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IMPACT OF BRAIN BASED LEARNING ON CRITICAL THINKING AND ACHIEVEMENT IN BIOLOGY OF SECONDARY SCHOOL STUDENTS

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Abstract
This study was intended to know about the impact of Brain Based Learning on Critical Thinking and Achievement in Biology of Secondary school students. Here adopted experimental method. Investigator selected 68 students of VIII standard from a Government school for the study as Control group and Experimental group through convenient sampling technique. Analysis of the data revealed that BBL is superior to existing method with regard the critical thinking ability and achievement scores in Biology. Therefore BBL can be used for the transaction of Biology in class rooms.

Key Words: Brain Based Learning, Critical Thinking, Achievement In Biology, Secondary School Students.

Background of the study

Children's learning is the most natural and innate of human skills. Humans are born to learn better than any other species. As a result of brain imaging technologies, researchers are now able literally to watch learning occur as specific pattern of brain activity within the brain light up one computer screen. These findings have undermined the behaviorist metaphor of the brain as a blank slate waiting for information. The brain is now seen as a far more flexible, self adjusting, biological metaphor as a living, unique, ever changing organism that grows and reshapes itself in response to challenge with elements that wither through lack of use. Mass of evidence that is now emerging about learning and development has spawned a movement towards educational practices which confirms that thinking skills as well as significant aspect of intelligence are learnable.

Science has advanced our knowledge of brain biology and has provided information applicable to student learning. Winters (2001) states that recent MRI research has indicated the possible locations where cognitive functions take place relative to learning. Brain research indicates that the brain does not act as a computer, in a linear fashion, as some educators previously thought. Rather, the brain uses multiple strategies to create meaning (Caine, 2000; Caulfield et al., 2000; Slavkin, 2004). In particular, the concept of neural plasticity posits that the brain is continually rewiring itself throughout our lives to access new memories and experiences. Accordingly, brain-based instruction must also be 'rewired' on a continual basis to remain effective.

Paul McClean developed a concept of the Triune Brain which refers to the evolution of the human brain in three parts. In this theory McClean hypothesized that survival learning is in the lower brain, emotions were in the mid-brain, and higher order thinking took place in the upper brain. Currently, brain-based education embraces a more holistic view of the brain -- one that is more systems-based and gestalt -- the whole being greater than the sum of its parts.

During the last two decades neuroscientists have be doing research that has implications for improved teaching practices as they have obtained much information on how the brain works from autopsies, experiments, and different types of scans -- MRIs, EEGs, PET and CAT scans. Information has been gleaned as neuroscientists construct clinical studies that use double blind, large, diverse, multi-age, multicultural groups of people to gather reliable information. This information has helped determine how human learning actually occurs. In essence, these scientists have been peering into the little black box in order to determine how the brain processes and retains information. Thus, technology in medicine has paved the way for many new learning innovations specifically based on conclusions from research in neuroscience. Professors from major universities have taken this information and incorporated it into books about learning. In accordance with these suggestions classroom practices can be modified by teachers applying new theories of teaching and learning based on recent findings.

Brain-based learning focus on how the brain learns. Brain based learning includes accepting the rules of brain processing and organizing the teaching according to these rules in the mind for meaningful learning (Caine and Caine, 1994; 1997 Caine, Geoffrey, Renate Nummela Caine and Sam Crowell. 1999). It is a concept which tells how fusion of the common sense, human experiences and brain researches produce useful tools and principles for classroom environment.

Objectives

The objectives of the present study are the following.

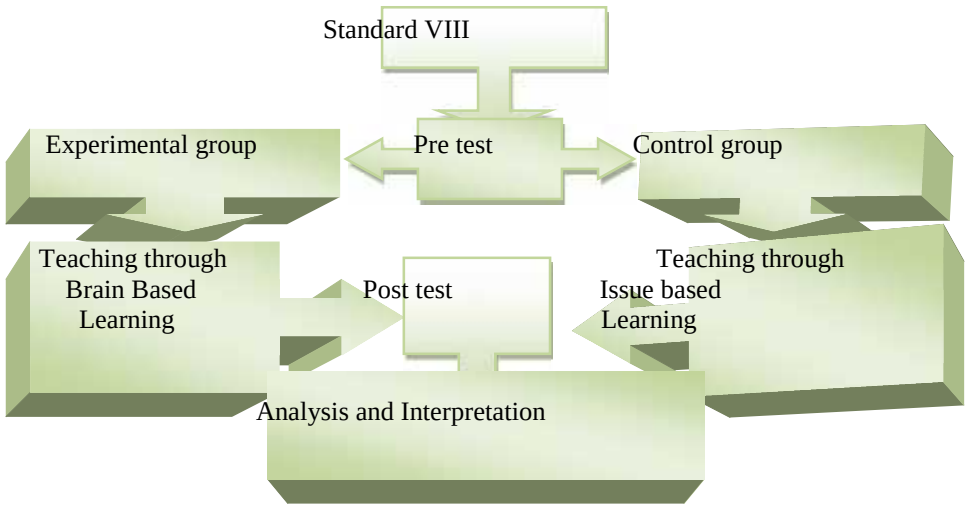
1. To find out the extent of Critical thinking ability and Achievement in Biology of Secondary School students.
2. To find out the effectiveness of Brain Based Learning on enhancing the Critical thinking ability and Achievement in Biology of Secondary School Students.

Hypotheses

1. There is no significant difference between the mean pre test scores on Critical thinking ability of students taught under Brain Based Learning and students taught under Issue based learning.
2. There is no significant difference between the mean pre test scores on achievement in Biology of students taught under Brain Based Learning and students taught under issue based learning.
3. There is no significant difference between the mean post test scores on Critical thinking ability of students taught under Brain Based Learning and students taught under issue based learning.
4. There is no significant difference between the mean post test scores on achievement in Biology of students taught under Brain Based Learning and students taught under issue based learning.

Methodology

Here informal experimental design namely pre-test post-test non-equivalent parallel group design was proposed to use.



EXPERIMENT DESIGN MODEL

Sampling Design

Investigator selected 68 students of VIII standard from a Government school for the study through convenient sampling technique.

Tools Used for the Study

Lesson transcription for Brain Based Learning, Lesson transcription for Issue Based Learning, Critical Thinking Scale and Achievement test in Biology.

Statistical Techniques employed for the study

The scores obtained were classified tabulated and subjected to statistical analysis. This include test of significance of the difference between means and ANCOVA.

Findings

- From the comparison of mean pre test scores of Experimental and Control group for critical thinking ability, it was found that the calculated t value (t=0.22) is not significant even at 0.05 level. Hence it can be concluded that the critical thinking ability of Experimental and Control group are more or less same before the treatment.
- From the comparison of mean pre test scores of Experimental group and control group for achievement in Biology, it is found that the calculated t value (t=1.79) is not significant even at 0.05 level. So it is concluded that achievement in biology of Experimental group and Control group is more or less same.
- From the comparison of mean post test scores of Critical Thinking of Experimental Group and Control group, it was found that the calculated t value (t=1.96) is significant at 0.05 level. It can be concluded that critical thinking ability of Experimental group is more than the Control group after the treatment.
- From the comparison of mean post test scores of Experimental Group and Control group for achievement in Biology, it is found that the calculated t value (t=4.58) is significant at 0.01. It can be concluded that achievement in Biology of Experimental group is more than the Control group

Table 1,Test of Significance of the Difference between the Mean Pre Tests and Post Tests scores of Experimental and Control Groups for Critical Thinking Ability and achievement in Biology

TREATMENT	GROUP	CRITICAL THINKING	ACHIEVEMENT TEST
Pretest	Control group	0.22#	1.79#
	Experimental group		
Post test	Control group	1.96*	4.58*
	Experimental group		

 # not significant **significant*

Conclusion

Brain Based Learning is effective for enhancing different skills among children. It is evident from the analysis that Brain Based learning method is significantly superior to issue based method of teaching for enhancing critical thinking ability of children. It can be effectively practiced in our classroom situations for inculcating critical thinking abilities. It always nurtures inquisitiveness, analyticity, systematicity, truth seeking etc among the children.

At the same time BBL also influence the achievement of students. Analysis of the data revealed that BBL is superior to issue based method with regard Achievement scores in Biology. Therefore BBL can be used effectively for the transaction of Biology in class rooms.

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