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BRAIN-BASED LEARNING AS AN APPROACH FOR IMPROVING EDUCATIONAL PRACTICE IN KURDISTAN REGION: AN EMPIRICAL STUDY IN PERSPECTIVE OF EDUCATIONAL PLANNING

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ABSTRACT

Brain-based learning refers to teaching methods, lesson designs, and school programs that are based on the latest scientific research about how the brain learns, including such factors as cognitive development-how students learn differently as they grow in age, and become mature socially, emotionally, and cognitively. This study aims mainly at knowing: (1) to what extent educators know the strategy of Brain-Based learning, (2) their ability to apply the strategy, (3) the significant differences between the responses of the educators in both dimensions cognition and application.
In order to achieve the above mentioned aims, the study hypothesizes that HO means there is no significant differences in response to educators up on the questionnaire items in both dimensions: cognition and application, collective and individual. The basic conclusion the study arrived at is: Educators do not have any specific knowledge, practice or training in regard to the so called Brain-Based learning strategy. This was obvious through the results, which were at a moderate level (3) in both cognitive and application dimensions. Finally, the study ended with some recommendations for pedagogical implications and some suggestions for further studies.

I. STATEMENT OF THE PROBLEM

This paper is an attempt to find out to what extent educators in the region deal with the strategy of the so called Brain Based Learning in the sense of cognitive and implementation dimensions. This strategy is considered as one of the effective approach for improving educational practice in Kurdistan Region. It takes into consideration that the Ministry of Education initiated to change the educational practice in coherence with

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the general planning of the region for social and economic development. Thus, this study aims to find out what may be needed to implement Brain Based Learning successfully and effectively, through the practical solutions for many specific situations in the Region education system.

II. SIGNIFICANCE OF THE STUDY

The significance of this study is twofold, the first being theoretical and the other being practical. This paper demonstrates the importance of knowledge in regards to Brain Based Learning strategy. On the other hand, it is designed to find out the shortcomings of the implementation of the strategy.

The Educational Planning process as forecasting for the future success of students requires a careful understanding of the student population whereas Brain-Based Education is an important factor for the success of the process. Brain-Based Education is a complicated process requiring planners' attention to many educational and psychological factors in addition to other social, economic, political and demographic factors. Brain-Based education is based on a two-tier model, which includes teaching and learning methods that premised the latest scientific findings about how the brain functions and learns, and how students learn changes as they grow emotionally, cognitively, socially and become more mature.

On the learning tier, brain-based education is inspired by the fact that learning can be enhanced if educators know what and how they reach subject matters using the new science of learning, rather than continue teaching on the past conjectures about the learning process. On the other hand, teaching tier, brain-based education are motivated by instructional practices and procedures that are based on the neuroscience of learning including scientific findings that are used to explain educational programs and strategies (The Glossary of Educational Reform, 2013).

Brain-Based education is a model which allows educators to see connections between brain functions and student learning. It begins with the notion, "Everything we do use our brain; let's learn more about it and apply that knowledge." Hence, each instructor ought to be professional enough to know what would be the best strategy as a best practice for his/her students. He or she should asses the students active participation in the learning process, and assure that they are able to apply. Further, since brain-based approach is about knowing and developing knowledge scientifically, educators can use this approach to determine why one teaching/learning strategy is preferred over another to help certain group of students (Jensen, N.D). For educators to know how the characteristics of the way in which girls and boys learn, enables them to use methodologies that contribute to the students' success.

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Brain-Based learning theory facilitates understanding the functions of the brain. Research indicates, as long as the brain is not scripted, it works better and fulfills its normal functions. Brain- Based education has helped to devise a new discipline as "Educational Neuroscience". It is an across-the-border approach to instruction using scientific inquiry from neuroscience and highlights how the brain learns naturally (Ramkarishan and Annakodi, 2013).Further, Brain-Based education is a paradigm that has spellbinding implications on student learning, because it is an approach that perceives how students' brains may learn and synthesize knowledge with minimum difficulty. Further, our understanding of the discipline of neuroscience psychology, biology, and sociology which are germane to the relationship between the brain and learning, expands this awareness of how student's brain processes new information (Jensen, 2000 :2 &6) .

III. AIMS OF THE STUDY

The questions which the study aims to answer are the following:

1. To what extent do educators know the strategy of Brain-Based Learning?
2. To what extent do educators apply the strategy?
3. Are there any significant differences between the responses of the educators in both dimensions, cognition and application, according to the following variables: Gender (Y1), Age (Y2), educational experience (Y3) and level of Scientific Degree (Y4)?
4. Are there significant differences among the responses of the educators in both dimensions, cognition and application, collectively among all the (Y) variables?

IV. HYPOTHESIS OF THE STUDY

The researcher used the following hypothesis:

HO means no significant differences in response to the educators up on the questionnaire items in both dimensions, cognition and application, collectively and individually. According to the research variables H (Y1) which means there are significant differences in response to the educators up on the questionnaire items in both dimensions, cognitive and application, collectively and individually.

V. LITERATURE REVIEW

CHARACTERISTICS OF THE BRAIN

The brain is divided into two hemispheres—the left and the right. This is better known as lateralization, which is a localization of function or activity on one side of the body in preference to the other side. Since 1960s, psychologists and neuroscientists have been studying how lateralization had affected brain function. However, it has always been

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encouraged to use your whole brain. This way you get the benefits of both hemispheres (Gemma, 2014).

Brain is known to be the "greediest" organ in the human body. It is the most energy hungry organ in human body. It needs a constant supply of carbohydrates, vegetables and low-sugar fruit provide good sources of carbohydrates for energy production (McCabe, 2014). When rested, the brain consumes glucose (the sweet colorless soluble dextrorotatory form that occurs widely in nature and is the usual form in which carbohydrate is assimilated by animals) together with oxygen ten times more than the rest of the body (Wolf, 2001). The brain when active, consumes 20 percent of all the oxygen and most of the sugar we take in. It is made up of 60 percent of fat, and functions on 20 watts of electricity (McMahon, McMahon and Romano, 1990; McCabe, 2014). Although, the brain constitutes a little more than two percent of the whole human physical weight, it is accountable for twenty percent of the body's energy use (Wolf, 2001). It is the most complicated, arcane and potent entity in the human body. It is the only organ that is able to study and learn about itself. When nourished by a hygienic and healthy environment. An active brain can stay active for more than hundred years.

To better understand how the brain functions better, it is crucial to evaluate the brain magnitude from different aspects as it ages. In the past, the common belief was that the larger the brain, the more astute it was (Cohen, 1988). However, modern science sheds light on the fact that difference in the brain magnitude amongst the human beings does not correlate to intellectual capabilities. Although, men have relatively larger brains than women, woman's brain is 10 percent smaller than man's brain. Having said this, due to a larger corpus callosum women's brain is 20 percent more active than men's brain. Furthermore, there are no discrepancies in the overall intellectual ability between the two genders (Cohen, 1988: 5&6; Kommer, 2006).

Everything we know about the brain, such as higher-level thinking and intuition are capabilities that exist in the brain at birth. If properly nourished, during the first eight years of life, the brain would maintain its healthy status and develop normally. The neo-cortex, which is the dorsal region of the cerebral cortex, consists of about twelve to fifteen billion neurons. Every neuron is able to interact with other neurons through its elongated limbs known as dendrites. Most of these lines of communication are created in the first eight years of life (Davies, 1996). Generally children at this age are in school, which means these lines of communication are strengthened while students are engaged in the learning practices.

The brain directs the body functions. It controls blood flow, digestion, thoughts, body movements, heartbeat, sensation, speech, and breath. Consequently, anything that the brain performs produces an action either mentally or physically. The brain guides and

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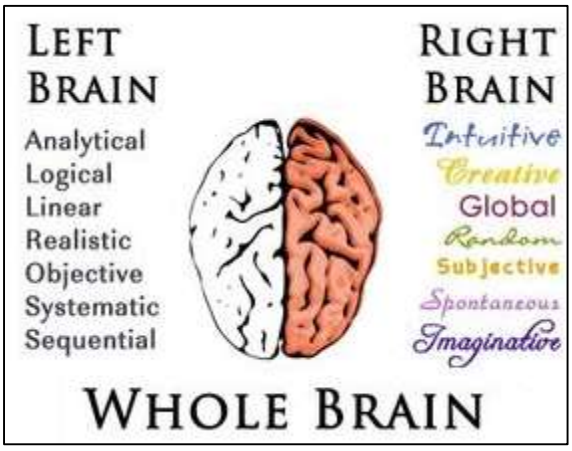
communicates with every organ through the glands of the endocrine system (Cohen, 1988:p.14).



Ref: https://www.pinterest.com/explore/whole-brain-learning/ (2015).

Brain neurons have different functions. The neurochemicals that are stimulated for exigencies, for instance, might move through the whole structure (Cohen, 1988, p.11). In viewing its histological (tissue structure or organization) discrepant configuration, we know that brain cells are not functioning independently from each other; Therefore, neural designs are structured into a chain of command with the neural functions at a level deeply contributing to the functions of other neural activities.

Every part of the brain has a major task to perform in order to keep the body healthy. The lowest levels of the brain are accountable for controlling and expressing the fundamental aspects of behavior. They control the necessary survival behaviors, such as eating, physical, and sexual activities. The higher levels of the brain are responsible for changing these behaviors to an objective approach. Any function of the brain at any level by any part affects the functions of the brain on other parts. The human brain is a mixture of one large system put together (Bennet, 1977, p. 3 & 28).

VI. GIRLS AND BOYS LEARN DIFFERENTLY

In recent decades educators have become savier than ever before about how girls and boys learn, act, and interact differently. Research shows that the differences in the way in which girls and boys learn are real and teachers must emphasize teaching methodologies with regard to how the brain of the two genders learns and how human multiple intelligences should be studied and integrated into the learning styles of each gender (Gurian, 2001, p. 9).

Each gender has a different approach for learning. Research indicates a difference in the learning styles might have been based on the learning modes—modes that one gender

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prefers. In general, for girls, the mode they prefer is to conceptualizing and experimenting, which leads them to a discovery-type investigation, while boys lean towards the use of assimilating learning style—a style that enables them to conceptualize and observe (You, 2010). The two genders are intrinsically different and the differences are in neurological development, biochemistry, and brain anatomy.

VII. LEARNING STYLE OF THE GIRLS

In the last four decades, there had been a good number of scholarly works that shows how girls learn. Generally, they are better in using their left side of the brain. Although girls are able to do logical thinking, they seem to use various decision-making methods applicable to different situations to solve problems. Girls may seek consensus to avoid conflict (NCETM, 2010). They are inductive learners and are better in developing concrete examples. They have a better grasp on oral expression and writing. During the process of learning, girls generate more words than boys, and are better listeners (Gurian, 2001, p. 44-46). Traversy characterizes girls' brains as:

- Having stronger neural connections in temporal lobes allowing better sense of memory, better listening and distinctions in vocal quality.
- Having a larger hippocampus which gives girls advantages in language arts.
- Having a more active and earlier developing prefrontal cortex which helps them to control impulsivity better than boys.
- Having more serotonin in the bloodstream and brain, which is known for promoting feelings of well-being.
- Using more of their cortical areas for verbal and emotive functioning (Traversy, 2009).

Girls tend to enjoy practicing skills. They prefer to have methodologies, well defined examples, and clear guidance to use them. They pay more attention to specific detail—and give more time to produce right answers and get the task completed (NCETM, 2010). Girls tend to be more socially dependent than boys. This requires a classroom environment that encourages group work so that girls can use their social traits while sharing with and learning from other students. The gender-biased classroom environment, traditionally, has had negative impact on female students since boys have almost always had more attention and time from teachers. Therefore, a gender-neutral classroom environment in which girls are given the time and attention needed for their participation and success (Mann, 1994). Further, girls perform better when they manipulate objects and are able to see concrete reasoning. They like to put the learned ideas in a clear version and wider perspective, and enjoy being more detailed; they usually are better in dealing with emotion than boys (Traversy, 2009).

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VIII. LEARNING STYLE OF THE BOYS

Research shows that boys are better in using the right side of the brain, and at an early age, boys are more likely to be disruptive in the educational environment. They often do not follow instruction to learn. They can easily get bored during classroom instructions. Generally, boys have impulsive responses to just about any problem by lashing out at unpleasant occurrences. Although, traditionally, boys have been taught not to show emotion, when they are upset their emotional state can easily trigger physical aggression. The inability in boys' approaches for handling their emotion occasionally leaves them with painful experiences (Kommer, 2006). Perhaps, we need to do more to support boys and their unique hardwiring in educational settings. The organization of the educational system, in general, does not help boys' learning styles (Schneider, 2013).

The characteristics which boys display in school sometimes are mixed with aggressive behaviors. Among them are those who may show less desire for learning (Carrier, 2009). They seem to be less concerned about consequences and undesirable results. However, when they are focused during the process of learning, after a few examples, they are more likely to learn quickly and retain information for later use. (NCETM, 2010). Some boys' characteristics are as follows:

- Boys use more of their cortical areas for spatial mechanical functioning and; therefore, have less space available (about half) than females for verbal emotive functioning
- This bias towards spatial mechanical functioning leads boys to experiment with moving objects, arms, and legs, and self through space.
- Boys do not use words and emotive content in the same way as girls – they may be more visual.
- In addition to less serotonin, boys also have less oxytocin, a chemical reputed to help with human bonding (that stimulates production of milk) and which make them more impulsive physically.
- Boys' brains are structured not to be as efficient as girls in multitasking and tend to compartmentalize their learning (Traversy, 2009).

The effects of these brain-based learning characteristics are readily apparent to all teachers who have observed boys in their classrooms:

> *The male brain is set to renew, recharge, and reorient itself by entering what neurologists call a rest state. The boy in the back of the classroom whose eyes are drifting toward sleep has entered a neural rest state. It is predominately boys who drift off without completing assignments, who stop taking notes and fall asleep during a lecture, or who tap pencils or otherwise fidget in hopes of*

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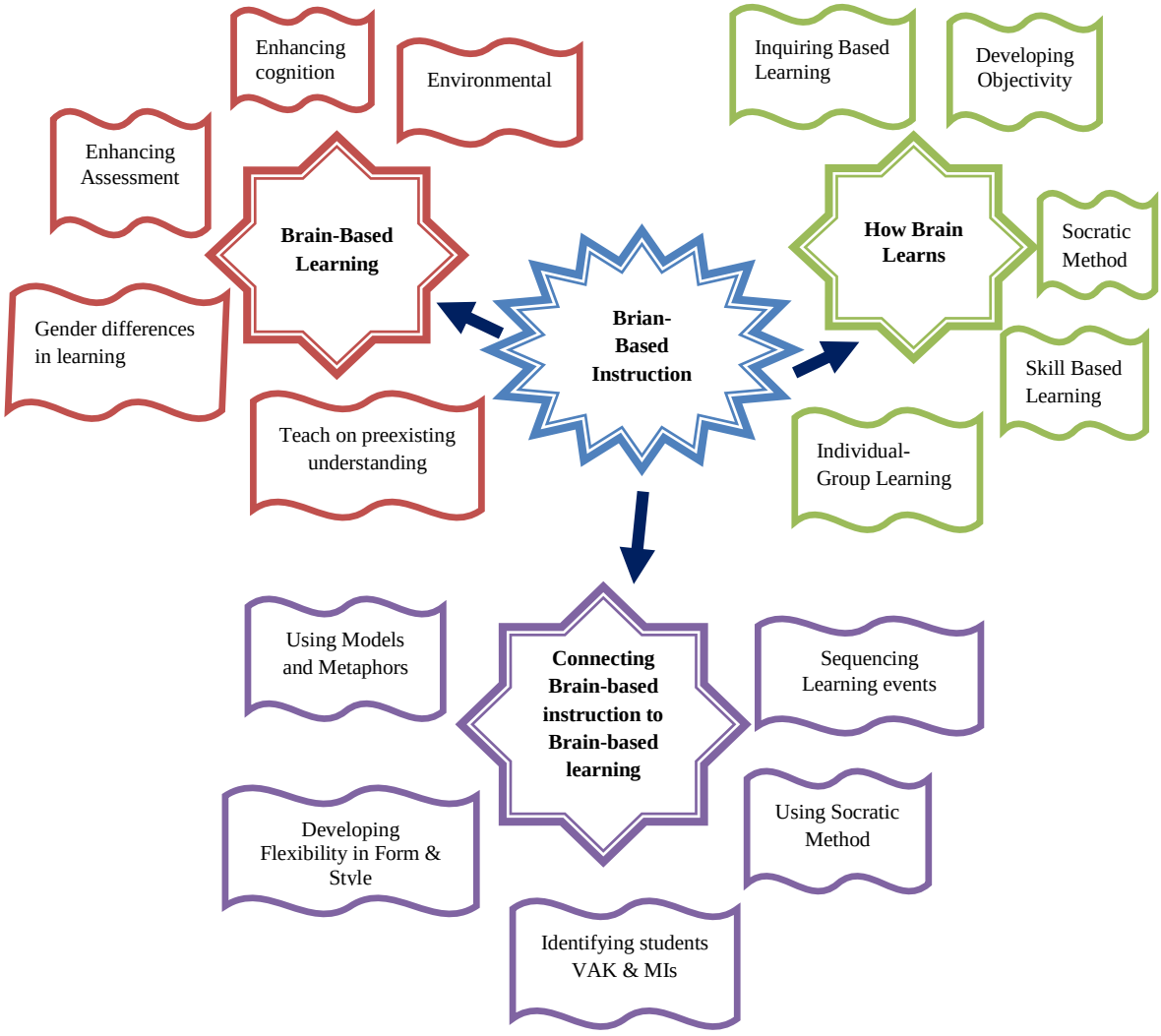
keeping themselves awake and learning. Females tend to recharge and reorient neural focus without rest states. Thus, a girl can be bored with a lesson, but she will nonetheless keep her eyes open, take notes, and perform relatively well. This especially is true when the teacher uses more words to teach a lesson instead of being spatial and diagrammatic. The more words a teacher uses the more likely boys are to "zone out," or go into rest state. The male brain is better suited for symbols, abstractions, diagrams, pictures, and objects moving through space than for the monotony of words (Traversy, 2009).

Boys are better at abstract and ratiocination (the process of exact thinking). When engaged in learning, they generally prefer silent environments. They also seem to like moving around to refresh and stimulate their brains, which also helps them to ease their impulsive behavior (Traversy, 2009). Boys enjoy outdoor learning and do better when engaged in field experience projects.



The Process of Thinking

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IX. BRAIN-BASED EDUCATION COMPONENTS

Teachers should challenge students to adapt their brains and to maximize the use of their brain—particularly to find ways for students to practice using areas that are not their natural learning styles (Lombardi, 2008). For example, in kindergarten or elementary classes, girls might be given spatial tasks while boys are given more verbal challenges.

Instructors at any level should always remind students that the brain is a very flexible and adaptive element that grows with learning. As stated by Gusman, the brain "functions best with adequate time, the absence of threat, immediate feedback, dynamic interaction, with global context as well as delineation of parts, and in a state of relaxed alertness" (Gusman, 2005, p. 1). It functions on multiple levels in different ways concurrently. The brain is more relaxed and engaged during social engagement, cooperative learning and games (Lombardi, 2008). In the author's experience this relaxed cooperative learning is also evident when the Socratic Method of teaching is applied.

Additionally, brain-based education allows instructors to use multi-disciplinary concepts, multiple intelligences, and the VAK (visual, auditory, and kinesthetic) learning styles. In this approach, teachers emphasize a student's higher mode of learning and dissemination of information (Richardson and Arker, 2010). This method helps teachers to critically examine information before it is delivered to students. Establishing connections between previous experience and newly learned knowledge is crucial to any meaningful learning. Brain-based instruction helps teachers and students to make these connections (Kahvaci, AY, 2008). It may be helpful for teachers to consider the following about the brain:

- The brain is a multifunctional workstation.
- Teaching engages neuroscience, brain function, psychology and sociology.
- Any subject matter across the curriculum should be taught within the frame of brain-based learning.
- Gender differences in learning should be taken into consideration in teaching.
- Both hemispheres of the brain and their general characteristics should be taken into consideration when teaching students.

As a result, brain-based education, as a scientific approach to learning, is a quality improvement in teaching the brain in various multidisciplinary fields of the academy and science.

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X. METHODOLOGY

1. SAMPLE OF THE STUDY

The sample consists of 92 responses (58 Males and 34 Females) from residents of Erbil City, Iraqi-Kurdistan, who hold Bachelors, Masters or PhD and are divided into the following category in respect to their experience:

- Less than 5 Years
- 5 – 10 Years
- 11 – 15 Years
- 16 – 20 Years
- And over 20 Years

The sample is chosen randomly.

2. DESCRIPTION OF THE QUESTIONNAIRE

The researcher utilised a descriptive methodology and constructed a reliably valid questionnaire, consisting from 19 items, which measures both dimensions, cognitive consisting from items 2,4,5,6,7,8,12,13,14,15 and the application dimensions consisting from items 1,3,9,10,16,17,18 and 19.

The researcher used scales of 1 – 5, with 1 being the lowest degree and 5 being the highest, except for item 7, which used 5 as the lowest and 1 as the highest in order to insure the validity of the responses and indicate the responder's seriousness in answering the questionnaire.

3. VALIDITY OF THE QUESTIONNAIRE

A group consisting of scientific academics, educational planners, psychologists and English Linguists, were to check the validity of the questionnaire items. According to their level and response, the researcher modified some items. Overall, the degree of the acceptance by the panel was 80%.

4. RELIABILITY OF THE QUESTIONNAIRE

Cronbach, Alpha Co-efficiency is used to check the reliability of the questionnaire, the percentage of the reliability was 71%, thus, indicating a satisfactory level of standard.

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5. THE STATISTICAL TOOLS

The following tools are utilised: Cronbach, Alpha Co-efficiency, T test, Z test and ANOVA one way for the independent sample, F test and Least Significant Difference (LSD) for the multiple significant differences.

XI. RESULTS OF THE STUDY

The results will be demonstrated according to the research question:

- To what extent do educators know the strategy of Brain-Based Learning?
- To what extent do educators apply the strategy?
- Are there any significant differences between the responses of the educators in both dimensions, cognition and application, according to the following variables: Gender (Y1), Age (Y2), educational experience (Y3) and level of Scientific Degree (Y4)?
- Are there significant differences among the responses of the educators in both dimensions, cognition and application, collectively among all the (Y) variables?

1- To what extent do educators know the strategy of Brain-Based Learning?
The arithmetic mean for the items which reflect the cognitive dimensions for the males and females, except item 13, where the above hypothetical arithmetic mean, which was 3. The mean was between 4.1379 – 2.313 for males and 4.2059 – 2.5882 for females. Table 7 and 8 illustrates the above results.
The arithmetic mean for items which reflect the application dimension for males and females was between 4.3966 – 3.60 for males and 4.0882 – 3.4706 for females. Table 1 and 8 illustrates the above results.

2- To what extent do educators apply the Brain-Based strategy?
Through the use of the Z test for the two independent variables (a=0.05), the level of significant was higher which indicates that there are no significant differences between females and males in the items of the questioner (1, 2, 3 to 19) collectively and in both of the dimensions, because the value of the significance for all the items was above the significant level, (a=0.05) thus, the HO hypothesis is accepted. Table 2 illustrates the above results.

3- Are there any significant differences between the responses of the educators in both dimensions, cognition and application, according to the following variables: Gender (Y1), Age (Y2), educational experience (Y3) and level of Scientific Degree (Y4)?

3.1 Through the use of T-test, the results relating to Y1 for two independent samples, there were no significant differences between both genders, on the items ranging from 1 – 19. The value of significance was higher than 0.05 (the level of significance). Accordingly, no hypothesis was accepted.

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3.2 Through the use of ANOVA one way, the results relating to Y2, the results indicated that there were no significant differences among the educators response. On the items ranging from 1 to 19. In both between groups and within groups, which indicate that there were no significant differences between both dimensions, cognition and application, and on the other hand, there are no significant differences among all age categories, because the level of the significance was higher than 0.05 (a=0.05). According to this result no hypothesis was accepted. Table 3 illustrates the above results.

3.3 Through the use of ANOVA one way, the results relating to Y3, indicates that there were no significant differences among the educators' responses in relation to the categories of experience, between and within groups in both dimensions. As the significance the level of significance was higher that (a=0.05). Accordingly, no hypothesis is accepted. Except, item 11, where differences were found between category (5-10 and 11-15) and (16-20) in favour of the first two categories. The significant values for the first two categories were lower than the significant value (a=0.05), thus H1 was accepted. The differences may be due to the responders in the first two categories where more realistic, confident and assured for the necessity of the learners participation. In more realistic learning situations, related with their life experiences. Table 4 and 5 illustrates the above results.

3.4 Through the use of ANOVA one way, the results relating to Y4, indicate that there were no significant differences among the educators' responses in relation to the categories of scientific levels, between and within groups in both dimensions. Since the level of significance was higher that (a=0.05). Accordingly, no hypothesis is accepted. Except, item 4, in which there was significant differences between responders with PhD and Master's degree, in favour to the responders with a PhD. The differences may be due to the fact that the holders of a PhD are more orientated with theoretical instructional strategy. Table 6 and 7 illustrate the above results.

4- Are there significant differences among the responses of the educators in both dimensions, cognition and application, collectively among all the (Y) variables?

4.1- Through the use of F and Z tests, there were no significant differences among the responders in both dimensions collectively and all Y variables (Y1, Y2, Y3 and Y4 Collectively) because significant value was higher than the level of significance (a=0.05) which indicates that there are no significant differences between and within groups in all the variables.

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XII. CONCLUSIONS AND RECOMMENDATIONS

From the analysis of the findings, it seems that educators do not have any specific knowledge, practice or training in regard to the so called Brain-Based Learning strategy. This was obvious through the indicated results, which was at a moderate level of (3) in both cognitive and application dimensions.

The moderate level (3) maybe due to normal and very basic knowledge obtained in time of formal studies in Universities or through normal everyday practice.

Accordingly, the researcher can recommend the following:

1. Teaching preparation programmes within universities should include appropriate competence and knowledge with regard to Brain-Based Learning
2. Students within educational colleges should be trained and taught about Brain-Based Learning Strategy.
3. Educators in the Erbil Province should be continuously trained and collaborate with educational colleges with regard to Brain-Based Learning Strategy.
4. The Directorate of Education in the Erbil Province should take a more proactive role in advocating, supporting and funding workshops and seminars to promote Brain-Based learning strategy.

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XIII. LIST OF TABLES

Table 1 – Illustrates the Arithmetic Mean for Cognitive and Application Dimension, in relation to their Gender

	y1	N	Mean	Std. Deviation
x1	Male	58	3.60	1.184
	Female	34	3.9118	1.0260
x2	Male	58	3.3103	1.0630
	Female	34	3.4412	1.0785
x3	Male	58	3.5000	0.9224
	Female	34	3.4706	0.9288
x4	Male	58	3.4310	1.0779
	Female	34	3.6176	1.0155
x5	Male	58	3.6552	0.9282
	Female	34	3.8824	0.8796
x6	Male	58	4.1207	0.8999
	Female	34	4.0882	1.0551
x7	Male	58	2.3103	0.9024
	Female	34	2.5882	1.2338
x8	Male	58	4.1379	1.1153
	Female	34	4.2059	0.8449
x9	Male	58	3.9310	1.1526
	Female	34	4.0294	0.7171
x10	Male	58	4.1034	0.9117
	Female	34	3.9706	0.7171
x11	Male	58	4.3966	0.7479
	Female	34	4.0588	1.2778
x12	Male	58	3.5172	0.9955
	Female	34	3.5588	1.0500
x13	Male	58	3.0517	0.9809
	Female	34	2.9118	0.9651
x14	Male	58	3.7414	1.2918
	Female	34	3.7941	1.1222
x15	Male	58	3.7759	0.7503
	Female	34	3.4118	1.0479
x16	Male	58	4.0345	0.8577
	Female	34	3.7647	0.9865
x17	Male	58	3.9483	0.9257
	Female	34	4.0588	0.8507
x18	Male	58	3.7241	0.8745
	Female	34	3.6765	1.1206
x19	Male	58	4.0690	0.9526
	Female	34	4.0882	0.9001

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Table 2 – illustrates the Z – Test for the two independent samples (males and females) in regards to the variations

Y1	Z	Df	Sig. (2-tailed)	Mean Difference
x1	-1.2649	90	0.2092	-0.3083
x2	-0.5668	90	0.5723	-0.1308
x3	0.1472	90	0.8833	0.0294
x4	-0.8186	90	0.4152	-0.1866
x5	-1.1550	90	0.2511	-0.2272
x6	0.1566	90	0.8759	0.0325
x7	-1.2415	90	0.2176	-0.2779
x8	-0.3071	90	0.7595	-0.0680
x9	-0.4488	90	0.6547	-0.0984
x10	0.7274	90	0.4688	0.1329
x11	1.6018	90	0.1127	0.3377
x12	-0.1895	90	0.8501	-0.0416
x13	0.6645	90	0.5081	0.1400
x14	-0.1981	90	0.8434	-0.0527
x15	1.9347	90	0.0562	0.3641
x16	1.3770	90	0.1719	0.2698
x17	-0.5694	90	0.5705	-0.1105
x18	0.2271	90	0.8209	0.0477
x19	-0.0956	90	0.9241	-0.0193

Table 3 – Illustrates the results of the F – test and ANOVA one way in regards to the categories of Age

y2		Sum of Squares	Df	Mean Square	F	Sig.
x1	Between Groups	0.8335	4	0.2084	0.1565	0.9596
	Within Groups	115.8186	87	1.3312		
	Total	116.6522	91			
x2	Between Groups	2.9543	4	0.7386	0.6412	0.6345
	Within Groups	100.2087	87	1.1518		
	Total	103.1630	91			
x3	Between Groups	5.4245	4	1.3561	1.6486	0.1693

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	Within Groups	71.5646	87	0.8226		
	Total	76.9891	91			
x4	Between Groups	6.1304	4	1.5326	1.4055	0.2389
	Within Groups	94.8696	87	1.0905		
	Total	101.0000	91			
x5	Between Groups	3.1893	4	0.7973	0.9561	0.4358
	Within Groups	72.5498	87	0.8339		
	Total	75.7391	91			
x6	Between Groups	1.8849	4	0.4712	0.5059	0.7315
	Within Groups	81.0282	87	0.9314		
	Total	82.9130	91			
x7	Between Groups	2.9262	4	0.7316	0.6673	0.6164
	Within Groups	95.3781	87	1.0963		
	Total	98.3043	91			
x8	Between Groups	5.2290	4	1.3072	1.2732	0.2867
	Within Groups	89.3254	87	1.0267		
	Total	94.5543	91			
x9	Between Groups	0.6536	4	0.1634	0.1541	0.9607
	Within Groups	92.2485	87	1.0603		
	Total	92.9022	91			
x10	Between Groups	2.4177	4	0.6044	0.8439	0.5011
	Within Groups	62.3106	87	0.7162		
	Total	64.7283	91			
x11	Between Groups	3.0901	4	0.7725	0.7896	0.5350
	Within Groups	85.1165	87	0.9784		
	Total	88.2065	91			

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x12	Between Groups	1.7286	4	0.4322	0.4124	0.7993
	Within Groups	91.1736	87	1.0480		
	Total	92.9022	91			
x13	Between Groups	8.5586	4	2.1397	2.4038	0.0558
	Within Groups	77.4414	87	0.8901		
	Total	86.0000	91			
x14	Between Groups	1.7866	4	0.4467	0.2880	0.8851
	Within Groups	134.9525	87	1.5512		
	Total	136.7391	91			
x15	Between Groups	1.4806	4	0.3701	0.4621	0.7633
	Within Groups	69.6825	87	0.8009		
	Total	71.1630	91			
x16	Between Groups	2.7941	4	0.6985	0.8346	0.5068
	Within Groups	72.8146	87	0.8369		
	Total	75.6087	91			
x17	Between Groups	4.8176	4	1.2044	1.5370	0.1985
	Within Groups	68.1716	87	0.7836		
	Total	72.9891	91			
x18	Between Groups	5.9818	4	1.4955	1.6449	0.1702
	Within Groups	79.0942	87	0.9091		
	Total	85.0761	91			
x19	Between Groups	2.7691	4	0.6923	0.7956	0.5312
	Within Groups	75.6982	87	0.8701		
	Total	78.4674	91			

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Table 4 – illustrates the results of the F – test and ANOVA one way for the Experience Category

y3		Sum of Squares	df	Mean Square	F	Sig.
x1	Between Groups	1.3521	4	0.3380	0.2550	0.9059
	Within Groups	115.3001	87	1.3253		
	Total	116.6522	91			
x2	Between Groups	4.6349	4	1.1587	1.0232	0.4000
	Within Groups	98.5281	87	1.1325		
	Total	103.1630	91			
x3	Between Groups	4.1962	4	1.0490	1.2538	0.2944
	Within Groups	72.7929	87	0.8367		
	Total	76.9891	91			
x4	Between Groups	3.9152	4	0.9788	0.8771	0.4811
	Within Groups	97.0848	87	1.1159		
	Total	101.0000	91			
x5	Between Groups	0.7958	4	0.1990	0.2310	0.9203
	Within Groups	74.9433	87	0.8614		
	Total	75.7391	91			
x6	Between Groups	5.3975	4	1.3494	1.5145	0.2050
	Within Groups	77.5156	87	0.8910		
	Total	82.9130	91			
x7	Between Groups	7.0740	4	1.7685	1.6865	0.1604
	Within Groups	91.2304	87	1.0486		
	Total	98.3043	91			
x8	Between Groups	8.5593	4	2.1398	2.1648	0.0796
	Within Groups	85.9951	87	0.9884		

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	Total	94.5543	91			
x9	Between Groups	1.1503	4	0.2876	0.2727	0.8949
	Within Groups	91.7519	87	1.0546		
	Total	92.9022	91			
x10	Between Groups	2.5451	4	0.6363	0.8902	0.4734
	Within Groups	62.1831	87	0.7147		
	Total	64.7283	91			
x11	Between Groups	9.1873	4	2.2968	2.5288	0.0462
	Within Groups	79.0193	87	0.9083		
	Total	88.2065	91			
x12	Between Groups	2.6861	4	0.6715	0.6476	0.6301
	Within Groups	90.2160	87	1.0370		
	Total	92.9022	91			
x13	Between Groups	2.7651	4	0.6913	0.7225	0.5789
	Within Groups	83.2349	87	0.9567		
	Total	86.0000	91			
x14	Between Groups	5.7068	4	1.4267	0.9473	0.4407
	Within Groups	131.0323	87	1.5061		
	Total	136.7391	91			
x15	Between Groups	2.5549	4	0.6387	0.8100	0.5222
	Within Groups	68.6081	87	0.7886		
	Total	71.1630	91			
x16	Between Groups	3.1063	4	0.7766	0.9319	0.4494
	Within Groups	72.5024	87	0.8334		
	Total	75.6087	91			
x17	Between Groups	4.4982	4	1.1246	1.4285	0.2313

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	Within Groups	68.4909	87	0.7873		
	Total	72.9891	91			
x18	Between Groups	1.9468	4	0.4867	0.5094	0.7290
	Within Groups	83.1293	87	0.9555		
	Total	85.0761	91			
x19	Between Groups	3.0560	4	0.7640	0.8814	0.4786
	Within Groups	75.4114	87	0.8668		
	Total	78.4674	91			

Table 5 – Illustrates the Multi Comparison among the Arithmetic Mean for the Category of Experience

Dependent Variable		(I) y3	(J) y3	Mean Difference (I-J)	Sig.
x1	LSD	less than 5 years	5-10 years	.059	.853
			11-15 years	.395	.330
			15-20 years	.170	.701
			more than 20 years	.068	.861
		5-10 years	less than 5 years	-.059	.853
			11-15 years	.337	.456
			15-20 years	.112	.818
			more than 20 years	.010	.983
		11-15 years	less than 5 years	-.395	.330
			5-10 years	-.337	.456
			15-20 years	-.225	.681

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			more than 20 years	-.327	.517
		15-20 years	less than 5 years	-.170	.701
			5-10 years	-.112	.818
			11-15 years	.225	.681
			more than 20 years	-.102	.849
		more than 20 years	less than 5 years	-.068	.861
			5-10 years	-.010	.983
			11-15 years	.327	.517
			15-20 years	.102	.849
x2	LSD	less than 5 years	5-10 years	.167	.568
			11-15 years	-.227	.544
			15-20 years	-.352	.391
			more than 20 years	-.545	.132
		5-10 years	less than 5 years	-.167	.568
			11-15 years	-.395	.345
			15-20 years	-.520	.250
			more than 20 years	-.713	.081
		11-15 years	less than 5 years	.227	.544
			5-10 years	.395	.345
			15-20 years	-.125	.805
			more than 20 years	-.318	.496
		15-20 years	less than 5 years	.352	.391

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			5-10 years	.520	.250
			11-15 years	.125	.805
			more than 20 years	-.193	.697
		more than 20 years	less than 5 years	.545	.132
			5-10 years	.713	.081
			11-15 years	.318	.496
			15-20 years	.193	.697
x3	LSD	less than 5 years	5-10 years	-.080	.750
			11-15 years	-.259	.421
			15-20 years	-.284	.421
			more than 20 years	-.659	.035
		5-10 years	less than 5 years	.080	.750
			11-15 years	-.179	.618
			15-20 years	-.204	.598
			more than 20 years	-.579	.098
		11-15 years	less than 5 years	.259	.421
			5-10 years	.179	.618
			15-20 years	-.025	.954
			more than 20 years	-.400	.320
		15-20 years	less than 5 years	.284	.421
			5-10 years	.204	.598
			11-15 years	.025	.954

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			more than 20 years	-.375	.380
		more than 20 years	less than 5 years	.659	.035
			5-10 years	.579	.098
			11-15 years	.400	.320
			15-20 years	.375	.380
x4	LSD	less than 5 years	5-10 years	.116	.690
			11-15 years	.032	.932
			15-20 years	-.443	.278
			more than 20 years	-.477	.184
		5-10 years	less than 5 years	-.116	.690
			11-15 years	-.084	.839
			15-20 years	-.559	.212
			more than 20 years	-.593	.142
		11-15 years	less than 5 years	-.032	.932
			5-10 years	.084	.839
			15-20 years	-.475	.346
			more than 20 years	-.509	.273
		15-20 years	less than 5 years	.443	.278
			5-10 years	.559	.212
			11-15 years	.475	.346
			more than 20 years	-.034	.945
		more than 20 years	less than 5 years	.477	.184

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			5-10 years	.593	.142
			11-15 years	.509	.273
			15-20 years	.034	.945
x5	LSD	less than 5 years	5-10 years	.013	.959
			11-15 years	.050	.878
			15-20 years	.250	.485
			more than 20 years	-.159	.612
		5-10 years	less than 5 years	-.013	.959
			11-15 years	.037	.919
			15-20 years	.237	.546
			more than 20 years	-.172	.625
		11-15 years	less than 5 years	-.050	.878
			5-10 years	-.037	.919
			15-20 years	.200	.651
			more than 20 years	-.209	.607
		15-20 years	less than 5 years	-.250	.485
			5-10 years	-.237	.546
			11-15 years	-.200	.651
			more than 20 years	-.409	.345
		more than 20 years	less than 5 years	.159	.612
			5-10 years	.172	.625
			11-15 years	.209	.607

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			15-20 years	.409	.345
x6	LSD	less than 5 years	5-10 years	.257	.324
			11-15 years	-.295	.374
			15-20 years	.705	.055
			more than 20 years	.114	.722
		5-10 years	less than 5 years	-.257	.324
			11-15 years	-.553	.138
			15-20 years	.447	.264
			more than 20 years	-.144	.689
		11-15 years	less than 5 years	.295	.374
			5-10 years	.553	.138
			15-20 years	1.000	.028
			more than 20 years	.409	.324
		15-20 years	less than 5 years	-.705	.055
			5-10 years	-.447	.264
			11-15 years	-1.000	.028
			more than 20 years	-.591	.181
		more than 20 years	less than 5 years	-.114	.722
			5-10 years	.144	.689
			11-15 years	-.409	.324
			15-20 years	.591	.181
x7	LSD	less than 5 years	5-10 years	-.508	.074

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			11-15 years	.086	.810
			15-20 years	.386	.329
			more than 20 years	.295	.394
		5-10 years	less than 5 years	.508	.074
			11-15 years	.595	.141
			15-20 years	.895	.041
			more than 20 years	.804	.041
		11-15 years	less than 5 years	-.086	.810
			5-10 years	-.595	.141
			15-20 years	.300	.538
			more than 20 years	.209	.641
		15-20 years	less than 5 years	-.386	.329
			5-10 years	-.895	.041
			11-15 years	-.300	.538
			more than 20 years	-.091	.849
		more than 20 years	less than 5 years	-.295	.394
			5-10 years	-.804	.041
			11-15 years	-.209	.641
			15-20 years	.091	.849
x8	LSD	less than 5 years	5-10 years	.371	.178
			11-15 years	.218	.533
			15-20 years	.943	.016

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			more than 20 years	-.227	.499
		5-10 years	less than 5 years	-.371	.178
			11-15 years	-.153	.695
			15-20 years	.572	.175
			more than 20 years	-.598	.116
		11-15 years	less than 5 years	-.218	.533
			5-10 years	.153	.695
			15-20 years	.725	.128
			more than 20 years	-.445	.308
		15-20 years	less than 5 years	-.943	.016
			5-10 years	-.572	.175
			11-15 years	-.725	.128
			more than 20 years	-1.170	.013
		more than 20 years	less than 5 years	.227	.499
			5-10 years	.598	.116
			11-15 years	.445	.308
			15-20 years	1.170	.013
x9	LSD	less than 5 years	5-10 years	-.016	.956
			11-15 years	-.268	.458
			15-20 years	.182	.646
			more than 20 years	-.159	.647
		5-10 years	less than 5 years	.016	.956

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			11-15 years	-.253	.531
			15-20 years	.197	.650
			more than 20 years	-.144	.713
		11-15 years	less than 5 years	.268	.458
			5-10 years	.253	.531
			15-20 years	.450	.358
			more than 20 years	.109	.808
		15-20 years	less than 5 years	-.182	.646
			5-10 years	-.197	.650
			11-15 years	-.450	.358
			more than 20 years	-.341	.477
		more than 20 years	less than 5 years	.159	.647
			5-10 years	.144	.713
			11-15 years	-.109	.808
			15-20 years	.341	.477
x10	LSD	less than 5 years	5-10 years	-.158	.498
			11-15 years	-.200	.501
			15-20 years	.375	.252
			more than 20 years	-.273	.341
		5-10 years	less than 5 years	.158	.498
			11-15 years	-.042	.899
			15-20 years	.533	.138

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			more than 20 years	-.115	.721
		11-15 years	less than 5 years	.200	.501
			5-10 years	.042	.899
			15-20 years	.575	.155
			more than 20 years	-.073	.844
		15-20 years	less than 5 years	-.375	.252
			5-10 years	-.533	.138
			11-15 years	-.575	.155
			more than 20 years	-.648	.103
		more than 20 years	less than 5 years	.273	.341
			5-10 years	.115	.721
			11-15 years	.073	.844
			15-20 years	.648	.103
x11	LSD	less than 5 years	5-10 years	.085	.746
			11-15 years	-.405	.229
			15-20 years	.920	.014
			more than 20 years	-.250	.439
		5-10 years	less than 5 years	-.085	.746
			11-15 years	-.489	.192
			15-20 years	.836	.040
			more than 20 years	-.335	.356
		11-15 years	less than 5 years	.405	.229

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			5-10 years	.489	.192
			15-20 years	1.325	.004
			more than 20 years	.155	.711
		15-20 years	less than 5 years	-.920	.014
			5-10 years	-.836	.040
			11-15 years	-1.325	.004
			more than 20 years	-1.170	.010
		more than 20 years	less than 5 years	.250	.439
			5-10 years	.335	.356
			11-15 years	-.155	.711
			15-20 years	1.170	.010
x12	LSD	less than 5 years	5-10 years	-.305	.278
			11-15 years	.132	.713
			15-20 years	-.068	.862
			more than 20 years	-.386	.263
		5-10 years	less than 5 years	.305	.278
			11-15 years	.437	.275
			15-20 years	.237	.582
			more than 20 years	-.081	.834
		11-15 years	less than 5 years	-.132	.713
			5-10 years	-.437	.275
			15-20 years	-.200	.680

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			more than 20 years	-.518	.247
		15-20 years	less than 5 years	.068	.862
			5-10 years	-.237	.582
			11-15 years	.200	.680
			more than 20 years	-.318	.503
		more than 20 years	less than 5 years	.386	.263
			5-10 years	.081	.834
			11-15 years	.518	.247
			15-20 years	.318	.503
x13	LSD	less than 5 years	5-10 years	.060	.824
			11-15 years	-.445	.197
			15-20 years	-.295	.434
			more than 20 years	.136	.680
		5-10 years	less than 5 years	-.060	.824
			11-15 years	-.505	.190
			15-20 years	-.355	.391
			more than 20 years	.077	.837
		11-15 years	less than 5 years	.445	.197
			5-10 years	.505	.190
			15-20 years	.150	.747
			more than 20 years	.582	.177
		15-20 years	less than 5 years	.295	.434

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			5-10 years	.355	.391
			11-15 years	-.150	.747
			more than 20 years	.432	.345
		more than 20 years	less than 5 years	-.136	.680
			5-10 years	-.077	.837
			11-15 years	-.582	.177
			15-20 years	-.432	.345
x14	LSD	less than 5 years	5-10 years	.367	.279
			11-15 years	-.159	.712
			15-20 years	.591	.214
			more than 20 years	-.250	.547
		5-10 years	less than 5 years	-.367	.279
			11-15 years	-.526	.275
			15-20 years	.224	.666
			more than 20 years	-.617	.188
		11-15 years	less than 5 years	.159	.712
			5-10 years	.526	.275
			15-20 years	.750	.201
			more than 20 years	-.091	.866
		15-20 years	less than 5 years	-.591	.214
			5-10 years	-.224	.666
			11-15 years	-.750	.201

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			more than 20 years	-.841	.144
		more than 20 years	less than 5 years	.250	.547
			5-10 years	.617	.188
			11-15 years	.091	.866
			15-20 years	.841	.144
x15	LSD	less than 5 years	5-10 years	-.342	.164
			11-15 years	-.400	.202
			15-20 years	.000	1.000
			more than 20 years	-.227	.450
		5-10 years	less than 5 years	.342	.164
			11-15 years	-.058	.868
			15-20 years	.342	.363
			more than 20 years	.115	.734
		11-15 years	less than 5 years	.400	.202
			5-10 years	.058	.868
			15-20 years	.400	.345
			more than 20 years	.173	.657
		15-20 years	less than 5 years	.000	1.000
			5-10 years	-.342	.363
			11-15 years	-.400	.345
			more than 20 years	-.227	.583
		more than 20 years	less than 5 years	.227	.450

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			5-10 years	-.115	.734
			11-15 years	-.173	.657
			15-20 years	.227	.583
x16	LSD	less than 5 years	5-10 years	.309	.221
			11-15 years	.045	.887
			15-20 years	.545	.124
			more than 20 years	-.045	.883
		5-10 years	less than 5 years	-.309	.221
			11-15 years	-.263	.463
			15-20 years	.237	.540
			more than 20 years	-.354	.309
		11-15 years	less than 5 years	-.045	.887
			5-10 years	.263	.463
			15-20 years	.500	.251
			more than 20 years	-.091	.820
		15-20 years	less than 5 years	-.545	.124
			5-10 years	-.237	.540
			11-15 years	-.500	.251
			more than 20 years	-.591	.167
		more than 20 years	less than 5 years	.045	.883
			5-10 years	.354	.309
			11-15 years	.091	.820

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			15-20 years	.591	.167
x17	LSD	less than 5 years	5-10 years	.045	.852
			11-15 years	.645	.041
			15-20 years	.045	.894
			more than 20 years	-.227	.449
		5-10 years	less than 5 years	-.045	.852
			11-15 years	.600	.087
			15-20 years	.000	1.000
			more than 20 years	-.273	.419
		11-15 years	less than 5 years	-.645	.041
			5-10 years	-.600	.087
			15-20 years	-.600	.158
			more than 20 years	-.873	.027
		15-20 years	less than 5 years	-.045	.894
			5-10 years	.000	1.000
			11-15 years	.600	.158
			more than 20 years	-.273	.510
		more than 20 years	less than 5 years	.227	.449
			5-10 years	.273	.419
			11-15 years	.873	.027
			15-20 years	.273	.510
x18	LSD	less than 5 years	5-10 years	.080	.766

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			11-15 years	-.041	.905
			15-20 years	-.466	.218
			more than 20 years	-.159	.630
		5-10 years	less than 5 years	-.080	.766
			11-15 years	-.121	.752
			15-20 years	-.546	.188
			more than 20 years	-.239	.520
		11-15 years	less than 5 years	.041	.905
			5-10 years	.121	.752
			15-20 years	-.425	.362
			more than 20 years	-.118	.783
		15-20 years	less than 5 years	.466	.218
			5-10 years	.546	.188
			11-15 years	.425	.362
			more than 20 years	.307	.501
		more than 20 years	less than 5 years	.159	.630
			5-10 years	.239	.520
			11-15 years	.118	.783
			15-20 years	-.307	.501
x19	LSD	less than 5 years	5-10 years	-.045	.859
			11-15 years	-.145	.657
			15-20 years	-.420	.243

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			more than 20 years	-.500	.115
		5-10 years	less than 5 years	.045	.859
			11-15 years	-.100	.784
			15-20 years	-.375	.342
			more than 20 years	-.455	.201
		11-15 years	less than 5 years	.145	.657
			5-10 years	.100	.784
			15-20 years	-.275	.535
			more than 20 years	-.355	.386
		15-20 years	less than 5 years	.420	.243
			5-10 years	.375	.342
			11-15 years	.275	.535
			more than 20 years	-.080	.855
		more than 20 years	less than 5 years	.500	.115
			5-10 years	.455	.201
			11-15 years	.355	.386
			15-20 years	.080	.855

Table 6 -Illustrates the results of the F – Test and ANOVA one way among the Categories of Scientific Rank

y4		Sum of Squares	df	Mean Square	F	Sig.
x1	Between Groups	5.188	3	1.729	1.365	.259
	Within Groups	111.464	88	1.267		

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	Total	116.652	91			
x2	Between Groups	2.597	3	.866	.758	.521
	Within Groups	100.566	88	1.143		
	Total	103.163	91			
x3	Between Groups	1.613	3	.538	.628	.599
	Within Groups	75.376	88	.857		
	Total	76.989	91			
x4	Between Groups	10.071	3	3.357	3.249	.026
	Within Groups	90.929	88	1.033		
	Total	101.000	91			
x5	Between Groups	.112	3	.037	.044	.988
	Within Groups	75.627	88	.859		
	Total	75.739	91			
x6	Between Groups	1.489	3	.496	.536	.659
	Within Groups	81.424	88	.925		
	Total	82.913	91			
x7	Between Groups	3.004	3	1.001	.924	.432
	Within Groups	95.301	88	1.083		
	Total	98.304	91			
x8	Between Groups	.121	3	.040	.038	.990
	Within Groups	94.433	88	1.073		
	Total	94.554	91			
x9	Between Groups	3.532	3	1.177	1.159	.330
	Within Groups	89.370	88	1.016		
	Total	92.902	91			
x10	Between Groups	4.149	3	1.383	2.009	.118
	Within Groups	60.579	88	.688		
	Total	64.728	91			
x11	Between Groups	.090	3	.030	.030	.993
	Within Groups	88.117	88	1.001		
	Total	88.207	91			
x12	Between Groups	1.015	3	.338	.324	.808
	Within Groups	91.888	88	1.044		

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	Total	92.902	91			
x13	Between Groups	.367	3	.122	.126	.945
	Within Groups	85.633	88	.973		
	Total	86.000	91			
x14	Between Groups	5.651	3	1.884	1.264	.292
	Within Groups	131.088	88	1.490		
	Total	136.739	91			
x15	Between Groups	3.750	3	1.250	1.632	.188
	Within Groups	67.413	88	.766		
	Total	71.163	91			
x16	Between Groups	3.381	3	1.127	1.373	.256
	Within Groups	72.228	88	.821		
	Total	75.609	91			
x17	Between Groups	.831	3	.277	.338	.798
	Within Groups	72.158	88	.820		
	Total	72.989	91			
x18	Between Groups	2.622	3	.874	.933	.428
	Within Groups	82.454	88	.937		
	Total	85.076	91			
x19	Between Groups	3.980	3	1.327	1.567	.203
	Within Groups	74.487	88	.846		
	Total	78.467	91			

Table 7 – Illustrates Multi Comparison among Means for Scientific Rank

Dependent Variable		(I) y4	(J) y4	Mean Difference (I-J)	Sig.
x1	LSD	B.A.	M.A.	.933	.174
			M.Sc.	.468	.490
			PhD	.515	.459
		M.A.	B.A.	-.933	.174
			M.Sc.	-.465	.096
			PhD	-.418	.189
		M.Sc.	B.A.	-.468	.490
			M.A.	.465	.096
			PhD	.047	.878

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		PhD	B.A.	-.515	.459
			M.A.	.418	.189
			M.Sc.	-.047	.878
x2	LSD	B.A.	M.A.	-.233	.719
			M.Sc.	-.324	.615
			PhD	-.636	.336
		M.A.	B.A.	.233	.719
			M.Sc.	-.091	.730
			PhD	-.403	.183
		M.Sc.	B.A.	.324	.615
			M.A.	.091	.730
			PhD	-.312	.281
		PhD	B.A.	.636	.336
			M.A.	.403	.183
			M.Sc.	.312	.281
x3	LSD	B.A.	M.A.	.567	.315
			M.Sc.	.595	.287
			PhD	.364	.525
		M.A.	B.A.	-.567	.315
			M.Sc.	.028	.903
			PhD	-.203	.437
		M.Sc.	B.A.	-.595	.287
			M.A.	-.028	.903
			PhD	-.231	.357
		PhD	B.A.	-.364	.525
			M.A.	.203	.437
			M.Sc.	.231	.357
x4	LSD	B.A.	M.A.	.733	.237
			M.Sc.	.676	.271
			PhD	-.045	.942
		M.A.	B.A.	-.733	.237
			M.Sc.	-.058	.818
			PhD	-.779	.008
		M.Sc.	B.A.	-.676	.271
			M.A.	.058	.818
			PhD	-.721	.010
		PhD	B.A.	.045	.942
			M.A.	.779	.008
			M.Sc.	.721	.010
x5	LSD	B.A.	M.A.	-.100	.859
			M.Sc.	-.036	.949
			PhD	-.106	.853
		M.A.	B.A.	.100	.859

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			M.Sc.	.064	.779
			PhD	-.006	.981
		M.Sc.	B.A.	.036	.949
			M.A.	-.064	.779
			PhD	-.070	.780
		PhD	B.A.	.106	.853
			M.A.	.006	.981
			M.Sc.	.070	.780
x6	LSD	B.A.	M.A.	.500	.393
			M.Sc.	.667	.251
			PhD	.530	.373
		M.A.	B.A.	-.500	.393
			M.Sc.	.167	.483
			PhD	.030	.911
		M.Sc.	B.A.	-.667	.251
			M.A.	-.167	.483
			PhD	-.136	.600
		PhD	B.A.	-.530	.373
			M.A.	-.030	.911
			M.Sc.	.136	.600
x7	LSD	B.A.	M.A.	-.533	.400
			M.Sc.	-.514	.413
			PhD	-.136	.832
		M.A.	B.A.	.533	.400
			M.Sc.	.020	.938
			PhD	.397	.178
		M.Sc.	B.A.	.514	.413
			M.A.	-.020	.938
			PhD	.377	.182
		PhD	B.A.	.136	.832
			M.A.	-.397	.178
			M.Sc.	-.377	.182
x8	LSD	B.A.	M.A.	.200	.751
			M.Sc.	.171	.784
			PhD	.152	.813
		M.A.	B.A.	-.200	.751
			M.Sc.	-.029	.910
			PhD	-.048	.868
		M.Sc.	B.A.	-.171	.784
			M.A.	.029	.910
			PhD	-.020	.944
		PhD	B.A.	-.152	.813
			M.A.	.048	.868

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			M.Sc.	.020	.944
x9	LSD	B.A.	M.A.	.600	.328
			M.Sc.	.360	.553
			PhD	.106	.865
		M.A.	B.A.	-.600	.328
			M.Sc.	-.240	.336
			PhD	-.494	.084
		M.Sc.	B.A.	-.360	.553
			M.A.	.240	.336
			PhD	-.254	.351
		PhD	B.A.	-.106	.865
			M.A.	.494	.084
			M.Sc.	.254	.351
x10	LSD	B.A.	M.A.	.833	.101
			M.Sc.	.640	.202
			PhD	.348	.497
		M.A.	B.A.	-.833	.101
			M.Sc.	-.194	.345
			PhD	-.485	.040
		M.Sc.	B.A.	-.640	.202
			M.A.	.194	.345
			PhD	-.291	.196
		PhD	B.A.	-.348	.497
			M.A.	.485	.040
			M.Sc.	.291	.196
x11	LSD	B.A.	M.A.	.067	.913
			M.Sc.	.090	.881
			PhD	.015	.980
		M.A.	B.A.	-.067	.913
			M.Sc.	.023	.924
			PhD	-.052	.855
		M.Sc.	B.A.	-.090	.881
			M.A.	-.023	.924
			PhD	-.075	.782
		PhD	B.A.	-.015	.980
			M.A.	.052	.855
			M.Sc.	.075	.782
x12	LSD	B.A.	M.A.	-.067	.914
			M.Sc.	-.288	.640
			PhD	-.258	.683
		M.A.	B.A.	.067	.914
			M.Sc.	-.222	.380
			PhD	-.191	.507

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		M.Sc.	B.A.	.288	.640
			M.A.	.222	.380
			PhD	.031	.911
		PhD	B.A.	.258	.683
			M.A.	.191	.507
			M.Sc.	-.031	.911
x13	LSD	B.A.	M.A.	-.367	.541
			M.Sc.	-.333	.575
			PhD	-.333	.584
		M.A.	B.A.	.367	.541
			M.Sc.	.033	.891
			PhD	.033	.904
		M.Sc.	B.A.	.333	.575
			M.A.	-.033	.891
			PhD	.000	1.000
		PhD	B.A.	.333	.584
			M.A.	-.033	.904
			M.Sc.	.000	1.000
x14	LSD	B.A.	M.A.	1.400	.061
			M.Sc.	1.270	.086
			PhD	1.136	.134
		M.A.	B.A.	-1.400	.061
			M.Sc.	-.130	.666
			PhD	-.264	.444
		M.Sc.	B.A.	-1.270	.086
			M.A.	.130	.666
			PhD	-.134	.685
		PhD	B.A.	-1.136	.134
			M.A.	.264	.444
			M.Sc.	.134	.685
x15	LSD	B.A.	M.A.	.700	.190
			M.Sc.	.874	.100
			PhD	.470	.386
		M.A.	B.A.	-.700	.190
			M.Sc.	.174	.421
			PhD	-.230	.351
		M.Sc.	B.A.	-.874	.100
			M.A.	-.174	.421
			PhD	-.404	.090
		PhD	B.A.	-.470	.386
			M.A.	.230	.351
			M.Sc.	.404	.090
x16	LSD	B.A.	M.A.	.567	.304

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			M.Sc.	.883	.108
			PhD	.803	.153
		M.A.	B.A.	-.567	.304
			M.Sc.	.316	.159
			PhD	.236	.355
		M.Sc.	B.A.	-.883	.108
			M.A.	-.316	.159
			PhD	-.080	.744
		PhD	B.A.	-.803	.153
			M.A.	-.236	.355
			M.Sc.	.080	.744
x17	LSD	B.A.	M.A.	.000	1.000
			M.Sc.	.108	.843
			PhD	-.136	.807
		M.A.	B.A.	.000	1.000
			M.Sc.	.108	.628
			PhD	-.136	.593
		M.Sc.	B.A.	-.108	.843
			M.A.	-.108	.628
			PhD	-.244	.319
		PhD	B.A.	.136	.807
			M.A.	.136	.593
			M.Sc.	.244	.319
x18	LSD	B.A.	M.A.	.800	.176
			M.Sc.	.631	.281
			PhD	.470	.433
		M.A.	B.A.	-.800	.176
			M.Sc.	-.169	.478
			PhD	-.330	.227
		M.Sc.	B.A.	-.631	.281
			M.A.	.169	.478
			PhD	-.161	.538
		PhD	B.A.	-.470	.433
			M.A.	.330	.227
			M.Sc.	.161	.538
x19	LSD	B.A.	M.A.	.933	.097
			M.Sc.	1.081	.053
			PhD	.773	.176
		M.A.	B.A.	-.933	.097
			M.Sc.	.148	.515
			PhD	-.161	.536
		M.Sc.	B.A.	-1.081	.053
			M.A.	-.148	.515

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			PhD	-.308	.216
		PhD	B.A.	-.773	.176
			M.A.	.161	.536
			M.Sc.	.308	.216

Table 8 – Illustrates Collective Arithmetic Mean for both Dimensions in regards o Gender

	y1	N	Mean	Std. Deviation
Cognitive	Male	58	3.5052	.45708
	Female	34	3.5500	.32122
Implementation	Male	58	3.9234	.50004
	Female	34	3.8922	.41075

Table 9 – Illustrates Z – Test for 2 independent samples (male and female) in regards to both dimensions (cognitive and application)

Y1	T	df	Sig. (2-tailed)	Mean Difference
Cognitive	-0.503	90	0.616	-0.04483
Implementation	0.308	90	0.759	0.03121

Table 10 - Illustrates results of the F – Test and ANOVA one way among the Age category in regards of the cognitive and application dimension

y2		Sum of Squares	df	Mean Square	F	Sig.
Cognitive	Between Groups	.909	4	.227	1.369	.251
	Within Groups	14.447	87	.166		
	Total	15.357	91			
Implementation	Between Groups	1.138	4	.285	1.324	.268
	Within Groups	18.702	87	.215		
	Total	19.840	91			

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Table 11 - Illustrates results of the F – Test and ANOVA one way among the Experience category in regards of the cognitive and application dimension

y3		Sum of Squares	df	Mean Square	F	Sig.
Cognitive	Between Groups	.658	4	.165	.974	.426
	Within Groups	14.698	87	.169		
	Total	15.357	91			
Implementation	Between Groups	.776	4	.194	.885	.476
	Within Groups	19.065	87	.219		
	Total	19.840	91			

Table 12- Illustrates Multi Comparison among the Arithmetic Means for the Experience Category in regards to the cognitive and application dimension

Dependent Variable	(I) y3	(J) y3	Mean Difference (I-J)	Sig.
Cognitive	less than 5 years	5-10 years	.01962	.862
		11-15 years	-.10091	.485
		15-20 years	.17159	.280
		more than 20 years	-.17273	.216
	5-10 years	less than 5 years	-.01962	.862
		11-15 years	-.12053	.455
		15-20 years	.15197	.383
		more than 20 years	-.19234	.220
	11-15 years	less than 5 years	.10091	.485
		5-10 years	.12053	.455
		15-20 years	.27250	.166
		more than 20 years	-.07182	.690
	15-20 years	less than 5 years	-.17159	.280
		5-10 years	-.15197	.383
		11-15 years	-.27250	.166

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		more than 20 years	-.34432	.075
	more than 20 years	less than 5 years	.17273	.216
		5-10 years	.19234	.220
		11-15 years	.07182	.690
		15-20 years	.34432	.075
Implementation	less than 5 years	5-10 years	.03097	.810
		11-15 years	-.02576	.876
		15-20 years	.11869	.511
		more than 20 years	-.24495	.124
	5-10 years	less than 5 years	-.03097	.810
		11-15 years	-.05673	.757
		15-20 years	.08772	.658
		more than 20 years	-.27592	.123
	11-15 years	less than 5 years	.02576	.876
		5-10 years	.05673	.757
		15-20 years	.14444	.517
		more than 20 years	-.21919	.287
	15-20 years	less than 5 years	-.11869	.511
		5-10 years	-.08772	.658
		11-15 years	-.14444	.517
		more than 20 years	-.36364	.098
	more than 20 years	less than 5 years	.24495	.124
		5-10 years	.27592	.123
		11-15 years	.21919	.287
		15-20 years	.36364	.098

Table 13 – Illustrates the results of the F – Test and ANOVA one way among Scientific Degree categories in regards of to the cognitive and application dimension

y4		Sum of Squares	Df	Mean Square	F	Sig.
Cognitive	Between Groups	.434	3	.145	.853	.469

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	Within Groups	14.923	88	.170		
	Total	15.357	91			
Implementation	Between Groups	1.462	3	.487	2.334	.079
	Within Groups	18.378	88	.209		
	Total	19.840	91			

Table 14 – Illustrates the Multi Comparison among the Arithmetic Means for the Scientific Degree Categories in regards to the cognitive and application dimension

Dependent Variable	(I) y4	(J) y4	Mean Difference (I-J)	Sig.
Cognitive	B.A.	M.A.	.22333	.373
		M.Sc.	.21622	.384
		PhD	.07727	.761
	M.A.	B.A.	-.22333	.373
		M.Sc.	-.00712	.944
		PhD	-.14606	.210
	M.Sc.	B.A.	-.21622	.384
		M.A.	.00712	.944
		PhD	-.13894	.213
	PhD	B.A.	-.07727	.761
		M.A.	.14606	.210
		M.Sc.	.13894	.213
Implementation	B.A.	M.A.	.58889	.036
		M.Sc.	.53954	.052
		PhD	.36195	.202
	M.A.	B.A.	-.58889	.036
		M.Sc.	-.04935	.661
		PhD	-.22694	.080
	M.Sc.	B.A.	-.53954	.052
		M.A.	.04935	.661
		PhD	-.17759	.152
	PhD	B.A.	-.36195	.202
		M.A.	.22694	.080
		M.Sc.	.17759	.152

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پـوختـه:

فێرکردن لەسەر بنەمای مێشك ئاماژە بۆ ڕێگاکانی وانەگوتنەوە و دیزاینی وانە و پڕۆگرامی قوتابخانەکان دەکات بە پاڵپشتی نوێترین توێژینەوەی زانستی دەربارەی ڕێگاکانی بەدەستهێنانی مێشك کە ئەم هۆکارانە لەخۆدەگرێت, وەك گەشەپێدانی زانیاری و چۆنیەتی فێرکردنی قوتابی بەشێوەیەکی جیاواز کاتێك کە تەمەنیان بەرەوژوور دەچێت و لەرووی کۆمەلایەتی و سۆزداری و زانیاری و دەرککردنەوە پێدەگەن.

ئامانجی ئەم توێژینەوەیە بەشێوەیەکی سەرەکی بۆ زانینی ئەمانەیە:

1. **تا چ ڕادەیەك پەروەردەکاران ستراتیژیەتی فێرکردن لەسەر بنەمای مێشك دەزانن.**
2. **تواناکانیان تا چ ڕادەیەکە لە پراکتیککردنی ستراتیژیەت و جیاوازییە گەورەکان لەنێوان وەلامدانەوەی هەردوو ڕەهەندی دەرککردن و پراکتیکییەوە.**

لەپێناو بەدی هێنانی ئەو ئامانجەی سەرەوە, توێژینەوەکە پێشبینی دەکات بەوەی (HO) واتا نەبوونی جیاوازی کە دەلالەت لە ئامار دەکات, ڕەتکردنەوەی وەلامدانەوەی پەروەردەکاران تەنانەت لەسەر بنەمای ڕاپرسی لە هەردوو ڕەهەندی دەرککردن و پراکتیکی تاکی و کۆمەلییەوە.

گرنگترین ئەو ئەنجامەی توێژینەوەکە پێی گەیشتووە بریتییە لە:

پەروەردەکاران هیچ زانیارییەکی پسپۆڕییان نییە لە ڕووی پراکتیکی و مەشقەوە, ئەمەش بە ئاماژەدان بە ستراتیژیەتی فێرکردن لەسەر بنەمای مێشك لەو ئەنجامانەی کە لە ئاستی ناوەندی (3) لە هەردوو ڕەهەندی دەرککردن و پراکتیکییەوە ڕوون بوو.

توێژینەوەکە کۆتایی دێت بە چەند ڕاسپاردەیەك بە ئامانجی پراکتیکی و هەندێك پێشنیار بۆ زیاتر ئەنجامدانی توێژینەوە لە داهاتوودا.

الملخص:

يشير التعليم القائم على الدماغ الى طرائق التدريس وتصاميم الدروس والبرامج المدرسية التي تستند الى احدث الابحاث العلمية حول الطريقة التي يكسب الدماغ، متضمنة العوامل التربوية كالتنمية المعرفية وكيفية تعلم الطلبة بصورة مختلفة عندما يتقدمون في السن ويصبحون بالغين اجتماعيا"، وعاطفيا" ومعرفيا" وادراكيا". وتهدف هذه الدراسة بشكل اساسي الى معرفة:

1- الى اي مدى يعرف التربويون استراتيجية التعلم القائم على الدماغ.
2- مدى قدرتهم على تطبيق الاستراتيجية والفوارق الكبيرة بين استجاباتهم في كلا البعدين الادراكي والتطبيقي.

ولتحقيق الاهداف المذكورة اعلاه، تفترض الدراسة بأن Ho يعني عدم وجود فروق ذات دلالة احصائية ردا" على استجابات التربويين وحتى على بنود الاستبيان في كلا البعدين الادراكي والتطبيقي والفردي والجماعي.

واهم الاستنتاجات التي توصلت اليها الدراسة هي: ليس للتربويين اية معرفة متخصصة من حيث الجانب التطبيقي والتدريبي بالاشارة الى استراتيجية التعلم القائم على الدماغ. وكان ذلك واضحا" من الاستنتاجات التي كانت في مستوى معتدل (3) في كلا البعدين الادراكي والتطبيقي.

وانتهت الدراسة الى بعض التوصيات لأهداف تطبيقية وبعض المقترحات لمزيد من الدراسات المستقبلية.