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Effect of Constructivist Approach on Achievement in Science at Elementary Level

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Abstract: - The aim of the present study was to find out the Effect of Constructivist Approach on Achievement in Science at Elementary Level. Experimental research design was employed in the study. A sample of 60 students were selected and grouped intoexperimental group (30) and control group (30). The experimental group was taught through constructive approach and control group was taught same topics with traditional method of teaching. For these 20 lesson plans has been developed by Investigator from selected topics of science, in which 10 lesson plans based on constructivist approach (7E model) and other 10 lesson plans based on traditional method.The study found that there is found significant difference in the effect of constructivist approach on achievement in science of students of control group and experimental group. The study concluded that constructivist approach is largely helpful in enhancing the achievement level in the subject of science.

Keywords: Constructivist Approach, Academic Achievement, Science & Elementary Level

INTRODUCTION

Science occupies an important position among subjects included in the elementary school curriculum. The definition of science defines as " the study of systematized knowledge produced by careful observation, measurement and experiment which attempt to establish general laws or principles to describe the phenomenon under study". Science seeks to understand how nature behaves by observing and correlating available factual information. Our understanding science is therefore based upon, and limited by, the factual information available. In science, feet based explanations are called "theories". Theories may be good, bad or indifferent. It all depends on the accuracy and the amount of the factual information available, and how logically these facts are interpreted.

Science education plays a pivotal role in the development and advancement of any country as it is required by a person to cope up with the challenge presented by one's evolving needs. Providing access to appropriate learning experiences in education systems contributes to

broadened skills and knowledge, increased productivity and thereby, it significantly improves the nation's economy. Using a constructivist perspective, teaching science becomes more like the science that scientists do it is an active, social process of making sense of experiences, as opposed to what we now call "school science." Indeed, actively engaging students in science (we have all heard the call for "hands-on, minds-on science") is the goal of most science education reform. It is an admirable goal, and using constructivism as a referent can possibly assist in reaching that goal.

Constructivist approach provides tremendous opportunities for inculcating creativity and initiative, so that learner's performance is enhanced. NCF 2005 has also suggested that at upper primary stage, the child should be engaged in group activities, discussions with peers and teachers, surveys, organizations of data and their display through exhibition etc in schools are to be an important component of pedagogy. On the basis of this it can be say that the constructivist learning is the combined element of the multiple realities constructed by people and implications of those constructions for their live and interactions with other. Constructivist view of learning emphasizes the significance of the individual learner"s prior knowledge.

Constructivism is basically a theory based on observation and scientific study about how people learn. It says that people construct their own understanding and knowledge of the world, through experiencing things and reflecting on those experiences. When we encounter something new, we have to reconcile it with our previous ideas and experience, maybe changing what we believe, or maybe discarding the new information as irrelevant. In any case, we are active creators of our own knowledge. To do this, we must ask questions, explore, and assess what we know. Constructivism is a learning theory based on the idea that new knowledge is "constructed" on top of learners' existing knowledge. According to the theory, students are not "empty vessels" that need to be "filled." Rather, students' existing knowledge serves as an important foundation for new learning. This approach to teaching and learning requires that teachers take the time to get to know students in depth, and to integrate what they learn about students into their instruction.

REVIEW OF RELATED OF LITERATURE

Gupta, Ajay Kumar (2023) - Effect of Constructivist Approach on Students' Achievement inScience at Secondary Level. The objectives of present study are: to study the effect of constructivist approach on class VI students'achievement in science, to study the effect of constructivist approach on the achievement of low achieversof class VI in science and to compare the performance of boys and girls of class VI students learnt throughconstructivist approach. This study was conducted in D.A.V School, Bhagalpur. It was limited to thestudents of class 10th. 5E Model of constructivist approach was implemented in the study. The presentdesign of study was quasi-experimental. Class 10th students of D.A.V School were population of thisresearch. The purposive sampling was used for selecting secondary school. 54 students were selectedfrom two sections for the purpose of this study. Researcher selected section 'A' as experimental groupand section 'B' as control group. Researcher had used two types of tools: Instructional Tool (5E model)& Measuring Tool (Teacher made Achievement Test). The data were analyzed by using appropriatestatistical techniques i.e., 't'- test and ANCOVA. Constructivist approach had significant effect on theachievement of class 10^{th} students in science (M1 = 22.16, M2 = 16.20, 't'-value is 2.345**). Constructivistapproach had significant effect on achievement of low achievers of class 10^{th} students in science (M1 =7.66, M2 = 5.5, 't'-value is 3.01**). It can be concluded that constructivist approach provides enough

scopefor active participation and interaction in classroom with peers and teachers. Through interaction, lowachievers can get better opportunity to acquire knowledge and increase their achievement.

Noureen, Ghazala (2020) -Effect of Constructivist Teaching Approach on Student'sAchievement in Science at Elementary Level. The Main objective of this study is to determine the effect of thisapproach while comparing it with traditional method ofteaching. The study was experimental in nature. The populationof study was 7class students school. Sixty students wereselected randomly. After pretesting students were distributedinto two groups. Treatment was assigned randomly to thegroups. Experimental group was taught through constructiveapproach and control group was taught through traditionalapproach. Treatment time was 8-weeks. Selected topics ofscience were taught to both groups. An achievement test wasconstructed and validity and reliability of the test was ensuredthrough expert opinion and pilot testing. Conquest 4 was usedto determine psychometric properties of items based on IRT.Selected items were used in achievement test. After taking posttestindependent t-test was used to calculate the differencebetween two groups. The main findings of the researchindicated that there is a significant difference betweenachievements of two groups. Experimental group performanceis better as compare to traditional method. So, it would besuggested that as constructivism renovates the student from apassive learner to an active participant in the teaching learningprocess, teacher's role is to facilitate students in constructingknowledge rather just mechanically consuming knowledge fromthe teacher or the textbook.

Adak, Samaresh (2017) - Effectiveness of constructivist approach on academic achievement in science at secondary level. The present study investigated the effectiveness of constructivist approach on academic achievement in science at secondary level using pre-test, post-test, experimental and control group design, with 58 samples grouped as experimental group (29) and control group (29) on the basis of matching by intelligence test. The investigators conducted this experiment over three weeks by using both traditional and constructivist 7E-model. The self-developed achievement test covering Class IX Textbook of West Bengal Board of Secondary Education, India was used as tool. The study found that the students exposed to the constructivist 7E-model significantly achieved better than traditional method. In addition, students exposed to the 7E-model performed significantly higher than those exposed to the traditional teaching method in respect of their gained scores at every intelligence levels. The constructivist approach strategy is capable of improving student's mastery of content at the higher order levels of cognition. It is therefore recommended that constructivist 7E-model strategy be used in science teaching for the development of student's higher achievement in science at secondary level.

Sandhu, Baljinder Kaur (2017) - Effect of Constructivist Approach on Academic Achievement ofElementary School Students in Hindi. The present study was attempted to find out the effect of constructivist approach on academic achievement of elementary school students in Hindi. Experimental design consisting of onecontrol and one experimental group was followed. Pre-test of academic achievement in Hindiwas given to seventh class students. 60 students of VII class were selected via purposivesampling. 30 students was treated as experimental group and give treatment according to thelesson plans prepared by using constructivist approach and 30 students was treated as controlgroup using traditional method of teaching. Elementary school students

taught by constructivist teaching approach exhibit significant higher level of academic achievement in Hindi as compared to those taught by traditional method of teaching.

NEED FOR THE STUDY

Throughout the world, science is one of the compulsory subjects in schools. Majority of students in schools ignored learning science due to lack of interest and motivation that leads to low academic achievement in science. Majority of teachers generally follow the traditional methods of instruction in schools. The conventional teaching method of teachers as sole information giver to passive students appears outdated.At elementary level, scientific concepts to be taught should comprise everyday experiences. Apart from simple experiments and hands on experiences, an important pedagogic practice at this stage is to engage the students (in groups) in meaningful investigations; particularly of the problems they perceive to be significant and important.Science inculcates the value of creativity and logical thinking. Due to limitations of traditional teaching, nowadays some skills such as updating, practicing, criticizing and analyzing of knowledge gain importance. Constructivist theory thus plays an import role in the field of education.NCF-2005 has emphasized following constructivist approach in classroom so that students can construct their own knowledge and understand the concept at grass-root level. Ultimately their achievement will be enhancing. That's why the researcher decided to find out the effect constructive approach on achievement in science subject.

STATEMENT OF THE STUDY

Effect of Constructivist Approach on Achievement in Scienceat Elementary Level

OBJECTIVE OF THE STUDY

1. To study the effect of constructivist approach on achievement in scienceof students of control group and experimental group.
2. To study the effect of constructivist approach on achievement in scienceof boys of control group and experimental group.
3. To study the effect of constructivist approach on achievement in scienceof girls of control group and experimental group.

HYPOTHESIS OF THE STUDY

1 There exists no significant difference in the effect of constructivist approach on achievement in scienceof students of control group and experimental group.
2 There exists no significant difference in the effect of constructivist approach on achievement in scienceof boys of control group and experimental group.
3 There exists no significant difference in the effect of constructivist approach on achievement in scienceof girls of control group and experimental group.

RESEARCH METHOD

In the present study experimental method has been used. In this method two groups were selected as- experimental group and control group. The experimental group was taught through constructive approach and control group was taught same topics with traditional method of teaching. For these 20 lesson plans has been developed by Investigator from selected topics of science, in which 10 lesson plans based on constructivist approach (7E model) and other 10 lesson plans based on traditional method.

SAMPLE OF THE STUDY

In the present study 60 students of elementary level has been selected through purposive sampling method as sample of the study.

TOOLS USED FOR THE STUDY

In the present study the self-developed achievement test has been used to find academic achievement of students in science subject.

STATISTICAL TECHNIQUES

In the present study mean, SD and t-test has been used for data analysis.

DATA ANALYSIS AND INTERPRETATION

$H_0$1 - There exists no significant difference in the effect of constructivist approach on achievement in science of students of control group and experimental group.

Table 1: Effect of constructivist approach on achievement in science of students of control group and experimental group

Group	N	M	SD	t-value	Result
Students of Control Group	30	7.58	1.24	3.19	Rejected
Students of Experimental Group	30	9.34	2.76		

Interpretation

It is clear from the above table, the mean score of academic achievement of students of control group is 7.58 and standard deviation is 1.24. On the other hand the mean score of academic achievement of students of experimental group is 9.34 and standard deviation is 2.76. After calculating the t-test with the help of the mean and standard deviation, the t-value is found to be 3.19, which is higher than the table value of 2.02 at the 0.05 significance level on 58 degrees of freedom. Therefore, the null hypothesis “There exists no significant difference in the effect of constructivist approach on achievement in scienceof students of control group and experimental group.” is rejected.

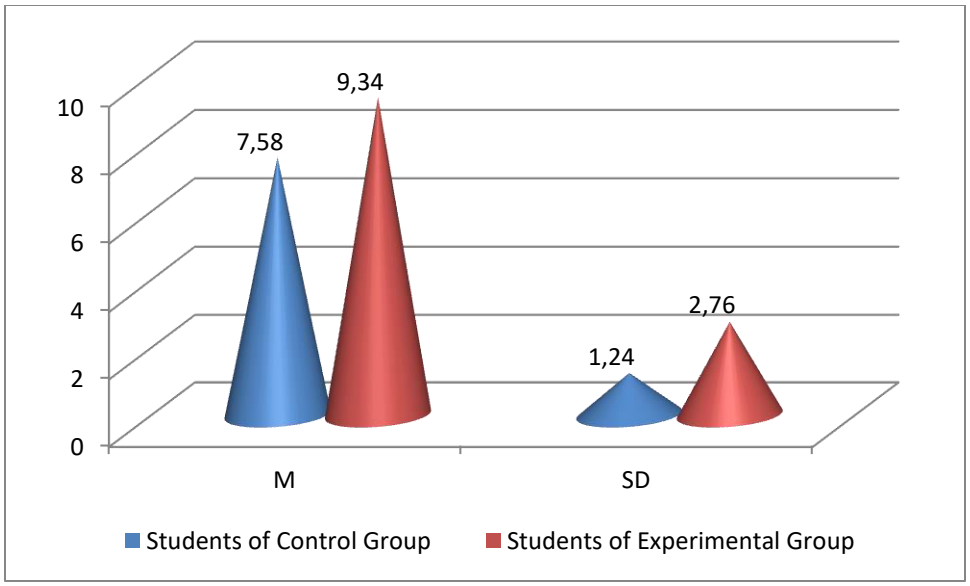

Figure 1: Mean & SD of achievement in science of students of control group and experimental group

$H_0$2 - There exists no significant difference in the effect of constructivist approach on achievement in science of boys of control group and experimental group.

Table 2: Effect of constructivist approach on achievement in science of boys of control group and experimental group

Group	N	M	SD	t-value	Result
Boys of Control Group	15	6.17	1.53	3.48	Rejected
Boys of Experimental Group	15	9.09	2.87		

Interpretation

It is clear from the above table, the mean score of academic achievement of boys of control group is 6.17 and standard deviation is 1.53. On the other hand, the mean score of academic achievement of boys of experimental group is 9.09 and standard deviation is 2.87. After calculating the t-test with the help of the mean and standard deviation, the t-value is found to be 3.48, which is higher than the table value of 2.04 at the 0.05 significance level on 28 degrees of freedom. Therefore, the null hypothesis "There exists no significant difference in the effect of constructivist approach on achievement in science of boys of control group and experimental group." is rejected.

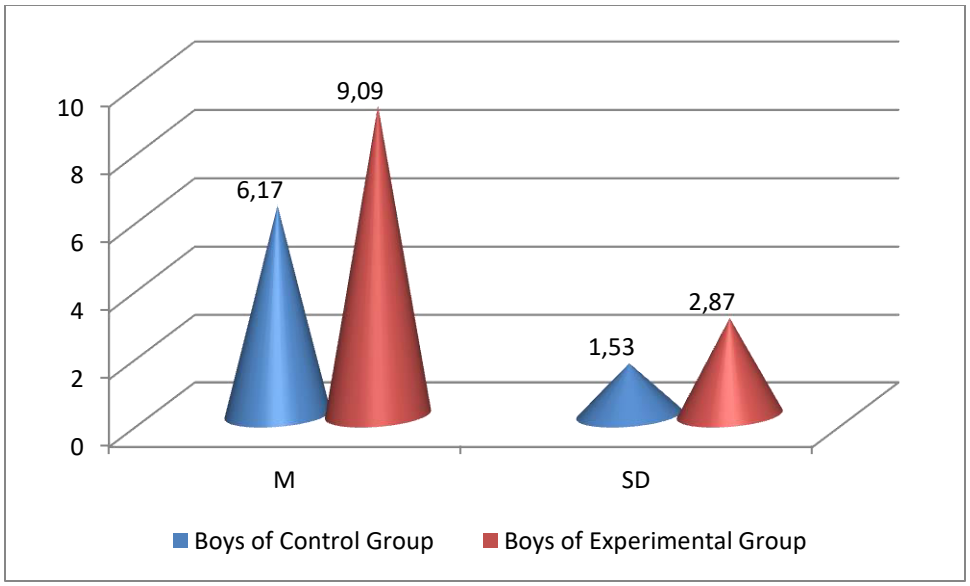

Figure 2: Mean & SD of achievement in science of boys of control group and experimental group

$H_0$3 - There exists no significant difference in the effect of constructivist approach on achievement in science of girls of control group and experimental group.

Table 3: Effect of constructivist approach on achievement in science of girls of control group and experimental group

Group	N	M	SD	t-value	Result
Girls of Control Group	15	7.88	1.13	2.96	Rejected
Girls of Experimental Group	15	10.11	2.69		

Interpretation

It is clear from the above table, the mean score of academic achievement of girls of control group is 7.88 and standard deviation is 1.13. On the other hand, the mean score of academic achievement of girls of experimental group is 10.11 and standard deviation is 2.69. After calculating the t-test with the help of the mean and standard deviation, the t-value is found to be 2.96, which is higher than the table value of 2.04 at the 0.05 significance level on 28 degrees of freedom. Therefore, the null hypothesis "There exists no significant difference in the effect of constructivist approach on achievement in scienceof girls of control group and experimental group." is rejected.

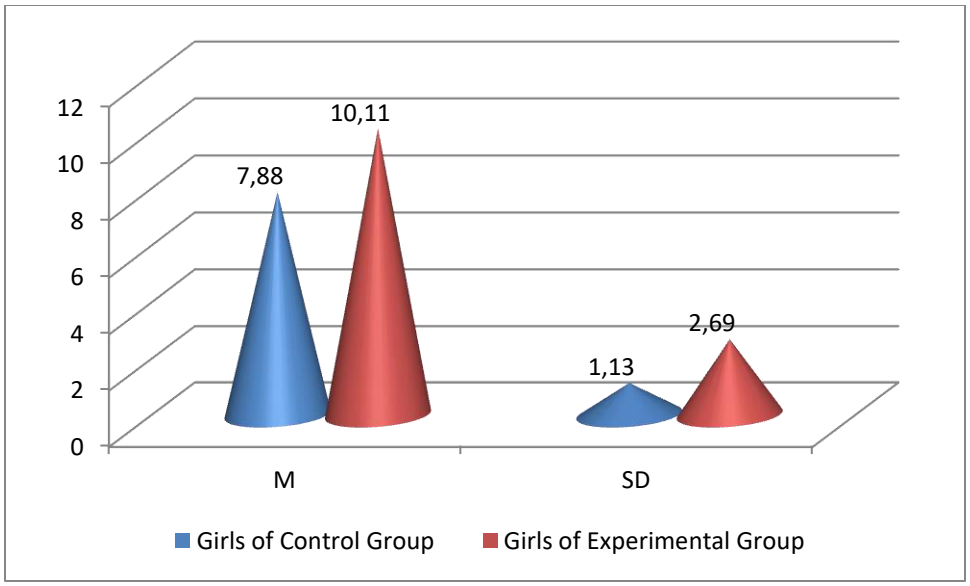

Figure 3: Mean & SD of achievement in science of girls of control group and experimental group

RESEARCH FINDINGS

1 There exists significant difference in the effect of constructivist approach on achievement in science of students of control group and experimental group.
2 There exists significant difference in the effect of constructivist approach on achievement in science of boys of control group and experimental group.
3 There exists significant difference in the effect of constructivist approach on achievement in science of girls of control group and experimental group.

EDUCATIONAL IMPLICATIONS

During the last year's constructivism as an approach in education has had a central position in didactical literature. Constructivist theory is definitely accepted as a modern and leading theory in the teaching of science. Constructivism has become the most valuable guiding principle for the teachers of science, as well as for researchers in this field. Constructivist teaching fosters critical thinking and creates active and motivated learners. The constructivist theory has been incorporated into the curriculum, and advocates that teachers create environments in which children can construct their own understandings.

The most outstanding characteristics of any research is that it must contribute something new to the development of the area concerned. The researcher may find out the following educational implications of the present study:

- 7E model of learning helps the learners to construct their knowledge positively.
- It gives enough scope for active participation and interaction in classroom with peers and teachers.
- Through interaction, low achievers can get better opportunity to acquire knowledge.
- Teacher can provide better opportunities to the learners to learn.
- 7E's model provides joyful learning environment between teacher and students.
- It is a better way to introduce hands on experience in learning.

REFERENCES

1. Adak, Samaresh (2017). Effectiveness of constructivist approach on academicachievement in science at secondary level. Educational Research and Reviews, 12(22), 1074-1079.
2. Gupta, Ajay Kumar (2023). Effect of Constructivist Approach on Students' Achievement inScience at Secondary Level. Educational Quest: An Int. J. of Education and Applied Social Sciences, 14(1), 67-71.
3. Jha, A. (2009). Constructivist epistemology and pedagogy Insight into teaching learning andknowing. New Delhi: Atlantic Publishers.
4. NCERT (2005). National curriculum framework. New Delhi: N.C.E.R.T.
5. Noureen, Ghazala (2020). Effect of Constructivist Teaching Approach on Student'sAchievement in Science at Elementary Level. Pakistan Social Sciences Review, 4(3), 904-911.
6. Sandhu, Baljinder Kaur (2017). Effect of Constructivist Approach on Academic Achievement ofElementary School Students in Hindi. International Journal of Education, 7, 1-5.
7. Sharma, S. K., Tomar, M. (2007). Learning and Teaching: Learning Process. New Delhi: IshaBooks.