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EFFECT OF CONSTRUCTIVIST APPROACH AND HERBERTIAN APPROACH ON ACHIEVEMENT IN MATHEMATICS AMONG 8TH CLASS STUDENTS

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ABSTRACT

The investigator adopted the analytical approach to study the effect of constructivist based teaching approach and herbertian approach on achievement in math at 8th grade. Sample of 80 students of 8th grade was taken from district Ludhiana of Punjab State. This was an experimental study in which "pre-test - post-test parallel group" design was used. The post test scores obtained after the experiment were analyzed and significant mean difference in the post-test scores clearly shown that constructivist teaching approach was far better in improvement mathematical achievement. As far as gender difference in achievement were not found either for the experimental group nor the control group.

Keywords: *Constructivist Approach, Herbartian Approach, Mathematics, Achievement.*

The most critical shift in education in the past 20 years has been a move away from a conception of "learner as sponge" toward an image of "learner as active constructor of meaning."Constructivism is a view of learning based on the belief that knowledge is not occurring. The teacher cannot supplement in his students brain with a single dose or to be simply remembered in the form of notes given by the teacher. Knowledge is constructed by learners through an active mental process of development. Learners are builders and creators of knowledge.

Jean Piaget (1977), within the book "to understand is to Invent"; the longer term of education implies that the expansion of data is that the results of individual constructions made by the learner's understanding. According to Piaget current state of knowledge is temporal changing as time passes as knowledge in the past has changed, it is not a static instance, and it is a process. Learning may be a process of continual construction and reorganization. Piaget observed constructivism as how of explaining how people come to understand about their world and picked up an in depth body of research of children's behaviors and witnessed children's behavior which he then used to create well supported inferences about the functions of the mind. Piaget asserted that learning occurs by an active construction of meaning, rather than by passive percipience. He explains that when we, as learners, encounter an experience or a situation that conflicts with our current way of thinking, a state of disequilibrium arises in our minds. To restore equilibrium or balance we make sense of the new information by associating it with what we already know, that is, by attempting to assimilate in into our existing knowledge.

Piaget's theory of constructivist learning has had wide ranging impact on learning theories and teaching methods in education and is an underlying theme of the many education reform movements. In past centuries, constructivist ideas weren't widely valued thanks to the perception that children's play was seen as aimless and of little importance. Jean piaget didn't accept as true with these traditional views, however. He saw play as a crucial and necessary a part of the student's cognitive development and provided scientific evidence for his views. Today, constructivist theories are influential throughout much of the informal learning sector.

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Thus generating and controlling informal learning environment during a formal classroom is that the real challenge for an educator. A teacher getting to adopt this approach should first attempt to understand the need of a constructivist classroom then manage it adequately.Following sub heads would discussion the essential features of a constructivist classroom.

Johan Friedrich Herbart (May 4, 1776- august 11, 1841) was a German philosopher, psychologist and founding father of pedagogy as a tutorial discipline. This work found little favor during his lifetime, but after his death, it had profound influence on teaching practices. His theory of education which brought ideas from both psychology and metaphysics, particularly ethics, into the study of learning, was dominant from the late nineteenth century until new approaches to education.According to Herbert, abilities were not innate but could be instilled. Only formalized, rigorous education could provide the framework for moral and intellectual development. He distinguished between the instructional process and the content of what was to be taught.

Researchers have proved that constructivist based teaching approach is more promising towards mathematics learning for students (Ginburg-Block and Funtuzzo, 1998; Grave Meijer 1993;Binkley, 2003) and it has also positive effect on both students performance and motivation. Constructivist instruction is found to be more effective teaching learning process than the herbartian approach in classroom (Naoremjibolata and Van Luit, 2012;Suk,2005). Self-regulated learning strategy in constructivist pedagogy improves achievement in mathematics and level of confidence for middle school students (Cekolin, 2001).

OBJECTIVES OF THE STUDY

1. To apply herbertian teaching approach in teaching mathematics to 8th class students.
2. To apply constructivist approach in teaching mathematics to 8th class students.
3. To develop lesson plans on shapes, angles, areas and perimeter, multiplication and division using constructivist and herbertian approach.
4. To see the effect of herbertian approach on achievements in mathematics.
5. To see the effect of constructivist teaching approach on achievement in mathematics.
6. To compare academic achievement in mathematics through constructivist based teaching and herbertian approaches.
7. To see the gender differences in academic achievement.

HYPOTHESES OF THE STUDY

1. There will be significance difference in the intelligence scores of the two groups.
2. There exists no significant mean difference in pre-test achievement scores in mathematics of students taught through constructivist approach and herbertian approach.
3. There exists significant mean difference in academic achievement score in mathematics of student taught through constructivist and herbertian approach.
4. There exists no significant difference in academic achievement in mathematics of male and female students taught with constructivist based teaching approach.
5. There exists no significant difference in academic achievement in mathematics of male and female students taught with herbertian approach.
6. There will be significance difference in gain scores of two groups.

METHODOLOGY

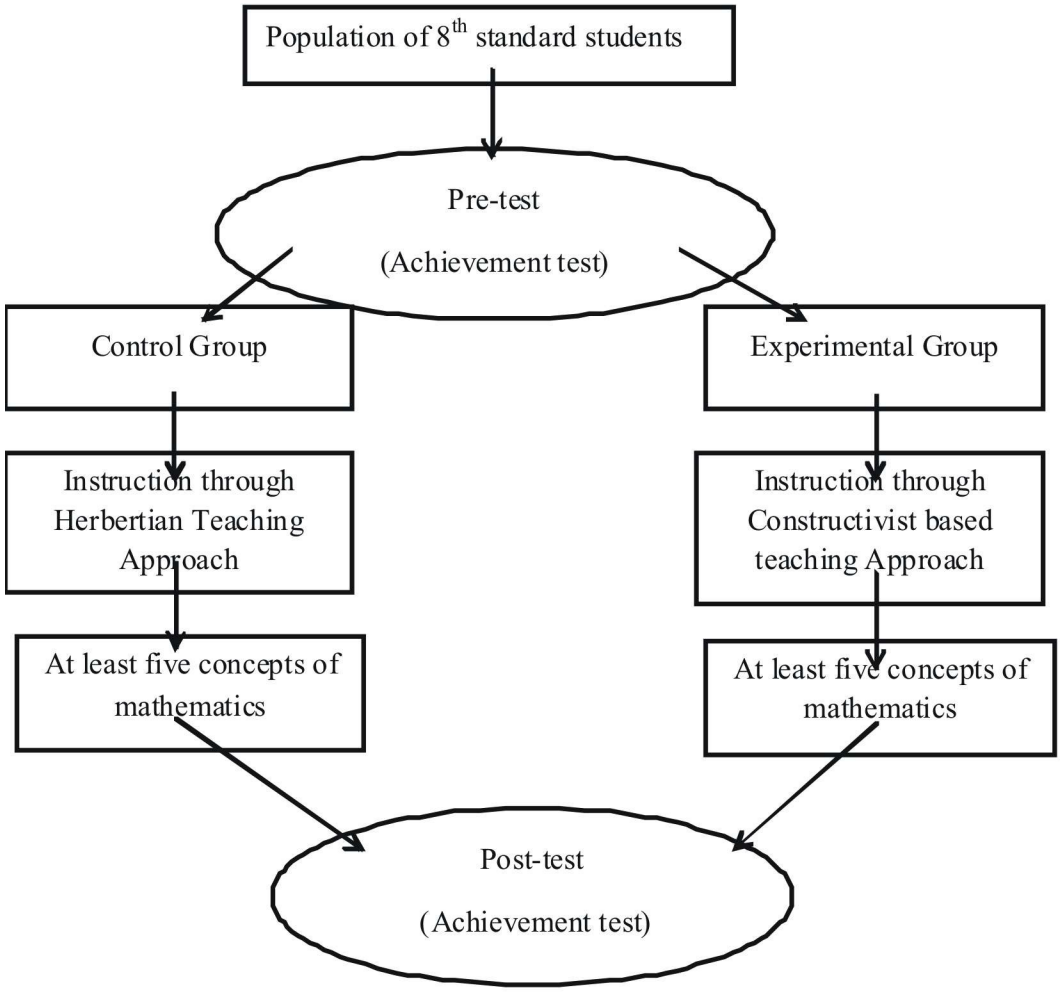
SAMPLE

A purposeful sample of 80 students of 8th grade was taken from Govt. Sen. Sec. School, Halwara; district Ludhiana during the session (2013-14). The sample was divided into two groups after being matched in terms of intelligence and mathematical

achievement. Both the groups comprised of 40 students each, the experimental group was taught mathematical concepts with the constructivist based teaching approach and the controlled group was taught with traditional method by investigator.

DESIGN OF THE STUDY

This was an experimental study in which pre-test, post-test parallel two group design was used. The design can be represented by the figure



TOOLS

The following tools and tests were used to match the two groups, to conduct the pre-test and post-test and to treat the experimental groups.

1. Mathematics achievement test developed by investigator.
2. Lesson Plans were developed by investigator.
3. Intelligence test (SPM by Raven)

PROCEDURE OF DATA COLLECTION

The investigator approached a secondary school for the permission of holding the experimental study on the 8th class students. A sample was comprised of 80 students which include both male and female students. Firstly, pre-test in the form of intelligence test and achievement test were be given. On the basis of these two scores the two matched groups were formed. One was control group and the other was experimental group.

GROUP-A (CONTROL GROUP) Group-A was taught through Herbertian Teaching Approach. The five concepts of mathematics were used by investigator.

GROUP-B (EXPERIMENTAL GROUP) Group-B was taught through Constructivist Based Teaching Approach by the investigator. The help of visual aids were also taken.

Both the groups were subjected to a Pre-test (Achievement test) which includes questions based on the topics selected for treatment via:

(i) Area

(ii) Cylinder

(iii) Cone

After the treatment the investigator applied Post-test on both the groups in the form of Achievement test. The Pre-test and post-test scores were further compared to see the effectiveness of the treatment.

STATISTICAL ANALYSIS

The data collected during the investigation was tabulated and two matched groups were formed i.e. Control Group (A) and Experimental Group (B). The statistical techniques such as means, standard deviation, t-value and skewness etc. were used. The bar diagram were to show the data graphically.

MAIN FINDINGS OF THE STUDY

Groups	Test	N	Mean Scores	S.D	't'value	Significant or Not
Group-A	Pre-test	127`	4.233	2.160	0.183	Non-Significant
Group-B	Pre-test	130	4.333	2.073		
Group-A	Post-test	358	11.933	4.494	3.687	Significant
Group-B	Post-test	464	15.466	2.713		
Group-A (Girls)	Post-test	173	13.307	3.449	1.570	Non-Significant
Group-A (Boys)	Post-test	185	10.882	4.998		
Group-B (Girls)	Post-test	231	16.5	2.37	2.07	Non-Significant
Group-B (boys)	Post-test	233	14.562	2.731		
Group-A (Gain score)	Post-test	231	7.7	2.507	6.993	Significant
Group-B (Gain score)	Post-test	334	11.133	0.973		

The present experiment study has brought the following facts into light:

1. While comparing constructivist based teaching with herbertian approach, it was found that Group-B achieved more than Group-A. It means that constructivist based teaching approach was more effective than herbertian approach in the teaching of mathematical concept.
2. The study revealed that both boys and girls improved through constructivist based teaching approach.
3. The investigator felt that mathematical concepts can be easily constructed from a base of prior knowledge. Children are not a blank slate and knowledge cannot be imparted with the child making sense of it according to his or her conceptions. Therefore children can learn best when they are allowed to construct a personal understanding based on experiencing things and reflecting on those experiences.

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