ORIGINAL ARTICLE

Exploration of Teachers' Attitudes toward Brain-Based Learning at the University Level

Fozia Fatima[1*], Muhammad Imran Hanif[2], Safia Fatima[3], Asiya Zahoor[1], Sobia Fatima[4]

ABSTRACT

Objective: This study looks at how instructors feel about brain-based learning and analyses the impact of demographics on those feelings.

Study Design: A standardized questionnaire was used to conduct a descriptive design using the survey approach.

Place and Duration of Study: This study was conducted from 2016 to 2018 at different universities of Islamabad Pakistan.

Materials and Methods: Through a multilevel mixed sampling procedure, 311 university instructors were selected as a sample. This survey only included faculty members at universities in Islamabad who are majoring in the social sciences, management sciences, or arts and humanities.

Results: The mean value of teachers' attitudes toward brain-based learning was 136.12. The male mean, which is 126.24, is higher than the female mean, which is 121.06, and the difference in means was sizable. Similarly, academic qualification (p=.024), disciplines (p=.000), age (p=.001), Teaching experiences (p=.006), and universities (p=.006) have a significant effect on teachers' attitudes toward brain-based learning.

Conclusion: Teachers at the university level were not fully confident in the use of brain-based learning principles because they were implementing them haphazardly and could not clearly explain why their actions were beneficial to the teaching-learning process. The attitudes of teachers regarding brain-based learning were significantly influenced by their gender, age, teaching experiences, universities, teachers' employment in the public or private sector, their academic specializations, or their educational background.

Keywords: *Demographic Factors, Brain-Based Learning, University Teachers.*

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Introduction

The world is currently experiencing an amazing expression of scientific research into the human mind and brain. The world of today requires a well-structured education and approaches to problem-solving that are regarded as learning challenges. An atmosphere of cooperation is Mind's favorite.[1] From now on the teaching strategies that are consistently tied to the students and the learning environment can be changed by brain-based learning (BBL). The emotions, consciousness, or memories of individuals have a direct impact on the brain's areas.[2] Both the teachers and the students were clear about what they expected from one another. Because of the flexibility of time and the regularity of teaching tactics, constant questioning, and analysis from teachers to their students, it was found that BBL was not a time-consuming learning process. Brain-based learning is a cutting-edge improvement in education because it has enormous consequences for

[1]*Department of Health Professions Education/Legal Affairs*[4]
National University of Medical Sciences (NUMS)
PWD Campus, Islamabad, Pakistan
[2]*School of Criminology and Criminal Justice System*
Minhaj University Lahore, Pakistan
[3]*Department of Pathology*
Armed Forces Institute of Pathology (AFIP)
CMH, Rawalpindi, Pakistan

Correspondence:
Dr. Fozia Fatima
Department of Health Professions Education
National University of Medical Sciences (NUMS)
PWD Campus, Islamabad, Pakistan
E-mail: foziafatima124@gmail.com

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educators and trainees.[3] When teachers regularly have the chance to review, rehearse, and implement a defined learning strategy for their students, effective erudition results. A person can only learn when his or her brain is able to organize all of the information into a precise pattern. The efficiency and effectiveness of a learning activity that has a tapering time limit and places deadline pressure on the students' projects can be affected because the teacher's instructions may halt or upset the brain's natural patterning ability.[4] In order for apprentices to develop creative and consistent knowledge corresponding to their brain configurations, teaching impulses must be topical and documented.[5] This study may help to broaden the altered dynamics that directly affect instructors' attitudes toward brain-based learning and may also help to identify the assertiveness of a person who might aid a teacher in developing curricula and doing the administration-related evaluation.

According to some experts, brain-based learning is a teaching strategy built around the way our brains naturally learn and is not evaluated as a straightforward assignment. Both studies discovered that a person can learn through set teaching-learning procedures that encourage the organic manner to gather information from their surroundings.[6] Because enticement and response contact constituted the core of behaviourism, learning is entwined with the concept of behaviourism. It was discovered that in order for this association to be effective, the individual must engage in regular practice. Ivan Pavlov also draws attention to the idea of personal intelligence, which was closely related to this association.[7] Similar to this, Skinner, another scientist, introduced the idea of reinforcement as learning motivation.[8] Constructive cognitivism, which was developed by Piaget, was another significant school of thought that claimed that learning was directly tied to a person's developmental phases. Because of this, this idea continues to have an impact on curriculum creation and teaching methods. This theory, however, has certain drawbacks, such as the inability to explain the value of an individual's social and cultural features.[9] In a similar vein, this school of thought was unable to account for individual variances in terms of an individual's intellectual process, social mores, or cultural background. These ideologies shifted the focus of education onto the student. The method of instruction was no longer solely reliant on the stimulus-response relationship; it was now additionally linked to the person's metacognition.[10] proposed twelve doctrines of common sense and cognizance that are based on a vast array of research findings ranging from consciousness to personal natural science.[11] The correlation between the brain, cognition, and frame of reference, as well as how this affects how we learn anything new, is also determined with aggregate perfection by neuroscience.[12] They recognized the following twelve doctrines of erudition:

1. All learning is physical or functional
2. Systematic prefiguring leads to the goal of investigating meaning.
3. The brain/mind progressions simultaneously shift from fragments to ensembles.
4. Education is developmental.
5. Learning is comprised of careful thought and supplementary understanding.
6. Learning is always made up of conscious and unconscious progressions.
7. At least two memory types that entail brain-based learning are used for constructing experience logic and archiving inaccessible facts and aids.
8. Each brain is systematized uniquely.
9. The brain and cognition are communal.
10. Connotation inquiry is innate.
11. The person's cognizance and brain include unstable combinations of stimuli,
12. Diverse knowledge is enriched by the encounter and withheld by risks or threats that are accompanied by helplessness.[13]

Each benchmark for brain-based learning has a clear focus and purpose; they are all tightly interwoven and don't separate. Since it is a teaching strategy with positive implications and a laid-back method of instruction, brain-centered instruction is extremely popular among educationalists of early childhood programs. This is because it has a positive effect on apprentice engagement and dynamic engrossment in their peculiar erudition.[14] The argument for brain-based learning should be supported by prevailing ideas that aid students in determining which kind of institution will be beneficial to them and their

societies. Approaches to education that focus on the brain, such as apprentice high-quality responsibility and small groups, may not be consistent with advancements meant to preserve enlightenment.[15] Brain-Based learning is a cutting-edge training model that produces a large number of trainees, their intense emotions, and physical and social-ecological situations that are essential to advancing knowledge through various teaching methods in the 21st century of learning. Because neuroscience is an intelligible, reasonable, pedagogical awareness and a speculative assumption in the field of education, the belief in brain-based learning remains unaffected. The teaching-learning process has evolved in three different ways as a result of the most recent research on many brain functions. In essence, it gives teachers access to brain research so they can forge speculative connections between teaching and learning and the brain.[16] Additionally, it enables educationalists to operate classrooms and institute environments that offer to lodge and mount diverse collections of apprentices. Thirdly, it is an appropriate and ideal teaching technique because brain-constructed research and strategies gave educators a solid foundation to create learning environments that are effective for students and the brain societies, which were founded on two moral principles:

1. Creating an academic environment that consciously accepts and welcomes all apprentices.
2. Extending hypothetical brain-based learning strategies that are operational exploration-centered and utilized to improve apprentice learning.[17]

As a result, it is abundantly clear from the research mentioned above that there have been many investigations into brain-based learning from various angles. In particular, the current investigation presents a challenge in determining how demographic factors affect the development of brain-based learning in university teachers. The primary goal of this study in Pakistan was to investigate teachers' attitudes toward BBL, specifically what kind of knowledge and practice they had in their classrooms while considering their demographic characteristics. (Gender, industry, credentials, age, experiences teaching, and organizations).

Research Questions

1. How do university teachers feel about brain-based learning?
2. What is the impact of demographic parameters (gender, sector, qualification, age, teaching experiences, disciplines, and Islamabad universities) on the instructors' attitudes toward brain-based learning?

Materials and Methods

Descriptive design through the survey method was used.

Population, Sample, and Sampling Technique

The population of the current study consisted of 19 university teachers from both public and private institutions because it was carried out in Islamabad. At Islamabad University, there were 9660 university instructors employed. The 6512 instructors who worked at the ten public and private universities in Islamabad were targeted. It is very common in research on organizations where different units of analysis are nested within one another and on the basis of different approaches both random (probability) and convenient (non-probability) sampling techniques are used simultaneously in it. For this reason, the multilevel mixed method sampling technique was used.[18] (See Figure.1). University teachers were used as the units of analysis in this study. For this reason, a total of 10 private and public institutions were included in the sample. This method of selecting a group of people ensures that every member of the defined population has an equal and independent probability of being included in the sample.[19] 311 male and female university professors were conveniently chosen based on their attitudes toward brain-based learning from among 05 public and 05 private universities. The anonymity of each person was strictly protected in this study project, and all demographic data about the desired sample was saved in an intimate way.

Research Instrument

The 12 brain and mind learning principles put forth by Caine et al. were combined to form a standard questionnaire about instructors' perspectives toward BBL (2005).[20] Richer experiences, processing of experiences, and relaxed alertness were its three main divisions. It was created by Klinek[21] and in the context of Pakistan, it was changed. While the researcher made certain tweaks and modifications

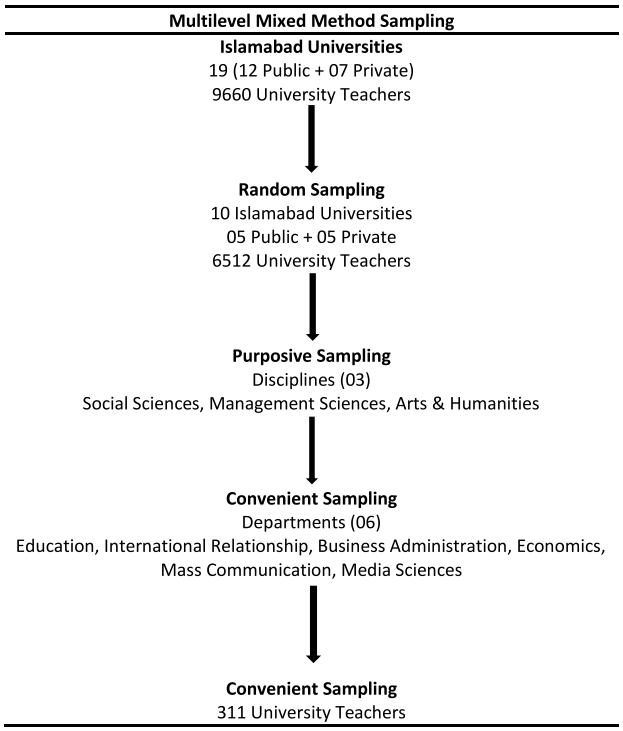

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Fig 1: Sampling Technique

to it for the setting of Pakistan, the questionnaire regarding beliefs, knowledge, and practices of brain-based learning focused more on the philosophy than the implementation of the method at the advanced level of edification. This questionnaire has 36 questions. The "Likert Scale" with five points was used to gauge each person's perceptions of the research inventory of the BBL approach, ranging from "Never True" to "Always True." Klinek's official authorization was obtained by the researcher via email. This questionnaire has been modified and adjusted within the context of Pakistan. Pilot testing was used to assess the product's robustness and consistency. Prior to the research inventory's final data collection, 25 questionnaires were employed for pilot testing. This questionnaire has 36 questions. The "Likert Scale" with five points was used to gauge each person's perceptions of the research inventory of the BBL approach, ranging from "Never True" to "Always True." Klinek's official authorization was obtained by the researcher via email. This questionnaire has been modified and adjusted within the context of Pakistan. Pilot testing was used to assess the product's robustness and consistency. Prior to the research inventory's final data collection, 25 questionnaires were employed for pilot testing.

Results

Two main research objectives of this study were measured through descriptive (Mean, percentage & frequency) and inferential statistics (t-test & ANOVA).

Descriptive Statistics

In this study, 311 university teachers took part, including 138 (44%) men and 173 (56%) women. In Islamabad universities, 67 (22%) university teachers have one to five years of service experience, 127 (41%) have six to ten years of service experience (34.8%), and 117 (38%) have eleven or more years of service. 160 university teachers (51%) come from public universities, and 151 (49%) come from private universities. Among instructors, 106 (34%) hold master's degrees, 149 (48%) hold MPhils, and 56 (18%) hold doctoral degrees. Among the teachers, 57 (or 18%) teach social sciences, 105 (or 34%) teach the arts and humanities, and 149 (or 48%) teach management sciences. The opinions on data of the Likert type vary. Most statisticians consider it as ordinal data, but some do not, particularly social science researchers. In the literature, if there is a large sample size, Likert-type data can be taken into account for statistical procedures, such as calculating the mean and standard deviation (Mill & Gay, 2019). In this study, the first objective was measured by the Likert scale. Respondents select the choice that most accurately reflects their feelings toward the statement or topic. So, descriptive statistic (mean and standard deviation) was used to test the first objective of the study (See Table 1).

Table 1 shows the mean value and standard deviation of teachers' attitudes toward brain-based learning (M=136.12). This table also displays mean values of sub-scales such as P1, P2, P3, P4, P5, P6, P7, P8, P9, P10, P11, and P12 (M=12.01, 13,9.46, 9.94, 11.19, 11.23, 14, 9.76, 12.29, 12, 9.62 & 11.57). Teachers' attitude toward brain-based learning was divided into three main dimensions enriched experiences (M=44.42), experience processing (M= 46.19), and relaxed alertness (M=45.50). It means that university teachers intuitively practice brain-based learning principles in their classrooms because they were not fully confident about these learning principles.

Table 1: Means of Teachers' attitude towards Brain -Based Learning (N=311)

Sr. No	Variables	Mean ± SD	Remarks
1	Entire learning is physical or functional	12.01 ± 1.48	Rarely True
2	The pursuit of examining meaning ensues through systematic prefiguring	13.00 ± .000	Rarely True
3	The brain/mind's progressions move from fragments to ensembles concurrently	9.46 ± 2.33	Rarely True
4	Learning is developmental	9.94 ± 1.55	Rarely True
5	Intensive consideration and peripheral insight encompass learning	11.19 ± 2.40	Rarely True
6	Conscious and unconscious progressions are constantly comprised of learning	11.23 ± 1.16	Rarely True
7	Constructing logic of experience and archiving inaccessible actualities and assistances have at least two styles of memory that involve brain-based learning	14.00 ± .000	Often True
8	Every brain is distinctively systematized	9.76 ± 1.47	Rarely True
9	The brain/cognizance is communal	12.29 ± 1.54	Rarely True
10	The exploration of connotation is inborn	12.00 ± 1.49	Rarely True
11	There are precarious configurations of sensations in the individual's cognizance/brain	9.62 ± 1.69	Rarely True
12	Multifarious knowledge is enriched by encounters and withdrawn by menace or risks that escorting by defenselessness	11.57 ± 1.73	Rarely True
13	Enriched Experiences	44.42 ± 3.02	Sometime True
14	Experience Processing	46.19 ± 2.91	Sometime True
15	Relaxed Alertness	45.50 ± 4.80	Sometime True
16	Teachers' attitude toward Brain-Based Learning	136.12 ± 9.26	Sometime True

Inferential Statistic

The hypothesis of this study was;

"There is no significant effect of demographic factors (gender, sector, age, qualification, teaching experience, discipline, and Islamabad universities) over the teachers' attitude towards brain-based learning."

Before doing inferential statistics, it is necessary to check the normality of the data. Table 3 shows a normality analysis in which the *p*-value (*p*=.316) shows that data come from a normal distribution, so we can use parametric tests (t-test & ANOVA) for measuring the effect of demographic factors (gender, sector, age, teaching experiences, qualification, discipline & Universities) over the teachers' attitude towards brain-based learning.

Table 2: Tests of Normality

Variable	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Total of Teachers' Attitude towards Brain-Based Learning	.099	310	.000	.951	310	.316

Lilliefors Significance Correction

*BBL= Brain-Based Learning

The table displays university-level male and female teachers' average opinions about brain-based learning. The male mean, which is 126.24, is higher than the female mean, which is 121.06, and the difference in means was sizable. The public teachers' mean, which is 124.40, is higher than the private teachers' mean, which is 122.26, and the difference in means was not statistically significant.

Table 3: t-test for Gender & Public & Private Teachers Regarding BBL

Variable	Gender	N	Mean	SD	df	t-value	Sig.
Teachers' Attitude toward BBL	Male	138	126.2464	10.95033	309	4.518	.000
	Female	173	121.0636	9.27120			
	Public	160	124.4000	10.12451	309	1.823	.069
	Private	151	122.2649	10.52660			

Table 4 shows that academic qualification (*p*=.024), disciplines (*p*=.000), age (*p*=.001), Teaching experiences (*p*=.006), and universities (*p*=.006) have a significant effect on teachers' attitudes toward brain-based learning.

Table 5 shows the output of LSD because when the F-ratio supports rejecting the null hypothesis (See Table 4), that is, when there is a significant difference between the population means, the least significant difference (LSD) test is performed in the context of the analysis of variance. This table also shows the significant effect of demographic factors on the teachers' attitude towards brain-based learning.

Table 4: ANOVA for qualification, Age, Teaching Experiences, Discipline & Universities of Teachers Regarding BBL

Groups	Sum of Squares	df	Mean Square	F	Sig.
Qualifications					
Between Groups	639.807	2	319.904	3.794	.024
Within Groups	25967.550	308	84.310		
Disciplines					
Between Groups	1310.509	2	655.255	7.978	.000
Within Groups	25296.847	308	82.133		
Age					
Between Groups	1436.875	3	478.958	5.842	.001
Within Groups	25170.482	307	81.989		
Universities					
Between Groups	6496.804	8	812.100	12.195	.000
Within Groups	20110.553	302	66.591		
Teaching Experiences					
Between Groups	159.048	2	79.524	.905	.006
Within Groups	21713.852	247	87.910		

Discussion

It was discovered that university teachers had little experience with brain-based learning at the university level. This discovery was supported by the work of some researchers who discovered that teachers have been using brain-based learning intuitively but are unable to clearly explain why they are doing so despite this.[22] This is because the descriptive analysis of this study revealed that teachers have a pedagogical belief that is in line with brain-based learning. They taught in accordance with each student's ability, gave them plenty of time for group work, and preferred the activities chosen by the students. These teachers also provided opportunities for reflection for their pupils. Since they think that art has no bearing on the teaching-learning process, these teachers decided to be serious, permitting criticism and punishment in their instruction and viewing decorating as a waste of time. These results matched those of Hassan [19] and Fatima [9] pretty closely.

It was noted that every individual procures and acquires information in different ways as the individuals' state of mind, emotions, attitude, and development are different from each other, which is why gender difference was observed among the university teachers. These differences were associated with the attitude of university teachers toward brain-based learning with respect to their gender, age, teaching experience, and universities. University teachers who were younger and had less experience teaching were found to have inadequate knowledge of brain-based learning. Teachers may not be aware of the educational aspects of the brain-based learning strategy, but they may have the instructional belief that is brought into play.[23] As a result, lower age and teaching experience groups also had higher mean differences than higher age and teaching experience groups. The research of Fatima and Zamir[15] and Jensen[20] also indicated a significant shift in university professors' attitudes toward brain-based learning, which supported this finding.

Additionally, it was discovered that university teachers' attitudes toward their educational specialties, credentials, and disciplines were not significant because their preparation for their classrooms may have been influenced by their academic backgrounds and beliefs regarding brain-based learning.[24] As a result, it was discovered in numerous research that the variables that can be changed include demographic aspects such as teaching experience, age, setting (both public and private), academic background, and teaching discipline. It was found that regardless of how well-trained teachers are, they are aware of the brain-based learning concepts and may be applying them unconsciously in their separate classes.

Table 5: Multiple Comparisons of Factors- LSD

Dependent Variable: Teachers' Attitude towards Brain-Based Learning				
Qualifications				
(I) Qualification	*(J) Qualification*	*Mean Difference (I-J)*	*Std. Error*	*Sig.*
Master	MPhil	-.04872	1.13337	.006
	Ph.D.	-3.99504*	1.55743	.011
MPhil	Master	.04872	1.13337	.006
	Ph.D.	-3.94632*	1.54009	.011
Ph.D.	Master	3.99504*	1.55743	.011
	MPhil	3.94632*	1.54009	.011
Disciplines				
Social Sciences	Arts & Humanities	4.55932*	1.17986	.000
	Management Sciences	3.49492*	1.33834	.009
Arts & Humanities	Social Sciences	-4.55932*	1.17986	.000
	Management Sciences	-1.06441	1.33834	.007
Management Sciences	Social Sciences	-3.49492*	1.33834	.009
	Arts & Humanities	1.06441	1.33834	.007
Age				
25-30 Years Old	31-35 Years Old	4.18159*	1.44144	.004
	36-40 Years Old	4.99167*	1.47549	.001
	41-45 Years Old	6.12783*	1.59565	.000
31-35 Years Old	25-30 Years Old	-4.18159*	1.44144	.004
	36-40 Years Old	.81008	1.34440	.007
	41-45 Years Old	1.94624	1.47528	.008
36-40 Years Old	25-30 Years Old	-4.99167*	1.47549	.001
	31-35 Years Old	-.81008	1.34440	.007
	41-45 Years Old	1.13616	1.50856	.002
41-45 Years Old	25-30 Years Old	-6.12783*	1.59565	.000
	31-35 Years Old	-1.94624	1.47528	.008
	36-40 Years Old	-1.13616	1.50856	.002
Islamabad Universities				
NUML	AIOU	.84397	5.81102	.005
	Bharia University	10.94397*	1.94983	.000
	COMSAT	9.25213*	1.35325	.000
	IIUI	3.47555*	1.49154	.020
	Foundation University	6.72632*	2.09509	.001
	Iqra University	3.56619	2.04250	.002
	Greenwich University	-4.51317*	2.28666	.049
	Riphah International University	-6.23936*	2.45388	.012
AIOU	NUML	-.84397	5.81102	.005
	Bharia University	10.10000	6.05187	.006
	COMSAT	8.40816	5.88682	.004
	IIUI	2.63158	5.92014	.007
	Foundation University	5.88235	6.10023	.006
	Iqra University	2.72222	6.08236	.005
	Greenwich University	-5.35714	6.16864	.006
	Riphah International University	-7.08333	6.23257	.007
Bharia University	NUML	-10.94397*	1.94983	.000

	AIOU	-10.10000	6.05187	.006
	COMSAT	-1.69184	2.16531	.005
	IIUI	-7.46842*	2.25432	.001
	Foundation University	-4.21765	2.69197	.008
	Iqra University	-7.37778*	2.65124	.006
	Greenwich University	-15.45714*	2.84360	.000
	Riphah International University	-17.18333*	2.97974	.000
	NUML	-9.25213*	1.35325	.000
	AIOU	-8.40816	5.88682	.004
	Bharia University	1.69184	2.16531	.005
	IIUI	-5.77658*	1.76392	.001
COMSAT	Foundation University	-2.52581	2.29698	.002
	Iqra University	-5.68594*	2.24911	.002
	Greenwich University	-13.76531*	2.47296	.000
	Riphah International University	-15.49150*	2.62836	.000
	NUML	-3.47555*	1.49154	.020
	AIOU	-2.63158	5.92014	.007
	Bharia University	7.46842*	2.25432	.001
	COMSAT	5.77658*	1.76392	.001
IIUI	Foundation University	3.25077	2.38108	.003
	Iqra University	.09064	2.33493	.009
	Greenwich University	-7.98872*	2.55126	.002
	Riphah International University	-9.71491*	2.70216	.000
	NUML	-6.72632*	2.09509	.001
	AIOU	-5.88235	6.10023	.006
	Bharia University	4.21765	2.69197	.008
	COMSAT	2.52581	2.29698	.002
Foundation University	IIUI	-3.25077	2.38108	.003
	Iqra University	-3.16013	2.75983	.003
	Greenwich University	-11.23950*	2.94511	.000
	Riphah International University	-12.96569*	3.07675	.000
	NUML	-3.56619	2.04250	.002
	AIOU	-2.72222	6.08236	.005
	Bharia University	7.37778*	2.65124	.006
	COMSAT	5.68594*	2.24911	.002
Iqra University	IIUI	-.09064	2.33493	.009
	Foundation University	3.16013	2.75983	.050
	Greenwich University	-8.07937*	2.90793	.006
	Riphah International University	-9.80556*	3.04118	.001
	NUML	4.51317*	2.28666	.049
	AIOU	5.35714	6.16864	.006
	Bharia University	15.45714*	2.84360	.000
	COMSAT	13.76531*	2.47296	.000
Greenwich University	IIUI	7.98872*	2.55126	.002
	Foundation University	11.23950*	2.94511	.000
	Iqra University	8.07937*	2.90793	.006
	Riphah International University	-1.72619	3.21026	.001

Riphah International University	NUML	6.23936*	2.45388	.012
	AIOU	7.08333	6.23257	.037
	Bharia University	17.18333*	2.97974	.000
	COMSAT	15.49150*	2.62836	.000
	IIUI	9.71491*	2.70216	.000
	Foundation University	12.96569*	3.07675	.000
	Iqra University	9.80556*	3.04118	.001
		1.72619	3.21026	.050
Teaching Experiences				
1-5 Years	6-10 Years	-.51136	1.52675	.038
	11 & above Years	-2.03636	1.66448	.022
6-10 Years	1-5 Years	.51136	1.52675	.038
	11 & above Years	-1.52500	1.38012	.050
11 & above Years	1-5 Years	2.03636	1.66448	.022
	6-10 Years	1.52500	1.38012	.040

*. The mean difference is significant at the 0.05 level.

Conclusion

The following conclusions have been drawn based on the research questions:

1. Teachers at the university level were not fully confident in the use of brain-based learning principles because they were implementing them haphazardly and could not clearly explain why their actions were beneficial to the teaching-learning process.
2. The attitudes of teachers regarding brain-based learning were significantly influenced by their gender, age, teaching experiences, universities, teachers' employment in the public or private sector, their academic specializations, or their educational background.

Recommendations

On the basis of the conclusions, the following recommendation has been revealed;

1. In order to help female instructors, enhance their self-esteem and self-confidence about their teaching tactics in their various classes, higher authorities may organize seminars or workshops on topics like culture, the home environment, female exposure, and communication strategies.
2. To improve their attitude toward implementing brain-based strategies in the classroom, teachers may employ activities such as visualizations, relaxation breathing, discussion, graphic organizers, and other brain Gym exercises or motions.
3. Teachers of seniors may serve as mentors to newly hired teachers who serve as mentees and assist them in the creation of brain-based learning methodologies at the university level by imparting their invaluable skills, expertise, and insights to them.

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