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Analysis of Brain-based Learning Pattern in Early Childhood Education in Punjab

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Abstract: *This study investigated teachers' attitudes towards Brain-Based Learning (BBL) in Early Childhood Education (ECE) using a descriptive approach and purposive sampling. Data from 209 teachers in Multan's Government schools where Early Childhood Education being taught were collected through a modified questionnaire based on Shelly Klinek's work (2009), but adapted and modified to align with the Pakistani context and the specific needs of the educational landscape in the region. The analysis of the collected data involved the use of statistical measures such as mean, standard deviation, and chi-square, with the software SPSS employed for the analysis. The findings of the study revealed a generally positive attitude among teachers towards the implementation of BBL in ECE. Moreover, significant mean differences were observed in various demographic factors, including teaching level, academic qualification, professional qualification, and teaching experience, concerning teachers' attitudes towards BBL at the ECE level. Recommendations include educational authorities organizing seminars or workshops focused on BBL in ECE to familiarize teachers, especially new ones, with brain-compatible classroom principles. Targeted professional development opportunities can effectively support teachers in implementing BBL, enhancing learning experiences for young children in early childhood education.*

Key Words: Early Childhood Education. Brain-based Learning, Pattern

Introduction

The study highlights the importance of brain-based learning (BBL) in education and focuses on the development of research in comprehending human thought, the universe, and the mind. BBL has important ramifications for curriculum development, instructional strategies, and assessment instruments since it harmonizes teaching techniques with biological brain processes. Because of the fast growth of the brain and its neural connections during this developmental era, BBL becomes more important in the context of early childhood education (ECE) (Wan Rosmini Hassan (2013) .

Notwithstanding BBL's capacity for transformation, there are several obstacles. Instructors may be reluctant to adopt BBL because they believe it to be a novel and undeveloped field. Acceptance is also influenced by cultural variables; for example, some educators favor traditional approaches over the BBL principles. Nonetheless, the study makes the case for the need to design classrooms that are brain-compatible and supports seminars or workshops to introduce BBL practices to instructors, particularly those in early childhood education (Jensen 2008).

Key principles of BBL in early childhood education involve hands-on learning, making learning meaningful, encouraging movement, facilitating social interaction, and reducing stress. These principles aim to create a brain-friendly learning environment, acknowledging the brain's continuous stimulation for change and emphasizing the role of cultural context (Shelly Klinek 2009).

The study underscores the importance of incorporating multi-sensory experiences, active learning, repetition, emotional engagement, and self-understanding in teaching practices. It suggests that BBL enhances contextual knowledge, decision-making, and group collaboration.

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Additionally, the research explores the link between teachers' attitudes towards BBL and students' motivation in early education. The study recognizes the role of self-determination and achievement motivation in the teaching-learning process, emphasizing the need for educators to understand students' unique distinctions and engage them effectively. (Uzezi and Jonah, 2017)

In conclusion, the study advocates for a paradigm shift in education towards BBL, especially in ECE, to create effective, engaging, and brain-friendly learning experiences, setting a foundation for lifelong learning and success.

Literature Review

Psychologists have given many definitions to the brain-based learning (BBL) idea, which is based on our comprehension of the brain's innate operational activities. Some see BBL as an inclusive method of instruction based on how the human brain naturally learns, while others believe that education is most effective when it is in line with the brain's natural processes. Jensen draws attention to the interdisciplinary aspect of BBL and links it to each person's own brain anatomy. The philosophy emphasizes intellectual ways for better comprehension, challenging conventional teaching techniques like rote learning. From a philosophical standpoint, BBL incorporates ideas from constructivism, materialism, idealism, realism, and dualism. It is based on psychological theories including constructivism, behaviorism, structuralism, and cognitivism. Neuroscience also has an impact on BBL; studies on the structure of the brain, synapse functions, and neural connections offer valuable information for designing successful teaching methods. Seith (2000)

The human brain is an electrical communication device with around 100 billion linked neurons. Axons and dendrites are two examples of the structures found in neurons, and synapses link them. The limbic system, which regulates emotions, and the cerebrum, which is involved in a variety of processes, are two examples of separate brain areas. It is essential to comprehend brain anatomy while talking about gender differences in brain-based learning. Brain-based education places a strong emphasis on designing the best possible learning environments, taking into account elements like ease of attention, rich experiences, and efficient experience processing. Studies show that happy feelings improve learning, and teachers are essential in creating conditions that facilitate thinking. The goal of using brain-based learning principles is to give students meaningful and in-depth learning experiences. (Wan Rosmini Hassan, 2013)

Cognitive methods are used in the classroom to improve students' learning experiences when the Brain-Based Learning (BBL) paradigm is applied. Immersion in intellectually challenging tasks that are in line with the brain's natural processes is emphasized in BBL. An enriched environment that supports brain function and halts cognitive decline can be created using a variety of techniques. Teaching techniques are shaped to accommodate a variety of learning styles by the integration of BBL, which is consistent with various theories including Multiple Intelligence Theory, Cognitive Learning Theory, and Meta-Cognition. According to the multiple intelligence theory, there are different types of cognitive skills and that each one depends on things like self-control and critical thinking. Brain-centered education is examined by Cognitive Learning Theory, which acknowledges the connection between awareness and cerebral development. The five stages of learning are explained by Social Cognitive Theory, which places a strong emphasis on self-efficacy and observational learning. In conclusion, a thorough approach to brain-based education is supported by the integration of various theories, which creates a welcoming and flexible learning environment for students. (Kathleen Cercone, 2006)

The popular "Brain Gym" methodology, which is a part of the Brain-Based Learning (BBL) approach, emphasizes cognitive strategies to improve learning. Targeting many facets of the learning process, Brain Gym consists of 26 exercises divided into three categories: Intermediate, Augmenting, and Dynamism Movements. The purpose of these exercises is to develop and activate brain pathways, which will help with lateralization, attention, and learning challenges. Learning styles vary, and BBL incorporates tactics that correspond with the activities of each hemisphere of the brain. Experiential learning theory (ELT) developed by Kolb divides learners into four groups: accommodators, assimilators, divergers, and convergers. These groups are distinguished by their inclinations towards active experimentation, abstract conceptualization, reflective observation, and concrete experience. Research indicates that a range of pedagogical approaches, including inquiry training, synapse prototypes, and role-playing, can improve

students' performance, creativity, and self-perception. Overall, successful learning has been demonstrated by the incorporation of BBL concepts with a variety of teaching modalities. (Veronika Shrhora, 2017).

The subsections highlight brain-based learning-related teacher philosophy and preparation changes. Teachers' views are cognitive, emotional, and evaluative. Belief requires judgement, but acquaintance is objective. According to scholars, instructors' views include assertiveness, convictions, choices, proverbs, assessments, philosophy, and discernment. Many research show that educators' attitudes and learning applications affect emotions and behavior. Teaching with brain-centered learning methodologies depends on teacher beliefs. Due to contextual circumstances, adopting these views is difficult, causing a conflict between educators' ideas and instructional settings. Management support, a dynamic curriculum, professional growth possibilities, pedagogical upbringing, unique content consideration, and confidence encourage teachers to implement their convictions. Brain-based learning is difficult to implement in classrooms due to educators' lack of knowledge and beliefs. Though theoretically, teachers may unconsciously follow brain-based learning. Demographics including developmental stage, instructional expertise, and instructor education affect educators' brain-based learning beliefs. Considering instructors' awareness and thoughts on brain-based learning in education is crucial. (Caine & Caine, 2005)

Research Objectives

The objectives of brain-based learning in ECE are as follows:

- Investigate how BBL can be helpful in academic activities of children.
- Determine how brain-based ideas may fulfill the needs of children's individual differences.
- Investigate how brain-based strategies can help children in their all round development.

Research Questions

Some of the research questions of the study are as follows.

1. What is the level of teacher's attitude towards Brain-Based Learning at ECE level?
2. How BBL can be helpful to enhance cognitive skills of children at ECE level?
3. How brain-based learning engage and stimulate learning environment that encourages learning, curiosity, and exploration?

Research Methodology

Considering that this study took a descriptive method, the researcher decided against using a questionnaire in the research conducted. (Smart, 2005). In this study, the participants consisted of all of the teachers and caregivers working in the Government Schools of the Multan District, which are responsible for teaching Early Childhood Education. In the case of the sample, a method of selection known as purposive sampling was utilized. (Kelly, 2010)

Specifically, 209 ECE teachers and caregivers of government schools in Multan, which were selected. Data was collected through the use of a questionnaire for teachers that was based on a five-point Likert scale. Mean, the standard deviation, and the chi-square test were utilized in SPSS to analyze the required data.

Data Analysis & Results

The Questionnaires were circulated throughout the selected population of 250 teachers and caregivers. On numerous reminders through personally visit to schools 209 members responded. The percentage of total usable samples is 83.6% of total population.

The study's participants exclusively consist of females, predominantly engaged in nursery-level teaching (74.6%). Academic qualifications vary, with 34.9% holding M.Phil degrees. Professional backgrounds include a diverse range, with many possessing a Master of Education (M.Ed) degree. Participants exhibit significant teaching experience, with a considerable percentage having 11-15 years of experience. In terms of age distribution, 20.4% fall within 25-30 years, and the majority are married (74.8%). By faculty, 66.8% belong to Arts & Social Sciences, and 50.8% are males. Qualification-wise, 39.2% hold Ph.D., and 37.2% are Assistant Professors. Experience-wise, 33.6% have 6-10 years, and 31.6% have 0-5 years. These concise demographic insights provide valuable context for interpreting the study findings in the context of participant backgrounds.

Figure 1

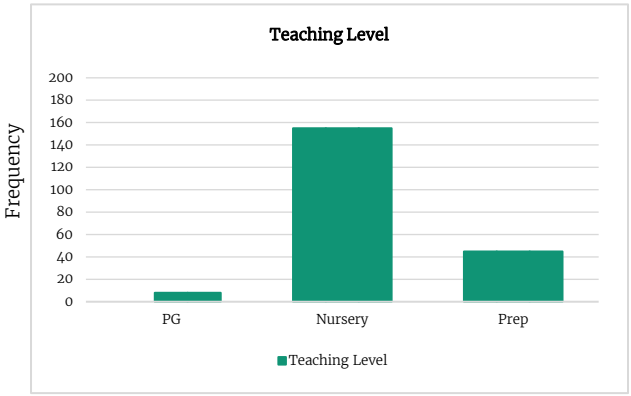


Figure 2

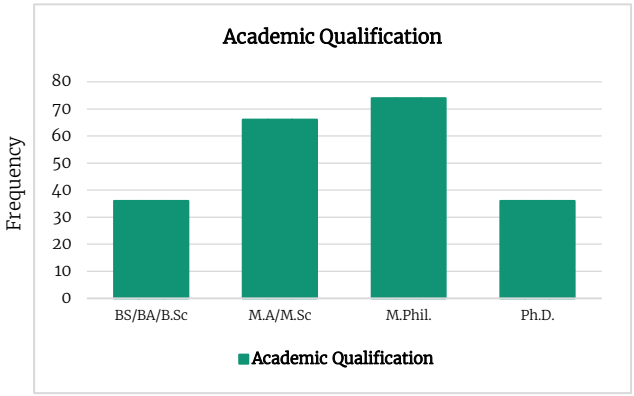


Figure 3

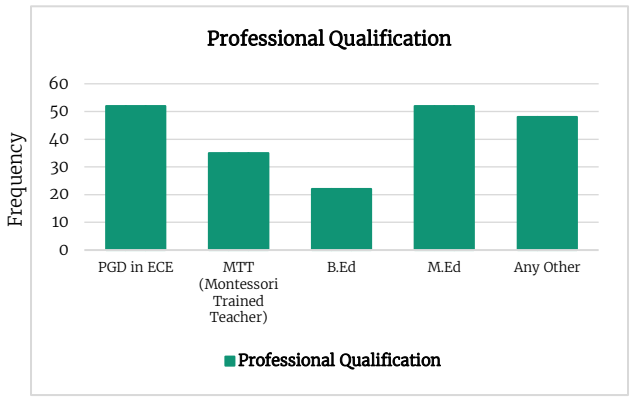
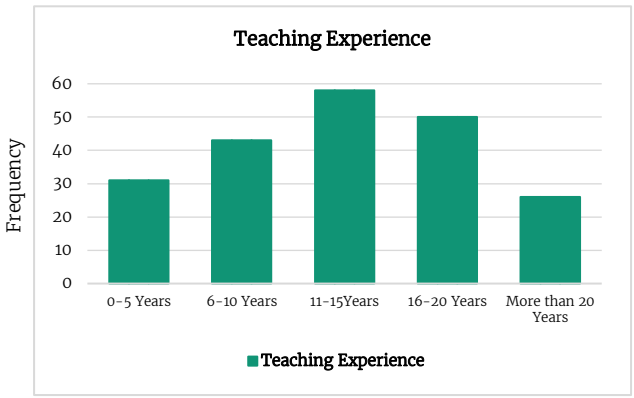


Figure 4



Following the collection of responses, the data from participants were compiled and input into the SPSS tool. Subsequently, the tool was employed to analyze the data, and the report presented the results of this analysis.

Table 1

Descriptive Statistics

N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
209	67.00	135.00	111.2392	12.42052	-1.176	.168	1.070	.335

The descriptive statistics table presents key metrics summarizing the responses to a questionnaire on brain-based learning in early childhood education (ECE). The dataset comprises 209 responses. The minimum and maximum values of 67.00 and 135.00, respectively, indicate the range of participant scores. The mean of 111.2392 represents the average response, offering an overall sense of central tendency. The standard deviation, with a value of 12.42052, reflects the extent of variability or dispersion in the responses. A higher standard deviation suggests greater diversity in the participants' opinions. The skewness value of -1.176 indicates a leftward skew in the distribution of responses, suggesting that the majority of participants may have provided lower scores in relation to brain-based learning in ECE. The associated standard error for skewness is 0.168, providing an estimate of the accuracy of this measure. Kurtosis, with a value of 1.070, implies that the distribution has heavier tails and a sharper peak compared to a normal distribution. The standard error for kurtosis is 0.335, offering insight into the precision of this measurement.

In summary, the descriptive statistics reveal that, on average, participants have provided responses around the mean of 111.2392. However, the variability, leftward skew, and kurtosis in the distribution of responses suggest diverse opinions, with potential concentrations towards lower values. These insights

provide a quantitative overview of the responses to the questionnaire on brain-based learning in early childhood education.

Pearson Correlation

For the correlation we implement the Chi-Square Test to find the Correlation between factor with symptoms and Techniques. These findings collectively demonstrate a generally positive attitude among ECE teachers towards innovative teaching methods, brain-based approaches, and the importance of sensory activities in early childhood education. While there is a prevailing consensus on certain aspects, the moderate variability in responses across tables indicates that opinions may differ among teachers, reflecting the diverse perspectives within the ECE community.

Table 2

Pearson Correlation of BBL in ECE.

Different Elements from Each Factors.	Learning activities are best when teachers involve the student's senses.	BBL encourages active engagement through hand-on exploration.	BBL strategies integrate with the existing early childhood curriculum.	Valuing individual differences is vital in ECE.	Each child's journey in cognitive and emotional development is unique.	Creativity and imagination are boosting critical thinking in young learners.
Different Elements from Each Factors.	**Sig. Value (P)**	**Sig. Value (P)**	**Sig. Value (P)**	**Sig. Value (P)**	**Sig. Value (P)**	**Sig. Value (P)**
BBL approaches are effective in enhancing cognitive skills in early childhood education.	.000	.000	.000	.127	.000	.000
BBL supports the development of social-emotional skills in young children.	.127	.127	.000	.000	.000	.127
Teachers create stimulating environments for effective curriculum engagement in ECE.	.127	.127	.000	.127	.000	.127
Teachers use diverse strategies to tailor activities to individual learning styles and needs.	.000	.000	.000	.000	.000	.000

The table presents the significance values (p-values) associated with different elements from each factor in the context of brain-based learning (BBL) in early childhood education (ECE). Each row corresponds to a specific element, and each column represents a distinct factor. The significance values indicate the likelihood that the observed correlations between the mentioned elements and factors are due to chance. Several noteworthy patterns emerge from the table. For instance, elements related to the effectiveness of BBL in enhancing cognitive skills consistently show highly significant p-values across all factors, suggesting a robust and consistent positive correlation. On the other hand, elements associated with teachers creating stimulating environments for curriculum engagement in ECE demonstrate significant correlations with BBL strategies and valuing individual differences. Moreover, the importance of diverse teaching strategies tailored to individual learning styles and needs exhibits highly significant p-values across all factors, emphasizing a strong and consistent positive association. The significance values in the

table offer valuable insights into the relationships between specific elements and factors related to BBL in ECE, providing a quantitative understanding of their interplay and contributing to the broader discussion on effective educational practices in early childhood settings.

Discussion

The study on Brain-Based Learning (BBL) in Early Childhood Education (ECE) involved a homogeneous group of 100% female participants, mainly in Nursery-level teaching, with diverse academic qualifications. Teachers displayed positive attitudes towards BBL, emphasizing its effectiveness in sensory engagement and traditional teaching methods. The alignment of learning activities with a child's brain development was highlighted, with a consensus that BBL is developmentally appropriate for ECE. Teachers endorsed its role in promoting active engagement and integration with the curriculum, emphasizing individual differences and diverse strategies. Pearson correlation coefficients revealed significant associations between BBL elements, highlighting the interconnected relationship among sensory activities, effective teaching techniques, active engagement, and diverse strategies. The study underscores the multifaceted impact of BBL on teaching and learning in ECE, offering valuable insights for future educational practices and professional development initiatives.

Conclusion

The study on Brain-Based Learning (BBL) in Early Childhood Education (ECE) reveals a predominantly female, Nursery-level teaching sample with diverse academic qualifications. ECE teachers express positive attitudes toward BBL, emphasizing the effectiveness of multisensory approaches and traditional teaching methods like "Chalk and talk." They believe in BBL's efficacy in enhancing cognitive and social-emotional skills in young children. The study highlights alignment with a child's brain development and emphasizes the importance of tailoring educational approaches. Teachers endorse BBL for promoting active engagement and integrating with the curriculum.

The findings underscore the significance of sensory activities for cognitive development and emphasize valuing individual differences in educational approaches. Educators employ diverse strategies to cater to individual learning styles. Positive attitudes prevail toward the impact of music, creative activities, and imaginative play on emotional development, memory enhancement, and information processing.

Pearson correlation coefficients indicate significant associations among sensory activities, effective teaching techniques, active engagement, and diverse strategies in BBL. The study emphasizes the multifaceted impact of BBL on teaching and learning in ECE, offering valuable insights for future practices and professional development initiatives. Overall, the study highlights positive perceptions of BBL among ECE teachers, informing a holistic approach to early childhood education.

Recommendations

- Identify and address teachers lacking knowledge about brain-based learning through higher academic authorities and in-service training programs, extending training to all levels of teachers, including pre-service teachers.
- Organize seminars and workshops led by higher management authorities to cultivate brain-based strategies among teachers, focusing on key principles like passive attention, theme creation, flow and fluency, student-centered learning, questioning techniques, movement, and emotional engagement.
- Implement mastery learning approaches like project formation, thematic work, and role-playing to enhance mastery, social goals, and performance goals among students in Early Childhood Education (ECE).
- Establish mentorship programs where senior teachers act as mentors, passing on valuable skills, knowledge, and insights to newly appointed teachers, contributing to the development of brain-based learning strategies in ECE.

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