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Brain Based Learning and Urdu EFL Learners' Academic Achievement in English at Secondary School Level in District Vehari

Abstract:

Current educational standards are changing dramatically to meet student's academic needs, and learners are at the heart of the educational system. The sole objective of the study is to compare the effect of brain-based learning teaching method and traditional teaching method on students' academic achievement in English at the secondary school level. For this study, the researcher has selected a convenient sample of sixty students enrolled in GBHS9-11/WB who took part in the experiment, and these were divided into two groups: one for control and another for experimental purposes through systematic random sampling. An academic achievement test was developed that served as both a pre-test and a post-test, and both were identical in content and administration. The study concluded that the BBL method is far superior to the traditional method of teaching for the subject of English. Native, foreign or second language learning is a social phenomenon, so brain-based learning teaching method provides socialization to the learner. Therefore, in contemporary forms of teaching, the BBL teaching method is far best for English as a subject.

Key Words:

Brain-Based Learning, Academic Achievement, English

Introduction

Neuro-education is an ever-changing field of study classified in this article as cognitive psychology. Research questions that are scientifically motivated are raised in cognitive sciences (Geake, 2009) Neuro-education is the area in which much attention has been paid. This course teaches you the relationship between cognitive and behavioral psychology, human brain development, and (Szucs and Goswami, 2007). Positive attitudes and mental progress help the learning process to be accelerated. In some cases, education neurology includes several fields related to improving human behavior and learning (Fischer, Daniel, Immordino-Yang, Stern, Battro, & Koizumi, 2007). It is an interdisciplinary field that has all played a role in its development, education, learning, and cognitive neuroscience. On the one hand, Neuroscience is not only developed as a means of research, interpretation, and advancement, but also as a means of improving; it communicates the process of neuroplasticity and the way students learn; it is implemented in the classroom as a result (Howard-Jones, Varma, Ansari, Butterworth, De Smedt, Goswami, Laurillard, & Thomas, 2016). It also includes information on corrective instruction organization and teaching methods.

Pedagogical instructions in education neuroscience focus on brain-based learning methods and techniques used in the classroom referred to as "learning-centered" instruction. During BBL lessons, the students get to see and feel the operation of a complete central nervous system. During this learning phase, the students actively improve their understanding of the current situation by participating in discussions. It focuses on how the brains develop learning, gain Knowledge and growth in a learning environment through the BBL teaching method (Madrazo and Motz, 2005). As a result, teachers should motivate students to participate in the established learning environment by

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reviewing current brain-based research. Among essential principles of the BBL, the teaching method is how students integrated into their expectations, decency, and study fields. Recent educational trends result in improved learning experiences for students and sufficient knowledge of long-term memory and short-term memory for educators (STM). An educator is also required to understand how prior learning influences the overall learning process.

The BBL method of teaching enables students to gain valuable knowledge and ideas from their experiences. BBL not only improves students' academic performance, but it also helps to build team spirit, commitment, and coordination among teammates (Duman, 2010). Teachers and students alike benefit from the BBL philosophy, which encourages them to learn from their own life experiences. Scenarios that are both dynamic and visually appealing are used to investigate linguistic structure and meaning. This creative process necessitates students' participation in educational activities while they are still able to do so. Several studies have demonstrated that the BBL method is superior to conventional teaching secondary science subjects (Ozden & Gultekin, 2008).

Using the brain in educational institutions, training, animating, and developing it is a fantastic opportunity to learn more about yourself and others. The brain-based study perspectives of English learners, as revealed in surveys, provide teachers with fresh air and help them transform problems into conceivable outcomes. Educators can better understand the needs of different second-language education students through innovative approaches in the form of teaching and learning through a variety of methods. The stunningly versatile nature of the cerebrum implies that ELLs are not stuck on a single road but that they can joyfully take a 12-way expressway of choice and opening.

In addition, the BBL method promotes expressive learning rather than factual memorization. If the information or ideas are not attractive, convincing, or pragmatic, the brain doesn't learn or retain them quickly. In the brain, there is a natural tendency to look for coherent and complete information. The role of a teacher is to build active and productive relationships with students in the context of a learning process. For an educator, stories, photos, correlations, variations, and aphorisms should combine easily understandable details. So, the student's brain must be forced into tasks and modeling and therefore learns through the peaceful environment of the learner (Tüfekçi & Demirel, 2009). Cognitive psychologists and educators study how a better understanding of brain function can improve teaching and enhance unconscious skills for students.

English as a foreign or second language is commonly used for academic and communication purposes at educational institutions in Pakistan. As a result, government policies demonstrate that the government recognizes the need for education teachers. English is the language of modernity, scientific studies, contact, communication, and contact and communication with others. English is the language used in this article. English is the language used in this article. Following its transformation into a global lingua franca, the government allocated adequate resources to the English language. As a result, English should teach as a mandatory subject to students in grades 1 through 12. In addition, the English language is used as a medium of instruction in the curriculum (Rind and Mari, 2019). The government has developed and implemented several policies due to the country's English language status, including the establishment of a National English Curriculum in 2006, which is now in its third year.

It describes the five skills, including the four integrated skills that students in grades one through twelve should master. Expertise includes lecture, writing, communication, thinking skills, official and lexical aspects of students' development, and their ethical and social development (Curriculum, 2006). It also serves as a benchmark for student learning outcomes, which must meet all these competencies. A comprehensive educational approach was proposed in the national curriculum to promote teachers' efforts and was combined with a particular assessment technique to encourage teachers' efforts. In English, each SLO is appropriately applied and measured per the proposed learning and evaluation strategies outlined in the English curriculum for 2006.

At the school level, student learning will improve through the use of diverse modern techniques and methods. In a neuroplasticity process, students' brains change quickly, while learning culture plays a vital role in the interpretation and clarification of these changes. The primary responsibility of teachers and schools is to be aware of how they can help students learn through brain-based learning techniques. The concept of unicity can be a powerful teaching tool, according to BBL research. The current study examines the impact of intellectual learning on the ability of students to communicate in English effectively. It allows students to learn more effectively through innovative teaching practices based on BBL theory and 12 developed principles. The variables under study are brain-based teaching methods and learning achievements in English (Academic Achievement).

The main research objective for the study is: To compare the effect of brain-based learning teaching method and traditional teaching method on students' academic achievement in English at the secondary school level. Further, the researchers formulate the following hypothesis for the attainment of the above-mentioned objective;

H_01: The mean achievement score of the students taught through brain-based learning teaching methods is not significantly different from the mean achievement score of the students' taught through the traditional teaching method. (Effect of teaching methodology on the three levels of academic achievement)

Review of Related Literature

The world today changes from a traditional educational process to a hybrid, increasingly popular, teaching-learning method. Brain-based classrooms that refer to environmentally friendly applications in developed nations are now becoming increasingly popular. Students are involved in an educational setting where they can take inspiration from their peers and teachers. Learners in brain-based classrooms performed as unique individuals who take advantage of their prior knowledge and are the foundation for relevant information learning (Fogarty, 2009). These classroom varieties have invigorated students to acquire specific skills during the learning process based upon the brain. The role of thinking in the learning process, together with the thought pattern itself, is comprehended by the students, according to Fogarty (2009). The training procedure is divided into three phases in cognitions-friendly classrooms: alerting, coordinated immersion, and active treatment (or problem-solving). These phases are interconnected and associated in different lines to promote the teaching and learning process (Caine, Caine & McClintic, 2002). Today, the invasion of medicine and academic technology has provided new learning skylines and progress and detailed descriptions of the brain learning experience (Jeffry, 2004; Duman, 2010). Researchers and educators are interested in improving pedagogical approaches by studying brain functions and students' learning potential.

The undermining conditions, the coursebook, the conclusive attitude of educators, and the start practising of "learning with packing" are traditionally obstacles to calculated training in Pakistan; (Aly, 2007). In this context, the terms "customary education" and "ordinary display." It can be seen that a significant proportion of the teachers used the traditional method of teaching in the homeroom. In homerooms, at least partially, many instructional techniques are applied. The conventional way to encourage others is one of these techniques. The use of traditional teaching technologies (Keeler and Steinhorst, 1995), the official introduction of content (Vella, 1992), and oral disengagement are the case for students (McIntosh, Grady, Haxby, Ungerrleider, and Horwitz, 1996). Traditional teaching techniques shall only be subject to information (Caine and Caine, 1995); progress in one-way correspondence (McIntosh, Grady, Haxby, Ungerrleider and Horws, 1996); (Ruyle and Delta, 1995). The student's brains participate lately in the ordinary education process with the demonstrated learning measure. Contemporary exhibition strategies have observed a remarkable combination of cerebral resources. The exhibition of students may also be followed if the pupils are taught using a demonstration technique based on the excessive use of natural resources of the human mind.

Since antiquity, it has been debated whether the intellect or heart is responsible for the psychometric, emotional, and cognitive states of human life, and the answer remains for discussion. From 460 to 380 B.C., the psychometric, physical, sensational, intelligent, and mental conditions of humans were predicted to be identified and held responsible in the human body by a brain organ. This forecast, however, was not completed before the 20th century. In 1896, an American psychologist named Baldwin proposed a theory known as the Baldwinian evolution. Based on this theory, learning was presented as an essential component of species survival throughout the universe. Piaget agreed with Baldwin's ideas and those of other psychologists like Janet, which called for a long-term perspective in education psychology. Piaget's work in science and education was well-known (Piaget, 1980). For his cognitive development theory, he presented a four-stage model. An overview of how they were configured and explicit academic settings for the four phases of the procedure were suggested (Smith, 2000).

The BBL method is frequently used in the classroom for languages, natural sciences, and social sciences categories. Collaboration, experiential learning, and the triune brain theory are some of the methods used in this program. The nature of the brain was investigated in depth by Hart (1983), who discovered that the learning environment must be consistent with the nature of the brain. It means that education is not practical unless the student has a fundamental understanding of the functioning of the brain's neural networks. Consequently, a teacher cannot impart information about a topic without first recognizing the mental abilities of undergraduates in the field of psychology. On the agenda, the straightforward association of learning through rules is placed at the top, which places a high value on brain-based learning (Caine and Caine, 1991). This scenario necessitates that a student adheres to a specific brain expectation illustration. When the brain's values are obstructed, the brain's work stops in a convenient location for the brain. Furthermore, imagery studies examine the areas of the brain that are active while the brain is engaged in learning different disciplines.

Brain-based learning (BBL) is a more straightforward approach than mainstream learning methods to comprehend how and where learning occurs. It combines these insightful principles and methodologies, such as the benefit of responsibility, modes of learning, different perspectives, practical learning, practical reactivation, experience, problem-based learning, growth training, and problematic learning (Lumsden & Wilson, 2005).

Instructors can implement brain-based learning procedures. More than most neuroscientists still live and work actively. These mental-based procedures should be used at different levels and in different substance zones of the classroom, according to Erlauer (2003). They should use the development, use Music, use the story, humor, use similarities and color as the first 15 to 20 minutes of the class, use concepts associated with knowledge, need tension and need tensions and require t the lack of any danger signs. Class status improved, and the world as an assistant has been used. Build an intelligent deliberative capacity, in contrast to carefully individualized learning, a meaningful education program, a Master's degree, and application – placing cement learning into long-term memory in real-life circumstances. Feedback is necessary immediately (Kaufeldt, 2010).

Research Methodology

The study intended to study brain-based learning and Urdu EFL learners' academic achievement in English in the Vehari District at the secondary school level. The present study uses a pre-test-post-test group design to compare the effect of brain-based learning and traditional teaching techniques on secondary school student academic achievement in English. The experiment was conducted with the involvement of secondary school students. For the study, the researcher chose the secondary students enrolled in GBHS 9-11/W.B. The sampled students used almost all the learning conditions, the educational environment, the classroom facilities, the contents of their courses, the medium of training, and the education system the same as for the group.

In the research and experimentation held at the school, 60 students from GBHS 9-11/W.B., Vehari, were involved. Researchers received a list of marks in 9th class English and attained Annual Examination Score (AES) results, and sequenced them in descending order. The researcher then split the 60 students into three categories: high-performing, medial- and low-performing students, according to Rehman's (2011) study. Furthermore, these students bifurcated them into two groups using a random sampling method, the first and second groups.

As a research tool, the preparation of an academic test for English was conducted and used as a pre-test and post-testing test. The two tests were the same, but the test was done differently from the other test. The English papers from the 10th grade were considered standardized by education authorities and prepared in conformity with the scheme of studies developed by the Multan Board of Intermediate and Secondary Education (BISE, Multan). The 10th-grade model papers are divided into the objective and the essay-type sections. The student's learning achievements measured according to the document we received based on their knowledge, understanding, application, analysis, synthesis, and evaluation. Research tool developed by extracting tool items from the previous six-year (2014-2019) papers in the subject of English conducted through BISE Multan. The number of items in the research tool doubled more than the number of items in the final research tool.

Fifteen high school students, Taimoor Shaheed Colony Vehari, were administered the examination as a part of a trial process (Vehari District). This exercise helped the researchers to understand the items more effectively. The experts once reviewed the test items and then re-examined them. The experts and teachers have reached a consensus on the final test result following a long discussion. Senior English teachers, a doctoral committee, and the research supervisor approved the validity of the research tool. Items from a research tool based on the unit text studied by students.

Method for assessing the reliability of the English-language academic test involves the twice administration of the test. The research scientists have chosen fifteen students from secondary school, and the tool was applied to check the reliability and validity. The same test gave for a second time to the same students. The result was analyzed, and the reliability value was determined as the alpha 0.78 coefficient, which shows that the reliability of an academic performance assessment has been satisfactory.

The experiment for the study was conducted during the academic session 2018-19. The period would take a total of 40 minutes, including breaks, in public schools. In both groups, the students were in school for the whole semester, six days a week. Moreover, ten-grade school kids from control and experimental groups were scheduled to teach once a day for six days. The experiment took a total of eight weeks (one week is six days).

A post-test was given to all the tested students after the teaching of control and experimental grouping using traditional methods and brain-based learning methods. This test enabled us to obtain each student's post scale ratings. The academic achievement result for all students was calculated by removing their pre-test results from the researcher's post-test results.

The values on the previous and subsequent tests and the achievement score are obtained to determine whether there is a difference between the mean control and experimental groups. The average score is calculated, the standard deviation, the correlations and the independent t-test. Null hypotheses tested were 0.05, and the sample size was 100, respectively. The results of the statistical tests indicated were obtained and then interpreted using SPSS 21.

Data Analysis and Interpretation

The study was conducted to compare the effect of brain-based learning teaching method and traditional teaching method on students' academic achievement in English at secondary school level in district Vehari. After acquiring the pre-test, post-test and achievement score, the mean score, standard deviation, correlations, and independent-sample t-test determine the difference between the mean scores of the control and

experimental group. All the tests were applied at a noteworthiness level of significance (S.L.) of 0.05; the expressed measurable tests were obtained through SPSS 21.

$H_0$7: The mean achievement score of the students taught through brain-based learning teaching methods is not significantly different from the mean achievement score of the students' taught through the traditional teaching method. (Effect of teaching methodology on the three levels of academic achievement)

Table 1. Group Statistics for Students of Experimental and Control Groups (Posttest)

Level of Achievement/ Teaching Methods	H.A.s	A.A.s	L.A.s
BBL Teaching Method	M = 51.70 SD = 3.199 *N*= 10	M = 43.20 SD = 3.584 *N*= 10	M = 34.10 SD = 2.885 *N*= 10
	M = 43.00 , SD = 7.948 , *N*= 30 (For whole experimental group)		
Traditional Teaching Method	M = 47.30 SD = 3.466 *N*= 10	M = 36.90 SD = 4.606 *N*= 10	M = 27.30 SD = 2.406 *N*= 10
	M = 37.17 , SD = 9.006 , *N*= 30 (For whole control group)		

Table 1 sum up the cell-wise estimation of means score and standard deviations for both groups' achievement scores. It is self-evident that the estimate of the mean score and standard deviation for high achievers (H.A.s), average achievers (AAs) and low achievers (LAs) in the trial group were 51.70 and 3.199; 43.20 and 3.584; 34.10 and 2.885 separately. Likewise, estimations of the mean score and standard deviation of the overall trial group were 43.00 and 7.948 individually. Table 1 also gave mean score and standard deviation value for high achievers (H.A.s), average achievers (AAs) and low achievers (LAs) in the control group as 47.30 and 3.466; 36.90 and 4.606; 27.30 and 2.406 separately. Similarly, the estimation of the mean score and standard deviation for the overall control group was observed as 37.17 and 9.006 individually.

Table 2. Group statistics for students of experimental and control groups (Academic Achievement)

Level of Achievement/ Teaching Methods	H.A.s	A.A.s	L.A.s
BBL Teaching Method	M = 34.10 SD = 2.885 *N*= 10	M = 29.30 SD = 4.165 *N*= 10	M = 22.90 SD = 3.315 *N*= 10
	M = 28.77 , SD = 5.758 , *N*= 30 (For whole experimental group)		
Traditional Teaching Method	M = 30.00 SD = 3.367 *N*= 10	M = 23.40 SD = 4.427 *N*= 10	M = 16.40 SD = 2.757 *N*= 10
	M = 23.27 , SD = 6.622 , *N*= 30 (For whole control group)		

Table 2 sums up cell-wise estimations of means score and standard deviations for achievement scores of test and control groups at the local zone. It is self-evident that M and S.D. estimates for H.A.s, A.A.s, and L.A.s in the experimental group were 34.10 and 2.885; 29.30 and 4.165; and; 22.90 and 3.315 respectively. Likewise, estimations of the mean score and standard deviation for the whole group was 28.77 and 5.758 separately. Table 2 additionally gave the measures of the mean score and standard deviation for high achievers (H.A.s), average achievers (AAs) and low achievers (LAs) in the control bunch as 30.00 and 3.367; 23.40 and 4.427 and;

16.40 and 2.757respectively. Additionally, the estimations of the traditional group's mean score and standard deviation were 23.27 and 6.622, respectively.

Table 3. Results of Post Hoc tests for Multiple Comparisons of mean Differences among Three Levels of Achievement by Tukey HSD (Control Group)

Levels of achievement (1)	Levels of achievement (2)	Mean Difference (1)-(2)	Standard Error of Mean (SE_M)	*p*-value
HAs	AAs	5.700	1.418	.001*
	LAs	12.400	1.418	.000*
AAs	HAs	-5.700	1.418	.001*
	LAs	6.700	1.418	.000*
LAs	HAs	-12.400	1.418	.000*
	AAs	-6.700	1.418	.000*

Table 3 recapitulates the outcomes of the mean difference between any two categories of students of H.A.s, A.A.s and L.A.s in their academic achievement. The Post Hoc test assumes that each group will be compared will all other groups. The data indicated that the performance of the stated high achievers (H.A.s) is significantly different from that of average achievers (A.A.s) ($p<0.05$, SEM = 1.418, SL = 0.05). It was also observed from the statistics that the average achievers (AAs) of the school performed significantly different than low achievers (L.A.s) ($p<0.05$, SEM = 1.418, SL = 0.05). The table reveals that the mean difference between high achievers and low achievers (12.400) is greater than the rest of the differences. Similarly, the mean difference between average achievers and low achievers (6.700) is greater than the mean difference (5.700) between high achievers and average achievers.

Table 4. Results of Post Hoc Tests for Multiple Comparisons of Mean Differences Among Three Levels of Achievement by Tukey HSD (Experimental Group)

Levels of achievement (1)	Levels of achievement (2)	Mean Difference (1)-(2)	Standard Error of Mean (SE_M)	*p*-value
HAs	AAs	4.800	1.563	.013*
	LAs	11.200	1.563	.000*
AAs	HAs	-4.800	1.563	.013*
	LAs	6.400	1.563	.001*
LAs	HAs	-11.200	1.563	.000*
	AAs	-6.400	1.563	.001*

Table 4 reviews the outcomes of the mean difference between any two categories of students of H.A.s, A.A.s and L.A.s in their academic achievement in the experimental group. The data indicated that the performance of the stated high achievers (H.A.s) is significantly different from that of average achievers (A.A.s) ($p<0.05$, SEM = 1.563, SL = 0.05). It was also observed from the statistics that the average achievers (AAs) of secondary school students performed significantly different than low achievers (L.A.s) ($p<0.05$, SEM = 1.563, SL = 0.05). The table reveals that the mean difference between high achievers and low achievers (11.200) is greater than the rest of the differences. Similarly, the mean difference between average achievers and low achievers (6.400) is greater than the mean difference (4.800) between high achievers and average achievers.

Results and Conclusion

It was found that the estimation of the overall mean score (43.00) and standard deviation (7.948) of the experimental group, in the same way, estimation of the overall mean score (37.17) and standard deviation (9.006) observed in the control group (Table 1). While (Table 2) informed about the group statistics for students of control and experimental groups about their academic achievement. In the control group, the

mean difference between average achievers and low achievers (6.700) is greater than the mean difference (5.700) between high achievers and average achievers (Table 3) whereas, in the experimental group, the mean difference between average achievers and low achievers (6.400) is greater than the mean difference (4.800) between high achievers and average achievers (Table 4). The BBL teaching method's impact on the subject of science for 5th graders was studied by Ozden and Gultiken (2004), while Rehman (2011) studied the effectiveness of the BBL theory for 9th graders in the subject of mathematics. However, this study investigates the effect of brain-based learning on a students' academic achievement in the field of English at the secondary school level. Thus, the findings of the study confirm the results of Ozden & Gultiken (2004) and Rehman (2011).

BBL teaching method is a promising approach that significantly affects the learners' academic achievement, especially in English. But when it is contrasted with the traditional teaching method or instructions in the light of the fact, it is concluded that the BBL teaching method center on the analogical agreement of brain, social interaction, commitment and oral sharing, joint effort and contemporary enlightening in language teaching. Native, foreign or second language learning is a social phenomenon, so the brain-based learning teaching method provides socialization to the learner. Therefore, in contemporary forms of teaching, the BBL teaching method is far best for English as a subject.

Recommendations

In view of the results and conclusions, the below recommendations have been made;

1. Brain-based learning is an encouraging teaching method because it affects language learners' academic achievement in the subject of English. So, it may recommend that conducive activities may conduct within the classroom, which involves the entire physiology of students for better English learning.
2. Taking enough water is one of the unique characteristics of the brain-based teaching method. Therefore, it may recommend that teachers may encourage students to take up their water bottles in the classroom and drink sufficient water for the better working of their mind.
3. Academic resources and BBL tool kits may be provided within each secondary school. Language laboratories develop in schools, and there may be implemented brain-based learning principles and techniques for students better communication skills.

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