



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

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Employing pre-test & post-test, experimental, and control group design, the current study examined the impact of constructivist-based teaching on the academic achievement and attitudes of VIII class students with a high level of intelligence in science. Using random sampling technique, 50 pupils from the VIII class were chosen. Among them, 25 students were assigned to an experimental group and instructed using constructivist lesson plans, while the remaining 25 students were assigned to a control group and instructed using conventional methods. Using a combination of constructivist and traditional teaching methods, the researchers administered this treatment over a period of four weeks. A self-made assessment of academic achievement and the Science Attitude Scale developed by Dr. J.S. Bhardwaj & Vandana Kaushik were used to collect the data. The results of the study demonstrated that pupils who were taught utilizing the constructivism method did better academically than their traditional science faculty members. Likewise, pupils who were taught using constructivism exhibited a more favourable disposition toward science than those who were taught using a traditional approach.

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

INTRODUCTION

Constructivism, a relatively new cognitive paradigm, was introduced in the 20th century, and it had a significant influence on education. The shift from behaviourism to cognitive to constructivism signifies both a philosophical and educational revolution in psychology as well as a breakthrough in traditional education. Its profound and original revelation of human learning had a huge impact on teaching practice and altered the paradigm of traditional instruction.

Because constructivist-based learning encourages investigation, discovery, and thoughtful consideration of the nature of scientific ideas, it aids in students' development of a thorough understanding of science. This method acknowledges and draws on the learner's personal constructs or meanings, which are formed by direct experiences and unofficial interactions with the real world, to inform the development of concepts during instruction. However, fewer questions and exchanges are raised by students during traditional instruction. The primary source of information for students is teacher-dominated lectures, which they are required to memorize. This causes pupils to have low motivation, understand the material poorly, and fail to develop their

creative faculties. Constructivism encourages students to assess newly supplied information and deliberately integrate it with their prior knowledge, taking into account their prior understanding or opinions about the subject. This allows for the creation of true meaning. This method was also found to have a number of benefits. Students demonstrated higher levels of dedication to learning, trust, and achievement motivation. Less fear of failing, greater resource sharing and tutoring, and increased student participation in the classroom are all present. It is advised that teachers incorporate a constructivist-based approach into their science teaching methodology in light of this. The goal of using constructivist teaching methods in science classrooms is to provide students significantly more difficult education, which will enhance their learning experience and make it more relevant. One meta-learning technique that helps build students' potential for autonomous science learning is constructivist pedagogy. Additionally, the teacher's participatory scenarios might encourage discussion among the pupils regarding pertinent themes. Because students participate in the process of learning and add new information based on prior experiences, constructivist education aids in the development of cognitive skills.

NEED OF THE STUDY

One of the subjects that are required in schools is science. Teaching science in Indian classrooms does not focus on piquing students' curiosity; instead, teachers use traditional methods to impart knowledge. Due to the majority of students' lack of participation in the learning process, scientific academic progress is low because they get cognitively disengaged from their studies. Learner-centered, active learning is emphasized in the National Curriculum Framework (2005). According to this policy declaration, curricula should be centered on constructivism, which allows students to develop their own ideas and ways of thinking via comprehension, experience, and introspection. In order to include the constructivist approach into normal classroom practice, NCERT is working to develop creative methods.

Chowdhury (2016) discovered that, as compared to traditional methods used in teaching and learning, constructivist learning greatly improves mathematical achievement. Both boys and girls have seen an increase in their academic achievement in science when using the constructivist learning approach. In addition, pupils who learnt using the constructivist method demonstrated a greater degree of comprehension and application skills when compared to other talents. The constructivist method places greater emphasis on pupils than on instructors. The modern classroom is changing from a traditional one to a smart one where students actively create their own knowledge through observation and experience. Thus, the instructor should set up a space for learning that allows students to design their own learning universe. Given the significance of the constructivism method to learning that has been discussed, the present study is justified by the question of whether the constructivist approach influences students' achievement and attitudes in science.

REVIEW OF RELATED LITERATURE

The experimental and control groups' achievement levels differed significantly, according to **Oguz (2008)**, although their attitudes did not differ much. It can be inferred, then, that constructivist

based activities helped the pupils become more successful and form favorable opinions. In contrast to students exposed to conventional (traditional) teaching techniques, **Mohapatra and Kumari's (2014)** research found that students taught using a constructivist based teaching approach scored higher on the post-test for the concepts of digestion and absorption. "Effectiveness of Constructivist Teaching Method on Student's Mathematical Academic Achievement" was the title of **Aydisheh and Gharibi's (2015)** study findings shows that constructivist instruction has an impact on students' knowledge, comprehension, application, analysis, combination, and evaluation. In addition to demonstrating a much greater degree of academic accomplishment, **Andri, P. L., & Baedhowi (2017)** The study's findings demonstrated that a constructivist-based economic module had been effectively created using current instructional materials, utilizing active learning in conjunction with constructivist learning syntax to enhance students' learning outcomes. Furthermore, the significant result demonstrated the efficacy of the constructivist-based module in enhancing student's learning outcomes. It is clear that the constructivist-based economic module that was created has been shown to be successful in raising student learning outcomes at Kupang City's private senior high schools, **UGWU, N. P., & EZE, A. U. (2019)** The analyses' findings showed that students' interest in social studies was not significantly influenced by their gender or the impact of their therapy. In the Social Studies Interest Inventory, students who were taught using constructivist-based learning methodologies outperformed their peers who were taught using a lecture style. The results above suggest that the constructivist approach is a useful tactic for piqueing students' interest in social studies. and **Heny, S. A., Rahman, A., & Djam'an, N. (2022)** The findings demonstrated the effectiveness of both conventional and constructivist learning strategies used by teachers in the classroom, and that learning based on a constructivist strategy is superior than conventional learning. The average normalized gain score, as determined by a constructivist method, is greater than raising students' motivation and achievement levels in junior high school mathematics classes.

OBJECTIVES OF THE STUDY

1. To find out significant difference in the academic achievement of control and experimental group students (VIII class) having high level of intelligence in science before experimental treatment.
2. To find out significant difference in the attitude of control and experimental group students (VIII class) having high level of intelligence in science before experimental treatment.
3. To find out significant difference in the academic achievement of control and experimental group students (VIII class) having high level of intelligence in science after experimental treatment.
4. To find out significant difference in the attitude of control and experimental group students (VIII class) having high level of intelligence in science after experimental treatment.
5. To analyse the impact of constructivist based teaching method on the academic achievement of VIII class students belonging to high level of intelligence in science before and after treatment.

6. To analyse the impact of constructivist based teaching method on the attitude of VIII class students belonging to high level of intelligence in science before and after treatment.

HYPOTHESES OF THE STUDY

1. There is no significant difference in the academic achievement of control and experimental group students (VIII class) having high level of intelligence in science before experimental treatment (Pre-test).
2. There is no significant difference in the attitude of control and experimental group students (VIII class) having high level of intelligence in science before experimental treatment (Pre-test).
3. There is no significant difference in the academic achievement of control and experimental group students (VIII class) having high level of intelligence in science after experimental treatment (Post-test).
4. There is no significant difference in the attitude of control and experimental group students (VIII class) having high level of intelligence in science after experimental treatment (Post-test).
5. There is no significant difference in the mean scores of pre-test and post-test on academic achievement of students having high level of intelligence in science taught by constructivist based teaching method (Pre-test & Post-test).
6. There is no significant difference in the mean scores of pre-test and post-test on attitude of students having high level of intelligence towards science taught by constructivist based teaching method (Pre-test & Post-test).

RESEARCH DESIGN

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

POPULATION AND SAMPLE

The entire student population of the Jammu district's JKBOSE VIII level comprised the present study. The one school was selected purposively from the Gandhi Nagar, educational zone, Jammu. The students were chosen through the simple random sampling method. For the selection of students for experimentation, the investigator required two groups. The total sample of the study was 50 from class VIII, out of which 25 students were selected in experimental group and 25 students in control group in a random manner.

TOOLS EMPLOYED

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 enumeration principles. In addition, additional teaching tools such as models, real objects, chart papers, and images were also employed.

Measuring tool: Measuring tools were in the form of:

- Academic achievement test were developed by the researcher.
- Group test of intelligence was used for measuring the intelligence level of students developed by G. C. Ahuja. The investigators have re-standardized the intelligence test.
- Attitude towards Science Scale was used for measuring the attitude of students developed by Dr. J.S. Bhardwaj.

STATISTICAL TECHNIQUES EMPLOYED

In this study, researchers used Mean, SD, SEM & ‘t’ test as statistical techniques for analysing the data.

RESULTS

Table 1

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

Parameters	Group	N	Mean	SD	t-value	Level of Significance
Academic achievement (High intelligence)	Control	25	36.80	2.08	0.42	Insignificant (at both levels i.e. 0.05 & 0.01)
	Experimental	25	37.04	1.93		
Attitude (High intelligence)	Control	25	347	16.80	0.36	Insignificant (at both levels i.e. 0.05 & 0.01)
	Experimental	25	348.76	18.04		

Table 1 reflects the mean scores of the control group $M= 36.80$ and experimental group $M= 37.04$ on academic achievement $df=48$ and the t-value 0.42. The findings revealed the insignificant difference between both two groups.

Similarly, Table 1 also reflects the mean scores of the control group $M= 347$ and experimental group $M= 348.76$ were found respectively on attitude toward science. The t-value 0.36 showed insignificant difference between experimental and control groups.

Results revealed that academic achievement of students in science were equal in both experimental and control groups respectively. Similarly, the students belonging to both groups reflected the same attitude towards science before the treatment.

Table 2

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

Parameters	Group	N	Mean	SD	t-value	Level of Significance
Academic achievement (High intelligence)	Control	25	36.48	2.33	15.18	Significant (at both levels i.e. 0.05 & 0.01)
	Experimental	25	45.80	2.00		
Attitude (High intelligence)	Control	25	364.54	15.46	11.31	Significant (at both levels i.e. 0.05 & 0.01)
	Experimental	25	410.08	12.90		

Table 2 reflects the mean scores of the control group $M= 36.48$ and experimental group $M= 45.80$ on academic achievement and the t-value found 15.18 which exhibited the significant difference between two groups.

Similarly, Table 2 also reflect the mean scores of control and experimental groups were found 364.54 and 410.08 respectively and the t-value 11.31 showed significant difference between two groups on attitude toward science. On the basis of findings, it can be calculated that the constructivist approach influenced positively in enhancing academic performance as well as developing a positive attitude towards Science.

Findings of the study conducted by **Gladys, U. J. (2017)** support the findings of this study and state that the pupils who were taught by a constructivist approach significantly outperformed those who were taught using a lecture method on the chemistry post-test, indicating that the constructivist learning cycle had a significant impact on students' achievement in the subject. Conclusion: Since constructivism improves student accomplishment and attitude, it appears to be a suitable instructional model that might be utilized to address issues with scientific teaching and learning.

Table 3

Showing the mean difference on Academic Achievement and Attitude of Experimental group students belonging to high level of intelligence, before (Pre-test) and after (Post-test) teaching through Constructivist based teaching method

Parameters	Group	N	Mean	SD	t-value	Level of Significance
Academic achievement (High intelligence)	Pre-test	25	37.04	1.93	16.24	Significant (at both levels i.e. 0.05 & 0.01)
	Post-test	25	45.80	2.00		
Attitude (High intelligence)	Pre-test	25	348.76	18.04	19.31	Significant (at both levels i.e. 0.05 & 0.01)
	Post-test	25	410.08	12.90		

Table 3 reflects the mean scores of experimental group on academic achievement, before (Pre-test) and after (Post-test) treatment were found 37.04 and 45.80 respectively, $df=24$ and the t-value 16.24. It was showed that the significant difference between the achievements of experimental group students before and after teaching through constructivist based teaching method.

Similarly, Table 3 also reflect the mean scores of experimental group on attitude, before (Pre-test) and after (Post-test) treatment were found 348.76 and 410.08 respectively, $df=24$ and the t-value 19.31. It was showed that the significant difference between the attitude of experimental group students before and after teaching through constructivist based teaching method.

On the basis of findings, it can be concluded that the constructivist based teaching method influenced and effect positively in enhancing academic achievement as well as developing a positive attitude towards Science.

The results of a study by Kauts, A., & Sikand, D. (2019) corroborate the results of this study and show that, in terms of students' achievement gain scores in social science, constructivist teaching is more impactful than traditional classroom instruction. Additionally, it was discovered that groups with higher intellect scored higher on accomplishment gains than groups with lower intelligence. Additionally, research indicates that kids taught using a constructivist approach, as

opposed to a traditional approach, obtain higher academic performance scores at different levels of cognitive domain. These students belong to the high intelligence category.

DISCUSSION

The study's main conclusions show that, as compared to the control group of students who received instruction using conventional methods, the experimental group's overall academic achievements increased significantly when they were taught constructivist-based teaching method. 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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