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IMPACT OF CONSTRUCTIVIST-BASED TEACHING ON THE ACADEMIC ACHIEVEMENT AND ATTITUDE OF VIII CLASS STUDENTS BELONGING TO LOW LEVEL OF INTELLIGENCE IN SCIENCE

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ABSTRACT

Using a pre-test, post-test, experimental, and control group design, the current study examined the effects of constructivist-based instruction on the academic achievement and attitudes of VIII class students with low levels of intelligence in science. A sample of fifty eighth-grade pupils was chosen by cluster sampling. Of these, 25 students were assigned to the experimental group, where they received instruction using constructivist lesson plans, and 25 students were assigned to the control group, where they received instruction using conventional teaching techniques. The treatment was administered by the investigators over a period of three weeks, utilizing both constructivist and traditional methods of instruction. Data were gathered using a self-created academic accomplishment test and Dr. J.S. Bhardwaj's Science Attitude Scale. The study's conclusions showed that pupils who received instruction using the constructivism method outperformed their traditional science teachers in terms of academic achievement. In a similar vein, children who received instruction based on constructivism revealed a more positive attitude toward science than students who received instruction based on a traditional method.

Key words: *Constructivist-based teaching, Low level of intelligence, Academic achievement, Attitude towards Science.*

I. INTRODUCTION

The introduction of constructivism, a relatively new cognitive paradigm, in the 20th century had a big impact on the field of education. The transition from behaviorism to cognitive to constructivism represents a revolution in conventional education as well as a step forward in psychology education and philosophy. The idea of traditional teaching changed significantly as a result of its profound and original realization of human learning, which had a significant impact on teaching practice.

Because constructivist education involves investigations, discoveries, and critical thinking about the nature of science concepts, it facilitates in the development of deep understanding of science in the students. During instruction, this method acknowledges and builds upon the learner's personal constructs or meanings, which are formed from direct experiences and informal interactions with the physical world. However, there are fewer student-initiated queries and interactions in traditional teaching methods. The primary source of information is teacher-dominated lectures, which students are required to memorize. This results in low motivation, a lack of understanding of the material, and a failure to develop the students' creative potential.

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Real meaning emerges in constructivism because students are encouraged to critically evaluate newly supplied information and deliberately incorporate it into their preexisting knowledge, taking into account their prior understanding or opinions about the subject. Additionally, a number of benefits of this strategy were noted. Pupils showed increased dedication to learning, increased trust, and increased drive for success. Students are more engaged in their education, have less fear of failing, and receive more assistance and resource sharing. Given this, it suggests that teachers incorporate a constructivist-based approach into their science lesson plans. The goal of constructivist teaching methods in scientific classrooms is to provide students with training that is significantly more challenging and, as a result, results in more meaningful learning. One meta-learning technique called constructivist pedagogy can help students become more capable of learning science on their own. Additionally, the teacher's participatory scenarios might inspire pupils to discuss pertinent concepts and ideas. Because constructivist learning involves students in the process of acquiring knowledge and building new knowledge based on prior experiences, it aids in the development of cognitive skills.

II. NEED OF THE STUDY

One of the required subjects in schools is science. In Indian classrooms, teaching science is not just about sparking students' curiosity; instead, teachers use traditional methods to impart knowledge. Because of this, the majority of students do not participate in the learning process, which causes them to become cognitively disengaged from their studies and results in low academic accomplishment in science. Learner-centered, active learning is the main theme of the 2005 National Curriculum Framework. According to this policy paper, the constructivist theory of curriculum should take the lead in allowing students to develop their own ideas and ways of thinking via comprehension, experience, and reflection. NCERT is working to provide creative ways to incorporate the constructivist method into everyday classroom activities.

Comparing constructivist learning to traditional methods used in teaching and learning, Chowdhury (2016) discovered that the former greatly improves student achievement in science. For both boys and girls, the constructivist learning approach has been successful in raising their academic achievement in science. Additionally, compared to other talents, kids who learnt via the constructivist technique had a higher degree of knowledge and application skills. The constructivist method prioritizes students over professors. The traditional classroom is giving way to a smart classroom, where students actively create their own knowledge via experience and reflection. In order to help students construct their learning world, teachers should establish a conducive learning environment. Given the importance of the constructivism approach to learning that has been discussed, it is reasonable to wonder if this method influences students' performance and attitudes toward science. This is the basis for the current investigation.

III. REVIEW OF RELATED LITERATURE

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Oguz (2008) observed that while there was no significant difference in the attitudes of the experimental and control groups, there was a significant difference in their achievement levels. Thus, it can be said that constructivist learning activities helped the students grow in achievement and in their perceptions of the world. **According to research by Mohapatra and Kumari (2014),** students who were taught using a constructivist approach performed better on the post-test when it came to the concepts of absorption and digestion than students who were taught using conventional (traditional) approaches. Under the heading "Effectiveness of Constructivist Teaching Method on Student's Mathematical Academic Achievement," **Aydisheh and Gharibi** conducted research in **2015.** The findings showed that knowledge, comprehension, application, analysis, combination, and evaluation are all impacted by constructivist teaching. **According to Sandhu (2017),** academic accomplishment in biology is substantially higher when constructivist teaching is used, and there is also a significant connection between teaching techniques and intelligence. The findings showed that constructivism is essential for raising academic achievement and for helping students understand biological topics. **Adak (2017)** investigated the impact of a constructivist approach on secondary school students' academic performance in science. The findings demonstrated that students who received instruction using the constructivist 7E-model performed better than those who received instruction using more conventional techniques. **According to Kauts and Sikand (2019**), students' achievement gain scores in social science demonstrate that constructivist instruction is superior than standard classroom instruction. Additionally, it was discovered that the group with higher intellect scored higher on achievement gains than the group with lower intelligence. It was also discovered that, in comparison to students taught using the traditional method, kids in the high intelligence group who were taught using the constructivist approach achieved better academic accomplishment scores at several levels of the cognitive domain.

IV. OBJECTIVES OF THE STUDY

1. To develop suitable lesson plans and supplementary learning materials for VIII class Science students on constructivist-based teaching.
2. To find out significant differences in the academic achievement of experimental and control group of VIII class students belonging to low level of intelligence in science before experimental treatment.
3. To find out significant differences in the attitude of experimental and control group of VIII class students belonging to low level of intelligence in science before experimental treatment.
4. To find out significant difference in the academic achievement of experimental and control group of VIII class students belonging to low level of intelligence in science after experimental treatment.
5. To find out significant difference in the attitude of experimental and control group of VIII class students belonging to low level of intelligence in science after experimental treatment.

V. HYPOTHESES OF THE STUDY

1. There is no significant difference in the academic achievement of experimental and control group of VIII class students belonging to low level of intelligence in science before experimental treatment (Pre-test).
2. There is no significant difference in the attitude of experimental and control group of VIII class students belonging to low level of intelligence in science before experimental treatment (Pre-test).
3. There is a significant difference in the academic achievement of experimental and control group of VIII class students belonging to low level of intelligence in science after experimental treatment (Post-test).
4. There is a significant difference in the attitude of experimental and control group of VIII class students belonging to low level of intelligence in science after experimental treatment (Post-test).

VI. RESEARCH METHODOLOGY

The design of the present study was Quasi-Experimental (Pre-test, Post-test, Control group design).

Population and Sample

The population of the current study consisted of all Jammu district JKBOSE VIII standard students. Students in the VIII class were chosen using the cluster sampling technique. For the study, 50 students were chosen from each of the two divisions. Section "B" served as the control group and Section "A" as the experimental group (25).

Tools Used: In the present study, the researcher was used two types of tool:

Instructional tool: It took the shape of lesson plans built around the constructivist teaching methodology's five enemas. In addition, additional teaching tools such as models, real items, chart papers, and images were also utilized.

Measuring tool: Measuring tools were in the form of:

- Academic achievement test were developed by the researcher.
- The G. C. Ahuja group test of intellect was used to measure each student's level of intelligence. The intelligence test has been restandardized by the investigator.
- Attitude towards Science Scale was used for measuring the attitude of students developed by Dr. J.S. Bhardwaj.

Data Analysis: In the present study, researchers used Mean, SD, SEM and ‘t’ test as statistical techniques for analysing the data.

VII. RESULTS

Table 1: Showing Student’s Academic Achievement and Attitude towards Science of Experimental and Control groups (belongs to low level of intelligence) on Pre-test

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Parameters	Group	N	Mean	SD	t-value	Level of Significance
Academic achievement (Low intelligence)	Experimental	25	6.72	1.1262	0.63	Insignificant
	Control	25	6.92			
Attitude (Low intelligence)	Experimental	25	299.28	26.2905	0.72	Insignificant
	Control	25	304.60			

Table 1 reflects the mean scores of the experimental group (M= 6.72) and control group (M= 6.92) on academic achievement and the t-value (0.63). The findings revealed the insignificant difference between both two groups. Similarly, the mean scores of the experimental group (M= 299.28) and control group (M= 304.60) were found on academic achievement. The t-value (0.72) showed insignificant difference between experimental and controlled groups . Results revealed that academic achievement of students in science were equal in both experimental and controlled groups respectively. Similarly, the students belonging to both groups reflected the same attitude towards science.

Table 2: Showing Students' Academic Achievement and Attitude towards Science of Experimental and Control groups (belongs to low level of intelligence) on Post-test

Parameters	Group	N	Mean	SD	t-value	Level of Significance
Academic achievement (Low intelligence)	Experimental	25	15.36	1.3479	17.52	Significant
	Control	25	8.68			
Attitude (Low intelligence)	Experimental	25	392	28.3758	11.12	Significant
	Control	25	302.72			

Table 2 reflects the mean scores of the experimental group M= 15.36 and control group M= 8.68 on academic achievement and the t-value found 17.52 which exhibited the significant difference between two groups. Similarly, the mean scores of experimental group and control group were found 392, 302.72 respectively and the t-value 11.12 showed significant difference between two groups. On the basis of findings, it can be calculated that the constructivist approach influenced positively in enhancing academic achievement as well as developing a positive attitude towards Science.

VIII. DISCUSSION

The main conclusions show that, when compared to the control group of students who were taught traditional methods and belonged to the low intelligence level, the experimental group's overall academic achievements significantly improved. The experimental group is made up of students who were taught constructivist-based teaching methods. It can be argued that at the secondary level, constructivist-based science education is superior and more effective than conventional science instruction. Since constructivist education is known to foster higher order critical thinking and problem solving abilities, educators, legislators, and other stakeholders have an obligation to help students develop 21st century skills by putting cutting-edge pedagogies into practice.

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