback of fifteen experts from different fields of study.

4. Tool to Assess English Language Skills - English Language Competency Test

English language competency test was developed by the investigator. The test carrying 50 marks was constructed based on the language achievement test pattern given by school teachers. The criteria used to test the language skills of the students include – 1) Listening - hearing, sensing, interpreting and remembering; 2) Speaking - pronunciation, grammar, vocabulary, fluency, and comprehension; 3) Reading - pace, phonic, fluency,

comprehension and expression; and 4) Writing - spelling, punctuation, vocabulary, knowledge, and creativity.

English language competency test constructed was carefully examined to make sure that the test efficiently covered the contents. The investigator had satisfied the reliability and content validity of the test. Hence, a blueprint of the test items was prepared and developed by the researcher.

Statistical Analysis of the Data

Keeping in view the objectives of the present study, descriptive and inferential statistical techniques were employed for quantitative analysis. The technique and the rationale for using them are given below:

Descriptive Statistics

1. Mean : The mean was determined as a measure of central tendency which tells us of the overall performance of the students in pre and post tests.
2. Standard Deviation: Standard deviation – one of the measures of central tendency was also calculated. It shows us how much the scores of the students are scattered.
3. Percentage: The percentage was employed to express a number as a part of a whole. It shows the tendency of value concerning the original value.

Inferential Statistics

1. ‘t’-test Analysis: ‘t’-test as an inferential statistic was calculated and analyzed. It shows whether there was any significant difference between the mean scores of pre-test and post-test or not and also if there was any significant difference across gender.

Findings and Conclusions

Findings and Conclusions on Progress/Improvement in English Language Skills during Experiment/Intervention

1. In each test conducted on each English language competency module among control group of students during the period the experiment was being conducted, progresses were found as follow:

a) In a test on module 1, the students' marks ranged from a minimum of 3 to a maximum of 9 and the mean score was 5.0952.
b) On module 2, the range of students' marks increased to a minimum of 5 to a maximum of 11. The mean score also increased to 8.95238.
c) On module 3, the minimum marks increased from 5 to 6 whereas the maximum mark is 13. The mean score increased from 8.95238 to 9.5.
d) On module 4, the minimum marks increased from 6 to 11 but the maximum marks remained 13. The mean score, however, came up to 12.07.
e) On module 5, the range of marks came up to a great extent and that it had become 11 to 15. Marked increase was also found in mean score which had come up to 13.8333.
f) On module 6, the minimum mark was 12 and the maximum mark increased from 15 to 16. The mean score increased further to 14.9286.
g) Marks improvement was found in module 7 that the mark range came up to 14 - 19 with a mean score of 16.762.
h) The mark range on module 8 came up to 16 to 20 and the mean score was increased to 18.452.
i) On module 9, test scores continued to improve in that the minimum mark was raised to 17 while the maximum mark was 22. The mean score came up to 19.76.
j) On the last module – module 10, students' test scores range was 17 - 22 and the mean score became 20.095.

Conclusion: Among control group students, mark range increased in every succeeding test conducted on every English language competency module. Mean scores also increased in succeeding tests during the period the experiment was being conducted. It is, therefore, concluded that there was appreciable progress in English language skills among control group students who were taught English language competency modules through traditional teaching method during the intervention.

2. Among experimental group students, progresses in English language skills found during the time the experiment was being conducted were as follow:

a) In a test on module 1, the students' marks ranged from a minimum of 3 to a maximum of 9 and the mean score was 6.7073.
b) On module 2, the range of students' marks increased to a minimum of 8 to a maximum of 15. The mean score also increased to11.244.
c) On module 3, the minimum mark increased from 8 to 10 whereas the maximum mark was 19. The mean score increased from 11.244 to 13.854.
d) On module 4, the minimum mark increased from 10 to 12 but the maximum mark was 21. The mean score, however, came up to 15.195.
e) On module 5, the range of marks came up to 11 to 20. Marks increase was also found in mean score which had come up to 16.171.
f) On module 6, the minimum mark was 15 and the maximum mark increased from 20 to 21. The mean score increased further to 18.439.
g) Marks improvement was found in module 7 that the mark range came up to 14 - 23 with a mean score of 19.659.
h) The mark range on module 8 came up to 16 to 24 and the mean score was increased to 21.024.
i) On module 9, test scores continued to improve in that the minimum mark was raised to 17 while the maximum mark remained 24. The mean score came up to 22.745.
j) On the last module – module 10, students' test scores became so high that the range was 19 - 25 and the mean score became 23.146.

Conclusion: Among experimental group students, mark range increased in every succeeding test conducted on every English language competency module. Mean scores increased in succeeding tests during the period the experiment was being conducted. It is, therefore, concluded that there was appreciable progress in English language skills among experimental group students who were taught English language competency modules through **whole brain teaching** during the intervention.

3. Findings on the relative progresses of students from control and experimental groups were as follow:

a) In a test on module 1, the ranges of students' marks were same for both the groups (control and experimental) with minimum of 3 to maximum of 9. However, the mean score, 6.7073 in respect of experimental group is more than 5.0952, i.e., the mean score of control group.
b) In the case of module 2, slight increases were seen in the ranges of marks as well as mean scores but the increase was more in the case of experimental group.
c) On module 3, the range of students' marks and the mean scores were increased in both the cases. However, the rates of increase were much more among students of experimental group which imply that the improvement in English language skills was more among experimental group than among control group during intervention.
d) The mark ranges and mean scores on module 4 again came up in both the cases. But the rates of increase were more in the case of experimental group which indicate more progress among the experimental group.
e) Minimum marks of both the groups became the same in module 5. However, the maximum mark and the mean score were higher among the experimental group which again signifies that progress in English language skills during the experiment was more among the experimental group.
f) On module 6, test scores continued to improve among students of control and experimental groups which resulted in increase in the mean scores. The higher range of marks and the higher mean score among experimental group indicate that there was more progress among the experimental group than control group.

g) Minimum marks of both the groups again became the same in module 7. However, the maximum mark and the mean score were higher among the experimental group which again implies that progress in English language skills was more among the experimental group than the control group during intervention.

h) On module 8, minimum marks of both the groups were same again but the maximum mark and the mean score were higher among the experimental group. These show that progress in English language skills was more among the experimental group than the control group during intervention.

i) Again in module 9, minimum marks of both the groups were same but the maximum mark and the mean score were higher among the experimental group. These indicate that experimental group had more progress in English language skills during the experiment.

j) On the last module – module 10, there was no increase in the mark range of students from control group whereas the mark range of students from experiment group kept on increasing. While there was very small and negligible increase in the case of students from control group, the mean score as well as the rate of increase among experimental group was higher.

Conclusion: Improvements in English language skills are noticed among students of both the groups. However, the rate of improvement is found to be more among the experimental group which indicates that there is more progress in English language skills among them during the period the experiment was conducted. This, at the same time, implies that whole brain teaching is more effective than traditional teaching for enhancement of English language skills.

Findings and Conclusions on Effectiveness of Whole Brain Teaching for Enhancement of English Language Skills

1. **In control group,** mean score of students in post test on English language **listening skill** exceeded the mean score in pre test and the paired t-value also exceeded the critical t-value at 0.01 level. Null hypothesis no. 1 stating, *"There exists no significant difference*

between mean scores of pre-test and post-test in English language listening skill among students from control group" was rejected.

2. Among control group students, mean score in post test on English language **speaking skill** surpassed the mean score in pre test and the paired t-value also exceeded the critical t-value at 0.01 level. Null hypothesis no. 2 which stated, *"There exists no significant difference between mean scores of pre-test and post-test in English language speaking skill among students from control group"* was rejected.

3. Among control group students, mean score in post test on English language **reading skill** exceeded the mean score in pre test and also that the paired t-value surpassed critical t-value at 0.01 level. Null hypothesis no. 3 which stated, *"There exists no significant difference between mean scores of pre-test and post-test in English language reading skill among students from control group"* was rejected.

4. Among control group students, mean score in post test on English language **writing skill** overtook the mean score in pre test and also that the paired t-value surpassed critical t-value at 0.01 level. Null hypothesis no. 4 which stated, *"There exists no significant difference between mean scores of pre-test and post-test in English language writing skill among students from control group"* was rejected.

5. Among **control group** students, mean score in post test on **English language skills** surpassed the mean in pre test and paired t-value rose above the critical t value at 0.01 level. Traditional teaching method employed for teaching English language competency modules among the control group has effectiveness for enhancement of English language skills. Null hypothesis no. 5 stating, *"There exists no significant difference between mean scores of pre-test and post-test in English language skills among students from control group"* was rejected.

6. Among students from **experimental group,** mean score in post test on English language **listening skill** rose above the mean score in pre test and the paired t-value also exceeded the critical t-value at 0.01 level. Null hypothesis no. 6 which stated, *"There exists no significant difference between mean scores of pre-test and post-test in English language listening skill among students from experimental group"* was rejected.

7. Mean score of **experimental group** students in post test on English language **speaking skill** surpassed the mean score in pre test and the paired t-value also exceeded the critical t-value at 0.01 level. Null hypothesis no. 7 which stated, "*There exists no significant difference between mean scores of pre-test and post-test in English language speaking skill among students from experimental group"* was rejected.

8. Mean score of **experimental group** students in post test on English language **reading skill** exceeded the mean score in pre test and also that the paired t-value surpassed critical t-value at 0.01 level. Null hypothesis no. 8 which stated, "*There exists no significant difference between mean scores of pre-test and post-test in English language reading skill among students from experimental group"* was rejected.

9. Mean score of **experimental group** students in post test on English language **writing skill** overtook the mean score in pre test and also that the paired t-value surpassed critical t-value at 0.01 level. Null hypothesis no. 9 which stated, *"There exists no significant difference between mean scores of pre-test and post-test in English language writing skill among students from experimental group"* was rejected.

10. Among **experimental group** students, mean score in post test on **English language skills** surpassed the mean in pre test and paired t-value rose above the critical t value at 0.01 level. Whole brain teaching employed for teaching English language competency modules among the experimental group has effectiveness for enhancement of English language skills. Null hypothesis no. 10 which stated, *"There exists no significant difference between mean scores of pre-test and post-test in English language skills among students from experimental group"* was rejected.

11. Experimental students excelled control students due to their higher mean score in English language **listening skill** and calculated t-value surpassed table t-value at 0.05 level but not at 0.01 level. Null hypothesis no.11 stating, *"There exists no significant difference between mean scores of control and experimental groups in English language listening skill"* is retained and rejected at 0.01 and 0.05 levels respectively.

12. Experimental students excelled control students due to their higher mean score in English language **speaking skill** but calculated t-value fell behind critical t-value at 0.05

and 0.01 levels. Null hypothesis no. 12 which stated, *"There exists no significant difference between mean scores of control and experimental groups in English language speaking skill"* was retained.

13. Experimental group did better in English language **reading skill** as their mean score surpassed that of control group but critical t-value at 0.01 and 0.05 levels exceeded the calculated t-value. Null hypothesis no. 13 which stated, *"There exists no significant difference between mean scores of control and experimental groups in English language reading skill"* was retained.

14. Experimental students rose above students of control group due to their higher mean score in English language **writing skill**; however, critical t-value at 0.01 and 0.05 levels also exceeded calculated t-value. The null hypothesis no. 14 which stated, *"There exists no significant difference between mean scores of control and experimental groups in English language writing skill"* was retained.

15. Experimental students rose above students of control group due to their higher mean score in **English language skills**. The critical t-value at 0.01 level exceeded calculated t-value but not in the case of 0.05 level. Students from experimental group who were taught English language competency modules through whole brain teaching method were little better in English language skills than that from control group. Null hypothesis no. 15 which stated, *"There exists no significant effectiveness of whole brain teaching for enhancement of English language skills"* was rejected at 0.05 level but retained at 0.01 level.

Conclusions:

1. Students of control group were taught ten English Language Competency Modules through traditional teaching method using Herbartian lesson plan by the investigator with the main objective of enhancing their English language skills. Their scores in post test on each of the skills (listening, speaking, reading and writing) and overall skill surpassed those in pre test. It is, thus, concluded that traditional teaching method is effective for enhancement of English language skills among students.

2. Experimental group students were taught the same English Language Competency Modules through **whole brain teaching method** using whole brain lesson plan simultaneously by the investigator with the main objective of enhancing their English language skills. Their scores in post test on each of the skills (listening, speaking, reading and writing) and overall skill surpassed those in pre test. It is, therefore, concluded that whole brain teaching method is effective for enhancement of English language skills among students.

3. On the question which one- traditional teaching method or whole brain teaching method is more effective for enhancement of English language skills among students, the following are the conclusions:

    1) Based on the findings that students of experimental group had higher rates of improvements in English language skills, experimental group are better than control group which implies that whole brain teaching is more effective.
    2) Based on the performance in post test covering different English language skills which reveals higher mean scores in favour of the experimental group, whole brain teaching is more effective than traditional teaching method. However, the difference between the two methods is statistically not significant which may indicate that whole brain teaching method is little better than traditional teaching method for enhancement of English language skills among students.

Findings and Conclusions on Effectiveness of Whole Brain Teaching for Enhancement of English Language Skills across Gender

1. Girls were better in English language listening skill as their mean score surpassed that of boys in pre test. However, significant difference was not there between their mean scores. The null hypothesis no. 16 which stated, *"There exists no significant difference between the pre-test scores of boys and girls in English language listening skill"* was retained.

2. Boys scored little bit higher than girls in post test on English language listening skill but the difference was not significant. The null hypothesis no. 17 which stated, *"There exists no significant difference between the post-test scores of boys and girls in English language listening skill"* was retained.

3. Mean score of girls in pre test on English language speaking skill was higher than that of boys. However, the difference was not statistically significant. The null hypothesis no. 18 which stated, *"There exists no significant difference between the pre-test scores of boys and girls in English language speaking skill"* was retained.

4. Mean score of boys in post-test on English language speaking skill was higher than that of girls. However, the difference was not statistically significant. The null hypothesis no. 19 which stated, *"There exists no significant difference between the post-test scores of boys and girls in English language speaking skill"* was retained.

5. Mean scores of boys and girls in pre test on English language reading skill were almost same and the small difference was not statistically significant. The null hypothesis no. 20 which stated, "*There exists no significant difference between the pre-test scores of boys and girls in English language reading skill"* was retained.

6. Boys' mean score was higher than that of girls in post-test on English language reading skill. However, the difference was not statistically significant. The null hypothesis no. 21 which stated, *"There exists no significant difference between the post-test scores of boys and girls in English language reading skill"* was retained.

7. Boys' and girls' mean scores in pre-test on English language writing skill were almost same and the small difference was not statistically significant. The null hypothesis no. 22 which stated, "*There exists no significant difference between the pre-test scores of boys and girls in English language writing skill"* was retained.

8. Boys' and girls' mean scores in post test on English language writing skill were almost same and the small difference was not statistically significant. The null hypothesis no. 23 which stated, "*There exists no significant difference between the post-test scores of boys and girls in English language writing skill"* was retained.

9. Mean score of girls in pre-test on English language skills was higher than that of boys. However, the difference was not statistically significant. The null hypothesis no. 24 which stated, *"There exists no significant difference between the pre-test scores of boys and girls in English language skills"* was retained.

10. Girls scored higher than boys in post-test on English language skills. However, the difference was not statistically significant. The null hypothesis no. 25 which stated, *"There exists no significant difference between the post-test scores of boys and girls in English language skills"* was retained.

11. a) Girls from both control and experimental groups were better than boys in their respective groups in English language **listening** skill. However, statistically significant difference was not found between their scores on listening skill (F - .037).

    b) The difference between students of control and experimental group in their scores on listening skill (F- 4.982) was not significant.

    c) Significant difference was not found between gender and the groups (control & experimental) in their scores on English language listening skill (F - .322).

    d) The null hypothesis no. 26 stating, *"There exists no significant difference between mean scores of control and experimental groups in English language listening skill across gender"* was retained.

12. a) Boys and girls from control group were equally good in English language **speaking** skill. In the case of experimental group, girls were better than boys. However, the difference between them was not significant as the calculated value of F between boys and girls was lower than the table value.

    b) The difference between students of control and experimental group in their scores on speaking skill (F - 3.897) was not significant.

    c) Significant difference was not found between gender and the groups (control & experimental) in their scores on English language speaking skill.

d) The null hypothesis no. 27 stating, *"There exists no significant difference between mean scores of control and experimental groups in English language speaking skill across gender"* was retained.

13. a) In both the groups (control and experimental), girls scored better than boys in English language reading skill but the gaps were small and statistically not significant as F- value 1.621 was lower than the table value.

b) The difference between control and experimental groups with F- value of 3.897 was not significant.

c) The difference between gender and groups (control & experimental) in English language reading skill indicated by F-value, .115 was not significant.

d) The null hypothesis no. 28 which stated, *"There exists no significant difference between mean scores of control and experimental groups in English language reading skill across gender"* was retained.

14. a) In an overall performance, girls were better than boys in English language writing skill. The gaps, however, were so small that they were not significant and F-value was only 1.821.

b) The difference between students from both the groups (control and experimental) in writing skill was not significant (F - .942).

c) No significant difference was observed between gender and the group (control & experimental) in their scores on English language writing skill (F - .004).

d) The null hypothesis no. 29 which stated, *"There exists no significant difference between mean scores of control and experimental groups in English language writing skill across gender"* was retained.

15. a) Girls scored higher than boys in their respective groups in English language skills as a whole. However, statistically significant difference was not found between them in their scores on English language skills.

b) Statistically significant difference was not found between control and experimental groups.

c) Significant difference was not found between gender and the groups (control & experimental) in this regard.

d) Null hypothesis no. 30 which stated, "*There exists no significant effectiveness of whole brain teaching for enhancement of English language skills across gender"* was retained.

Conclusion: The mean scores of girls from control group were higher than that of boys in listening, reading and writing skills whereas in experimental group, girls scored higher than boys in all the English language skills. However, the mean differences were not statistically significant which indicate that girls were not much better or little better than boys in English language skills.

Discussion of Findings

Effectiveness of whole brain teaching

The present study establishes the effectiveness of whole brain teaching for enhancement of English language skills mainly based on the following grounds:

1) The experimental group had more progresses and higher rates of progresses than the control group in English language skills during the period the experiment was being conducted which implies that whole brain teaching is more effectiveness for enhancement of English language skills than traditional teaching method.
2) When the performances of students in tests (pre and post tests) were compared, experimental group were better than control group which implies that whole brain teaching is more effective.
3) When group-wise comparison was made on the performances of students in post test on different English language skills, the experimental group were found to be better which indicates that whole brain teaching is more effective.

The present findings have the support of other studies. The findings are in agreement with that of Melani (2005) who investigated the impact of whole brain teaching technique in enhancing English language vocabulary among 60 SMP Sultan Agung seventh grade students. The findings of the study confirmed that whole brain teaching has a significant impact on the students' mastery in English vocabulary.

In an action research study carried out by Asmayanti and Amalia (2014) examining the effectiveness of the whole brain teaching technique in improving speaking skill among college students. The study concluded that the mean score of students in speaking skill improved. This is further supported by the finding of Dwintan (2016) who worked on improving speaking skill through whole brain teaching among eleventh grade students and who reported that experimental group showed better scores and improvement in their speaking achievement.

The use of the whole brain teaching approach to improve reading skills of students was also investigated by Rimatika and Miladiyah (2015) where the study concluded that the students were more engaged and focused on the lecture when the whole brain teaching method was administered in class. Lahita, Mujiyanto and Sutopo (2018) employed the same method to improve the reading skill of grade eight students.

The findings of the study are again confirmed by Santoso (2016) who focused on improving spiritual intelligence in English language inscription by formulating whole brain teaching approach. The quantitative data were analyzed and the result shows that there was an improvement found in spiritual intelligence of the students in English language writing skill. Supportively, Natalia (2019) came out with the finding that the whole brain teaching has an impact on students' writing skill.

Furthermore, Cannon (2014) in his study on implementing whole brain teaching on class discussions exhibited the impact of whole brain teaching by applying one of the techniques i.e., Teach-Okay which enhanced students' engagement in class discussions. Another study which is in agreement with the present ones is an experimental study conducted by Palasigue and Torres (2009) which concluded that after implementing the whole brain teaching method, the behavior of the students improve tremendously.

The finding of Lockhart (2017) which revealed that whole brain teaching enhanced language acquisition and motivated primary school students to learn is in agreement with the results of the present study. The study reporting the positive impact in the academic performance of African-American elementary male students when brain-based teaching technique was applied (Vanhosen, 2015) has the support of the present study.

Kharsati (2017) also researched the impact of whole brain teaching strategies among 30 class seven students in Shillong. The key idea of the experimental study was to identify how whole brain teaching strategies can affect students' performance in science subject. The finding shows that the teaching method helps the students improve their test scores.

Torio and Cabrillas (2016) also undertook a quasi-experimental study that aimed to establish the effectiveness of whole brain teaching techniques on academic performance and motivation of students. A set of six lesson plans were executed to two groups of tenth grade students. The analysis confirmed that students had an average learning gain of 20% to academic performance and motivation. The finding that whole brain teaching method proved to have positive effects as a teaching strategy is in agreement with the present study.

Muthukrisknan, Phang; Rui and Ling (2019) also researched on whole brain teaching method on learning Math subject and its impact on the behavior of the student among 30 preschool children. Additional problems were taught before the experiment using traditional method of teaching. After the students were taught the five different fun-filled strategies the whole brain teaching method was implemented. This study revealed that the whole brain teaching enhanced the behavior and the students' performance and engagement also improved.

Thus, studies mentioned above support the present study as they all reported the effectiveness of whole brain teaching for enhancement of English language skills or some other academic skills.

Effectiveness of traditional teaching

The result that control group, exposed to traditional teaching with Herbatian lesson plan had progresses in English language skills in succeeding English language Competency

modules confirms that the traditional teaching method, if accompanied by proper lesson plan with teaching aid is still effective for teaching students. The teacher's preparation for the class, his/her skill in teaching and other factors play a very important role in successful teaching.

Effectiveness of English language competency modules

Again, the findings that both control and experiment group witnessed progresses in English language skills throughout the experiment and that both the groups had scored better in post-test in comparison with pre-test may lead us to the possible important role that the English language competency modules themselves play for enhancement of English language skills. In this regard, there are some studies that support and confirm the effectiveness of this kind of modules.

Sonalde (2002) who developed English Language Competency Modules (ELCM) that aimed to improve the English language competency of students concluded that the teaching and learning materials provided for the study helped improve the students' language skills. Ali, Kassim and Osman (2008) also developed modules to enhance language skills among students. The findings exhibited the effectiveness of using English language modules. Lee (1995) asserted that language module played a fundamental role in the enhancement of English language skills. In the same vein, Lalongo (2009) affirmed that language module facilitated learning of new abstract concepts by helping to concretize ideas and integrate learners' interests.

Modules for language enhancement will help students attain proficiency in various language skills. In a qualitative study conducted by Ngowananchai (2013), B-SLIM Model was used that aimed to enhance language skills among students taking Business English II. Based on the findings, B-SLIM model proved to be enhancing the language skills of students. Supportively, Ramat et al. (2016) developed an English Instructional Module among students from Suratpittaya School. The study concluded that the English instructional module had impact on academic achievement of students; after implementing the B-SLIM model, students developed a high level of satisfaction in the class teaching and learning.

The advantage of executing language modules in promoting students' learning is indisputable. They are meant to enhanceactiveparticipation in thelearningprocess, reducingtheteacher-centeredness in teachingandlearning. The principle of a language module is not a vague proposal but a specific hypothesis about human language (Cook & Newson, 2007). Language module not only benefits the students but also teachers in understanding the academic performance of students.

In view of the above research findings, we can conclude that the English language competency modules taught to students of both the groups played a very important role in enhancing English language skills.

Educational implications

Findings of the present study have implications for different stakeholders of education particularly at school level.

Firstly, the findings that whole brain teaching has effectiveness for enhancement of English language skills among students and that it is more effective than Herbartian traditional teaching approach have the implications that educational planners, administrators, managers, headmasters, teachers, students, parents and community at large need to be aware of this method. They should think on how to make it popular and how to start introduction of it in our teaching-learning process.

Secondly, the finding that traditional teaching method also has some effectiveness for enhancement of English language skills among students, if accompanied by proper lesson plan with teaching aids, has important educational implications. What it mainly implies is that introduction or implementation of new teaching method may require time and that for the time being, efforts should be made to improve the teaching methods being used through different means. Teachers need to prepare themselves well in time by preparing lesson plans and need to prepare or collect relevant teaching aids for different topics to make the teaching-learning process more effective.

Since English language competency modules are considered to be playing important role for enhancement of English language skills among seventh grade students, the modules may be used for the relevant class and many other modules may be prepared by the teachers for their respective subjects and classes. These will help students in acquiring many important skills necessary for different subjects.

Recommendations of the Study

Specific Recommendations

1. Arrangements could be made for school teachers to undergo training or short term course on whole brain teaching.
2. The whole brain teaching could be recommended for school teachers to improve teaching, learning and academic achievement as it combines instructional strategies and direct instruction while the respective teachers facilitate the lesson's core concept.
3. The whole brain teaching method could be adopted for use in any type of schools for the attainment of pedagogically sound curriculum and effective classroom management.
4. The whole brain teaching method could be introduced and adopted in different educational institutions.
5. The whole brain teaching could be employed to foster memory and retention of students at all levels as it focuses to take full advantage of students' involvement by activating the whole brain.
6. The whole brain teaching method could be implemented to develop the relationship between students and teachers.
7. The whole brain teaching method could be implemented to keep the students engaged and motivated.
8. Teachers should attempt to explore the whole brain teaching approach as the brain will not operate on the command by a rigid pre-designed curriculum but has its unique rhythms. A teacher must know nature's engine run to maximize learning.

9. There could be a fundamental shift from traditional form of teaching to brain-based teaching and learning approach. To improve students' performance the teacher and educator must be well versed on the function of the brain.
10. Given the findings on the effectiveness of the whole brain teaching, it could be introduced in teacher training institutions.
11. The whole brain teaching lesson plan could be used for enhancing students' language skills – listening, speaking, reading and writing.

General Recommendations

1. The educational planners, administrators, managers, headmasters, teachers, students, parents and community at large should be made aware of whole brain teaching techniques.
2. Apart from the teaching method adopted, teachers' preparation plays a very important role for successful teaching. Thus, teachers should prepare themselves for the classes well in time by preparing lesson plans, teaching aids etc. They should follow the right procedure of teaching with meaningful closure.
3. Implementation of whole brain teaching can begin by insisting school teachers to attend workshops and seminars that are related to brain-based teaching methodology and educating them about the importance of teaching method.
4. Comprehensive educational programmes on brain-based teaching must be planned by the state Government opening opportunities for teachers to attend sessions that are freely accessible and reachable.
5. Execution of financial aid for teachers would be a practical solution. For example – implementing a monthly training on brain-based teaching approaches for all teachers.
6. The School Education Department could examine the quality of teaching methodology used in schools.
7. Teachers could try to study the brain-based teaching and learning process and explore the different techniques involved in the teaching method.
8. Teachers should not only aim to complete the syllabus given in the textbooks but try to create interest and motivate the students to learn new knowledge.

9. Curriculum construction and enhancement could be prepared under the supervision of academically trained personnel.
10. Classroom environment could be revamped. It could be made more interactive and activity oriented. The seven techniques put forward by the whole brain teaching could be employed in the class.
11. Availability of efficient infrastructure, offline and online learning facilities could be ensured for improved teaching and learning environment. In this regard, Minimum Requirements of Infrastructures and Learning Facilities (MRILF) could be employed for practical implementation.
12. The English Language Competency Modules (ELCM) could be adopted as a remedial teaching tool for enhancing the language skills.
13. The English Language Competency Modules (ELCM) could be recommended for use to enhance the academic achievement of the students.

Suggestions for Further Studies

1. Effectiveness of whole brain teaching for learning subjects other than English may be studied.

2. Effectiveness of whole brain teaching on academic achievement of students at middle or below level may be studied.

3. Competency modules for different subjects may be prepared and their effectiveness may be studied.

4. Teachers' perception or attitude or opinion about whole brain teaching can be studied in relation to their school management and teaching experience.

5. Parents' perception or attitude or opinion about whole brain teaching can be studied in relation to their socio-economic and education level.

6. Research on any of the above mentioned topics may be conducted in other states of the country or among students of other classes or among students attending schools under different managements.

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