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**RESEARCH PAPER**

# Investigating Teachers' Perception Regarding Brain-based Teaching Method at College Level

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**ABSTRACT**

This study investigates teachers' perception regarding brain-based teaching method. It also identified the challenges faced by teachers in the way of using brain-based teaching at college level. Traditional lecture-centered approaches, although still widely used, are increasingly seen as insufficient for addressing the varied learning needs of modern students. Integrating brain-based teaching principles can help bridge this gap by fostering more interactive, engaging, and learner-centered classrooms. The study used descriptive quantitative survey design. Sample of the study consisted of 503 teachers from public and private colleges from district Multan. Both descriptive statistics and inferential statistical techniques were applied. Findings show that brain-teaching method improves student learning and understanding. Teachers reported increased students' motivation and satisfaction with brain-based teaching strategies, which ultimately results in enhanced academic achievement. Colleges should provide supportive structures—such as flexible classroom layouts, teaching aids, and manageable class sizes—to make it easier for teachers to apply brain-based strategies.

**KEYWORDS** Brain-Based Teaching Method, Neuroscience, Students' Motivation, Challenges

## Introduction

Brain-based teaching method or brain teaching method has been found to be most beneficial in helping students to retain content in long term memory and to increase motivation, as it requires students to employ multiple cognitive processes while connecting content material to the senses or to the real world (Jensen, 2008). Neuroscience has emerged, and now understanding how to structure certain teaching techniques for the benefit of natural brain function. Research in neuroeducation shows that students achieve better comprehension and retention when instructional strategies follow the way the brain learns (Sousa, 2023). Guided by this foundation, brain-based teaching strategies have been developed on a set of principles, including, neuro-plasticity, emotional resonance, active learning, and contextual relevance (Tokuhama-Espinosa, 2015). These principles not only optimize cognitive performance but also foster students' critical thinking, problem-solving, and adaptability skills essential for success in both academic and real-world contexts. According to Han and Lee (2020), students didn't experience almost as much academic pressure in classes where these mind-based strategies were applied as the brain-based environment provides a healthier learning environment and better mental well-being. Brain-based teaching is based on several foundational principles derived from research in neuroscience and psychology, each of which contributes to a more holistic approach to education. Dehaene (2021) was of the view that neuroplasticity means that the brain is able to rewire itself because of the ways we experience and learn and repeated exposure and reinforcement allow students to strengthen those neural connections to reinforce learning and true understanding.

In this context, Zadina (2014) opined that the brain operates better when you're actually doing it. Passive learning in higher education is not effective in learning complex information. The problem-solving tasks, discussions, and hands on activities as active learning techniques, forces students to deeply process information which therefore leads to increased understanding and recall. Furthermore, Tokuhama-Espinosa (2021) claimed that the knowledge is considered to be stored in the brain more effectively if the brain applies the knowledge to a specific situation or environment. Various approaches linked to the brain suggest that for content to be meaningful and accepted by students it has to be related with what they are experiencing or what they are interested in. Various works show that contextual learning positively impacts the means through which students appreciate information, their ability to memorize, and skills that they are likely to master for practice elsewhere other than the classroom.

The brain teaching method encourages student engagement in the classroom, leading to improved thinking skills and active participation in class (Kharsati & Prakasha, 2017). The Brain teaching approach has the potential to significantly enhance intervention strategies aimed at promoting students' learning and well-being (Baratali & Zardeini, 2023). The brain-based teaching approach exemplifies a student-centered approach. In a brain-based approach, a teacher guides the learning process while fostering a positive learning environment and promoting student engagement in the class. It is crucial to provide young children with instruction that is both efficient and impactful. An effective teaching method is characterized by its ability to enhance children's motivation to learn, foster their self-awareness of their understanding, and promote their reflection on the knowledge they acquire, provided that this teaching is grounded in pertinent and observable instruction. An effective intervention that has been identified is Whole Brain Teaching (WBT) (ElAdl, 2020). This approach can be seen as a teaching strategy that engages multiple senses and aligns with brain-based learning principles (Muthukrishnan et al., 2019). This approach is rooted in the fundamental tenets of cooperative learning. This method facilitates children's engagement in the learning process by stimulating both hemispheres of the brain (ElAdl & Saad, 2019).

Brain-based teaching method is a pedagogical method grounded in neuroscience. This concept emphasizes how brain learns effectively and naturally. Despite its globally accepted importance as instructional strategies i.e. first-hand learning, multisensory engagement, stress-free environments, and learner-centered techniques—its adoption at college-level education in Pakistan remains inconsistent. Teachers mostly rely on lecture-driven conventional methods. In this connection, the researcher of this study aimed to investigate teachers' perceptions regarding improving pedagogical effectiveness by adopting brain teaching methods and challenges faced by them in the way to adopt brain teaching methods.

## Literature Review

Ever since cognitive psychology was introduced during the 1970s and 1980s, the application of brain-based learning strategies could be identified. As the field of neuroscience advanced the amount of research documenting teaching practices in terms of brain functions expanded. Over the last few decades, the area of neuroeducation has grown rapidly, focusing on applying neuroscientific knowledge into educational processes to design learning conditions (Hattie & Donoghue, 2020). Furthermore, Lopez and Green (2021) claimed that teachers who used brain-based methods found that peer to peer interaction improved and decreased classroom disruptions. Brain based teaching acknowledges that not all people learn the same way — some prefer visual, auditory, kinesthetic styles of learning, for example. Because of this approach, teachers find it easier to cater for a wide group of learners and lessons are accessible and effective for all students. Integral to student diversity success, teachers found that combining visual aids, hands on exercises, and interactive discussions helped to reinforce their learning (Allen & Williams,

2023). According to Ruiz et al. (2020), teachers believe these methods are useful for teaching students' essential skills beyond memorization, in order to prepare them for complex real-world problems.

## Theoretical Frameworks Supporting Brain-Based Teaching

Several theoretical frameworks of how the brain learns and how educational practices can be optimized to support effective learning ground for brain-based teaching methods. These neuroscience, psychology, and educational theory derived frameworks help educators make sense of how to design instruction that matches up with natural brain processes.

### Constructivist Theory

The theory of learning is the constructivist theory, which basically works on Piaget's construct on learning and later on Vygotsky's idea on the learning of the child as the process of constructing knowledge out of experiences and interactions. The main ingredient of the constructivist theory includes the use of students to content actively, the use of prior knowledge to newly learned materials and the comprehension of the concepts from the actual experience. You can also see this theory on brain-based teaching which requires using an active learning, collaborative assignments, and application to the real world to achieve meaningful learning (Piaget, 1972; Vygotsky, 1978).

### Multiple Intelligences Theory

According to Gardner (2011), each and every one of us possesses them. His Multiple Intelligences Theory proposes that intelligence possesses more than one form – linguistic, logical mathematical, spatial, musical, bodily kinesthetic, interpersonal, intrapersonal, and naturalistic. Through brain-based teaching, this framework provides a recognition for the utilization of different instructional strategies that accommodate difference in learning preferences and strengths. Brain Based Teaching Applications, according to Gardener (2011), are as follows:

- A mix of visual, auditory, kinesthetic, and logical tasks that the incorporate to meet different intelligence types.
- Offering a way for students to take part in learning activities that match their style patterns.

### Information Processing Theory

Atkinson and Shiffrin's (1968) Information Processing Theory explains how the memory process is: Explanation of how the brain encodes and stores and remembers information and ways of making attention, perception, encoding and recall better for greater recall of memory. This theory states that by chunking complex information into understandable chunks promoted by repeated memorization and making sense of the notion among the information. This theory then is applied to these applications in educational settings using mnemonics, visual aids and interactive activities, in attempt to solidify the learning, making the information more accessible and more memorable for students.

### Social Learning Theory

The Social Learning Theory of Albert Bandura says that people learn by observing others and more so modeling and imitation which shows how social world and peer environment shape our learning. This brain-based theory of teaching supports practices

where through interaction and collaboration, students learn through peer learning and role playing. Context to application for social learning theory involves how different type of classroom activities such as group discussions and activities that create shared learning experiences to modeling and demonstrations to show skills and a behavior (Bandura & Walters, 1977).

**Bloom's Taxonomy of Cognitive Development**

Cognitive processes are sorted into hierarchy in Bloom's Taxonomy from lowest level where basic knowledge recall is included and ends up with higher order skills of analysis, synthesis, and evaluation. This framework provides the basis upon which brain-based teaching has its foundation, advising educators to select lessons, which will help students progress through these cognitive stages, thus advancing and ultimately deepening their understanding and critical thinking. In practice, brain-based teaching with respect to Bloom's Taxonomy entails the crafting of lessons from an anchor from the base forward to the ends of analysis and evaluation via complex task (Bloom,1956). It also encourages initiatives such as discussions or projects that promote reflection and synthesis, and the involvement of students with content.

**Cognitive Load Theory**

According to Sweller (1988), the brain is able to process only one piece of information at a time and thus the instructional strategies should promote and reduce the extraneous cognitive load, whereas emphasizing on the important information. This theory also accepts the methods in brain-based teaching such as simplifying complex concepts, using visual aids and giving step by step guidance to difficult things. Applications which are effective include structuring presentation of information to prevent cognitive overload; and using diagrams and visuals to deconstruct complex processes to aid them in being more accessible and understandable to students.

**Mind, Brain, and Education (MBE) Framework**

The Mind, Brain and Education (MBE) framework is a unification of the fields of neuroscience, psychology, and education that supports using methods of teaching that are consistent with brain's natural educational processes. As noted in MBE, these strategies fit with research on long term memory and brain plasticity. MBE is used in brain-based teaching by using spaced repetition to enhance memory retention and stress reducing techniques such as mindfulness to create an atom optimal learning environment. There are these practices that effectively promote the learning the emotional and cognitive principles of students (Tokuhama-Espinosa, 2010).

**Emotional Intelligence Theory**

As suggested by Emotional Intelligence Theory of Goleman (2005), emotions play a substantial role in learning, and students' emotions have high impact on how much students can absorb and retain information. Brain based teaching is the reason that is why as teachers it is being advocated for of course providing emotionally calm environments and incorporate their social emotional learning (SEL) practice. First, being emotionally intelligent helps students handle their emotions and learn how to have social skills. It has been used in brain-based teaching to create safe and supportive classrooms which provide the emotional security to create socially and emotionally as well as academically learning places.

**Challenges in the way of adopting Brain-Based Teaching**

Brain based teaching methods can make for dynamic engaging learning environments that are consistent in cognition, but there are logistics and systemics within the college that can support those methods. Since much of brain-based teaching is based on neuroscience, and most educators are not trained in neuroscience, we often either misuse brain science or over utilize it. Although studies show that educator's value brain-based approaches, limited access to the professional development needed on neuroscience informed practices prevents this (Seifert et al., 2022). Many of these brain-based teaching strategies take additional resources: technology, hands on materials, and time to plan. The implementation of these resource intensive methods, however, can be challenging at college where class sizes are large and there is limited time (Smith et al., 2023).

The outcomes of brain-based teaching, was critical thinking and emotional resilience, and these were very difficult to measure using traditional assessment methods, such as standardized testing. The lack of alignment between assessment objectives and the intended teaching objectives can render the determination of success of brain-based methods in higher education difficult (Turner & Gold, 2021). The tradition often used in college institutions centers on established lecture-based teaching, which can cause resistance when attempting to implement brain-based methods. Since changing deeply ingrained instructional practices and curricula also requires institutional support, which may not always be available (Garcia & Lam, 2020), the question of what these shortfalls might mean for the efficacy of the proposed curricula arises as well. Brain based teaching allows more personalized, adaptive learning, all to serve the individual needs of each student. In large and diverse student populations in college settings however, it is difficult to provide individualized instruction that addresses each student's cognitive needs (Chen et al., 2022).

Brain based tactics are often introduced in a shift away from traditional, lecture based, instruction towards a more interactive, student-centered environment. Not all teachers will feel comfortable or familiar with these changes. However, as reported by Mendez and Salazar (2023) when it comes to brain base method teachers especially those who have experience with the traditional method have reservations when it comes to it as it needs them to adjust to more flexible and dynamic teaching methods. In like manner, teachers normally note the constraints of resources like budget and large class size when adopting brain-based teaching. They feel that these are the challenges that stop them from fully utilizing the interactive and hands on approaches. In reality, external constraints regularly impede the teacher's creation of an active and multifaceted learning environment that influences the learning of students (Martin & Zhou, 2022).

Sometimes students who prefer clear guidelines can feel unstructured, which is why brain-based teaching frequently includes open ended tasks and collaborative work. Zhang and Adams (2023) observed that some students had trouble with the flexibility required in brain activities and were unable to focus and manage their time during these kinds of sessions. Students indicate that brain–based techniques can be inconsistent in terms of academic performance, depending on the class pursued. However, some topics don't fit as well with brain-based techniques, especially when they involve memorization and factual recall. Research by Mukherjee and Lee (2023) showed that students understood that brain-based teaching motivated them to engage, but at times it felt shallow as compared to traditional teaching (in mathematics and science). By and large, brain-based teaching effectiveness depends a great deal on the instructor's ability to apply the brain principles of neuroscience.

**Methods for Promoting Brain-Based Teaching**

An effective brain–based teaching needs a supportive (positive) classroom atmosphere. Establishing rapport with the learners, as a result of which learners are convinced that they are valued, along with setting up clear expectations for the learners'

conduct and their communication with the teachers, being respectful, paves the way for creating an environment, in which learners would feel safe and valued. Johnson and Lee (2022) bring to light a positive learning environment is a major factor that influences student engagement and success.

Technology for brain-based learning is a powerful ally for teaching. The interactive tools are smart boards, educational apps, online platforms for examples which engage for collaboration and motivates. Kahoot and Quizlet are a platform that has successfully incorporated gamification to learning, making the process not to be uninteresting, and to involve users actively (Nguyen et al., 2023)

Spaced repetition and multisensory activities are brain based and can be used to enhance memory retention by matching it to the brain's natural learning process (Patel et al., 2021). By using these techniques, you reinforce neural pathways and improve long term recall so students will remember complex information easier. Active learning methods are part of the whole brain teaching model and help keep students engaged and have another moment to process and internalize the material. Teachers using methods like collaborative learning and problem-solving exercises have a greater chance to increase students' intrinsic motivation and focus as they involve the students more actively in the learning process and they are intuitively motivated to cope with the task in front of them (Alozie et al., 2022). Methods based on the brain are capable of connecting with a variety of learning styles with the aid of visual tools, hands on activities and group discussions. Overcoming the incompatibility in the learning environment of many classes, this inclusive approach accommodates varying learning styles and makes the classroom more accessible for different kinds of learners (Lewis & O'Boyle, 2023).

Interactive discussions, multimedia, and hands on projects are all brain-based methods that help students have a feeling of connection to the material. A study by Nguyen and Tanaka (2021) showed that while brain-based classes were higher motivated due to more motivation and attentiveness, it was because the methods made the complex topics more accessible and engaging.

A short mindfulness exercise or reflection time before and/or after lessons help students feel they are connected to what they are learning, and what they are stressed about. According to Mazza-Davies (2015), mindfulness practices help students to pay more attention, be emotionally well and academically wise. Everyone will be better engaged in one way or the other given the different activities and resources that appeal to their learning preferences, readiness level and interest.

It's collaborative learning where students learn to work together and communicate with each other. Group projects, discussions and work are learnt from other students. According to the research by Hwang and Kim (2022), if students engage in the collaboration, it will create a sense of community in the classrooms and increase the residence numbers. Students will have to learn something and it is tied to a real-world context they will have to engage with and understand why they were learning a specific thing. In such cases, educators can use case studies, field trips, guest speakers to explain concepts to students who will be prompted to want to dig more into a matter. Real world applications increase student motivation and knowledge retention of the knowledge provided (Torres & Patel, 2024).

## Material and Methods

This study used a descriptive, quantitative research design. In the present study, population comprised of all the male and female teachers of public and private colleges in district Multan. 219 male teachers and 284 female teachers were selected as sample of the study using simple random sampling technique. Data collection was conducted using a self-

structured questionnaire having 46 items. Questionnaire was validated by seeking opinions of experts and pilot testing. Using Cronbach's for all 45 items, it was found to be α=.81. The collected data was analyzed using descriptive and inferential statistical methods.

## Results and Discussion

### Analyses of Teachers' Responses

### Descriptive Analyses

All statements are perceived in a very positive way, pointing out a high level of agreeableness. Majority of the respondents agreed that brain-based teaching enhances student learning, enabling them to grasp complicated topics effectively, while teachers exhibit a confident comprehension of brain-based teaching methodologies. The findings indicated that the classroom environment affects the efficacy of brain-based teaching; students perceive the learning materials as interesting and stimulating, and they assert that the classroom atmosphere improves my entire teaching experience. The educators indicated that technology facilitates greater student engagement in the learning process, enables differentiated instruction tailored to individual learning requirements, and instills confidence in utilizing technology to augment brain-based teaching strategies within the classroom. The educators indicated that their pupils exhibit heightened passion for learning when brain-based strategies are employed, and overall, they are content with the level of motivation demonstrated by my students when utilizing these teaching methods.

### Inferential Analyses of Difference between Respondents

Inferential analysis was performed to find the discrepancy in opinions of teachers regarding gender, locality, academic qualification and their teaching experience. The data were analyzed using an independent sample t-test and a one-way ANOVA.

**Table 1**
**Difference between Male and Female teachers' Opinions**

| Variables | Category | N | Mean | SD | df | t | Sig. |
|---|---|---|---|---|---|---|---|
| Gender | Male | 219 | 3.4852 | .49393 | 501 | 10.296 | .297 |
| | Female | 284 | 3.9865 | .45441 | | | |

Table 4.3.1 illustrates the perspectives of male and female pupils. The average number of female instructors (3.9865) is greater than that of male teachers (3.4852). Nonetheless, the computed significance value was the score of .29 is greater the established significance threshold of 0.05, indicating no statistically significant disparity in instructors' attitudes according to gender.

**Table 2**
**Difference between Teachers' Opinions by locality**

| Variables | Category | N | Mean | SD | df | t | Sig. |
|---|---|---|---|---|---|---|---|
| Locality | Urban | 375 | 3.9186 | .49816 | 501 | 3.865 | .329 |
| | Rural | 128 | 3.7194 | .51819 | | | |

Table 2 illustrates the variance in instructors' judgments by locality. The computed significance value of .32 exceeds the specified significance level of 0.05. This signifies that there is no statistically significant disparity in instructors' attitudes according to their locality.

**Table 3**
**Difference between Teachers' Opinions by Academic Qualification**

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 26.171 | 94 | .278 | .941 | .632 |
| Within Groups | 120.679 | 408 | .296 | | |
| Total | 146.851 | 502 | | | |

Table 3 demonstrates the variation in instructors' viewpoints according to their academic credentials. The computed significance value of .63 exceeds the specified significance level of 0.05. This signifies that there is no statistically significant disparity in instructors' attitudes relative to their academic degrees. The assertion is further corroborated by the F value (.941).

**Table 4**
**Difference between Teachers' Opinions by teaching experience**

| | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 134.066 | 94 | 1.426 | 1.033 | .407 |
| Within Groups | 563.349 | 408 | 1.381 | | |
| Total | 697.416 | 502 | | | |

Table 4 indicates that the teaching experience completed by instructors influences the variance in their judgments. The computed significance value (.407) above the established significance threshold of 0.05. This signifies that there is no statistically significant disparity in teachers' opinions according to the teaching experience. The assertion is further corroborated by the F value (1.03).

## Discussion

The goal of this study was to find out ways to improve the brain teaching method at college level. The findings indicated that brain-based teaching enhances student learning, enabling them to grasp complicated topics effectively, while teachers demonstrate a confident comprehension of brain-based teaching methodologies. The results are in consistent with Sousa (2023) and Tokuhama-Espinosa's study (2021), who claim that the brain teaching technique has emerged as a potent educational approach grounded in cognitive neuroscience, providing educators with teaching strategies that align with optimal brain learning processes. The use of this blended teaching module has provided educators with critical insights into how instructional strategies can be designed to stimulate neural pathways, potentially enhancing both academic achievement and cognitive growth.

Further, teachers reported that active learning techniques are integral to the whole brain teaching approach, enhancing student engagement and providing more opportunities to absorb and integrate the material. Educators employing strategies such as collaborative learning and problem-solving activities are more likely to enhance students' intrinsic motivation and concentration, as these approaches engage students more actively in the learning process, fostering an intuitive drive to tackle the tasks presented. The study of Alozie et al. (2022) also supported this result.

The findings indicated that the classroom environment affects the efficacy of brain-based teaching; students see the learning materials as interesting and stimulating, and they believe that the classroom atmosphere improves my entire teaching experience. Teachers indicated that technology facilitates greater student engagement in the learning process, simplifies the differentiation of instruction according to individual learning requirements, and instills confidence in their ability to utilize technology to augment brain-based teaching strategies in the classroom. In addition to it, teachers also reported that their pupils exhibit heightened passion for learning when brain-based strategies are employed, and overall, they are content with the motivation levels demonstrated by my students when utilizing these teaching methods. Mueller et al. (2020), Williams and Kim (2023) and Smith and Walker's (2021) reached the same conclusion. Regarding challenges in the way to brain-based teaching methods it was found that such a neuroscience-informed pedagogy facilitates individualized and adaptable learning, according to the unique needs of each student. In extensive and varied college student populations, it is challenging to deliver individualized and personalized education that caters to each student's cognitive requirements. The result is consistent to the study of Chen and Franks (2023).

## Conclusion

The study reveals a mostly positive attitude towards incorporating brain-teaching methods into instructional practice. It also highlights key challenges in the way of its successful implementation. Brain teaching method has become a powerful educational method based on cognitive neuroscience that gives educators ways of teaching that matches how the brain most learns. Contrary to most previous approaches, which commonly focus on note memorization and passive intake of knowledge, brain-based learning is autonomous and encourages activity, connection with feelings, and the use of content. Teachers admitted that brain-teaching method grounded in cognitive science, such as active engagement, meaningful context, and consideration of students' emotional and cognitive needs significantly enhances students' learning outcomes. Major challenges reported by teachers were issues regarding professional training, lack of accessible resources. There is a dire need for developing awareness of brain-teaching methods and supportive administrative policies to help teachers to improve their instructional strategies. Such an approach can not only empower teachers but also play an important role to promote more effective, student-centered learning environments.

## Recommendations

- Teachers should be encouraged to adapt BBL techniques to suit their subject needs.
- Colleges should ensure that classrooms are equipped with technology, flexible seating arrangements, and interactive materials that support BBL.
- Institutions should allocate funding to create brain-friendly learning spaces that reduce stress, encourage movement, and promote student engagement.
- Colleges should revise academic schedules, reduce unnecessary paperwork, and encourage flexible teaching practices so teachers can experiment with BBL methods.

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