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CONSTRUCTIVISM AND VARIOUS CONSTRUCTIVIST STRATEGIES TO TEACHING MATHEMATICS

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ABSTRACT
NEP 2020 emphasizes constructivism. If you want to study and teach, first you should know the concept, principles and assumptions of Constructivism. Knowledge of how to use Constructivism is essential. A teacher must also know how Constructivism is used in various subjects. A number of epistemological approaches can be used in the study and teaching of mathematics and they can be classified into three categories. 1) Student-centered 2) Teacher-centered 3) Student-teacher cooperative teaching methods Teaching techniques and teaching paradigms are used to formulate the curriculum. It is implemented considering the prior knowledge of the student. That is, mathematics is a subject of understanding and living. Student's study will not be meaningful without changing the role of teacher to teach and student to study only.

INTRODUCTION

In order to understand the difference between Constructivism and traditional education, we need to consider the background of the Constructivism debate. It has to be understood. Individuals do not simply accept the information they receive, but use prior knowledge to combine the given situation with experience to create new knowledge. In Constructivism, the learner is considered at the center. In the current prevailing system, teachers have an important position and students are given a secondary position. But the National Curriculum Framework 2005 has given central position to the student. Some guidelines have been given for this. It is as follows.

1. Being able to structure knowledge is study.
2. All students construct knowledge in their own way.
3. Interpreting them according to different experiences is study.
4. Students construct knowledge based on prior experience.
5. Students construct knowledge through different interactions that require different experiences.

Constructivism has been given a central position in the National Curriculum Framework 2005. So it is necessary to know it in detail. Constructivism is the creation of knowledge. The process required for this has gained importance. When students create new knowledge by combining prior knowledge and acquired knowledge, it is called epistemic constructivism.

ASSUMPTIONS OF CONSTRUCTIVISM

Some of the assumptions made in Constructivism are as follows

1. Knowledge is structured by experience.
2. Different concepts are formed through the process of giving meaning to experiences.
3. Students exchange ideas and perspectives. Therefore, different experiences acquire different meanings.
4. The student constructs his own knowledge.
5. Teachers as facilitators create various opportunities for students to study.
6. The value of students is measured by how much they participate in the learning process.

CONSTRUCTIVISM IN EDUCATION

Constructivism should be applied in curriculum development in fact the current curriculum emphasizes only Constructivism. Therefore, the study and teaching process has changed. The role of the teacher has changed drastically and the learning process has become student-centered rather than teacher-centered. Teachers should provide opportunities for students to construct knowledge by giving them different experiences. A democratic environment must be created in the classroom. Such an environment will make students study meaningfully and they will enjoy it. The principle of Constructivism should be used in the process of study and teaching.

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When using cognitive constructivism in the classroom, there are students of different abilities in the classroom. Differences in student's intellectual ability, economic, situation, social situation should be taken into account. According to that situation, teachers should implement study and teaching process. Student's creativity, imagination and new ideas should be given importance. Students should be encouraged to think, ask questions, and try to find their answers. They should be able to fully organize the knowledge gained. Instead of stressing the risks, focus on how the understanding will progress. Teachers should take the initiative to create different types of interaction. Different ways should be used for that. All these things should be considered while preparing the school schedule.

Various methods and techniques should be used in teaching and learning. Emphasis should be placed on the use of e-sources. Experience should be given according to the different study styles of the student. Emphasis should be placed on how students will use different study styles in their studies. Similarly, teachers should teach for the creation of knowledge while teaching. Children should be valued as producers of knowledge. Like science, mathematics, language, social science, values, skills and attitudes should be thought of as epistemological studies and teaching. While carrying out these activities, attention should be paid to how innovation will come in the students' work and how they will actively participate in individual work as well as in group work. All children should receive individual attention. Students will be enriched by having various experiences. Students with special needs will also be given attention. Their development will also gain importance. Teachers should use clinical pedagogy. Practicing will allow students to look at the same situation from different perspectives. How it can be used in actual daily life will also be considered. By asking them to reflect on each item, they can draw attention to how critical reflection can occur. This will increase the decision making ability of the student. Students will be able to decide what is good and what is bad.

DIFFERENCE BETWEEN BEHAVIOURIST TEACHING-LEARNING AND CONSTRUCTIVIST TEACHING-LEARNING

Behavioural studies are teacher-centered in teaching. The teacher has control over the learning process, he decides what to teach, how to teach and how much to teach. The teacher controls all the activities in the classroom. Teachers conduct tests to check how much progress students have made. Depending on the ability of the student, the teacher can hardly focus on the student.

CONSTRUCTIVIST TEACHING-LEARNING

Students are centred at constructivist teaching-learning. The student decides what to learn, how and how much to learn. Students give importance to action in learning. Teachers guide the children where necessary. And help the students to move forward. Students use many ways to study without having to study on a regular basis. Children's curiosity and curiosity are given importance. According to the ability of the student, the teacher can easily teach according to the ability of the student. Mathematics is included as an important subject in study and teaching. That is why it is said that the greatest invention of the human mind is mathematics.

Mathematics has become an integral part of human life. We use mathematics in our daily life from the time we wake up in the morning to the time we sleep at night. Mathematics has a unique and general importance in daily life. Branches of mathematics are expanding day by day. It has to be used in other subjects too eg. A teacher who teaches science, economics, painting, geography, educational technology, mathematics must also have knowledge of these branches. A teacher must use a variety of strategies to teach mathematics effectively. Teaching methods are a set of teaching methods and teaching techniques. These policies are as follows.

Teaching Methodology- Deductive-Inductive Method, Experiential Method, Self-Exploratory, Directed, Demonstration, Synthesis Lecture.

MODELS OF TEACHING

The 5 E model is based on Constructivism and uses five steps in the teaching model - concept acquisition, organizing, face training, direct instruction, and role play. Along with teaching paradigms, various techniques are also used. 1) Jigsaw method 2) Creative writing 3) Round robin method 4) Collaborative study 5) Three step interview 6) Think pair share 7) Self-directed study 8) Scaffolding method 9) Discovery process 10) Brainstorming 11) Design 12) Discussion 13) methods in the life cycle

VARIOUS CONSTRUCTIVIST STRATEGIES TO TEACHING-LEARNING OF MATHEMATICS

The study classifies teaching methods into three groups: 1) teacher-centered 2) student-centered 3) teacher-student-centered teaching methods. . Student centric approach is based on this Constructivism. Their information is as follows.

1. Use of hardware and software: These concepts are generally used in the world of computers, hardware and methods of teaching mathematics concepts using the materials provided to learners. Hardware includes beads, sea beads, broken clocks, weighing forks, stones, old calendars; these materials can be used by children to provide hands-on learning.

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2. Activity Education: Learning new things by engaging children with what they are already experiencing is the crux of the learning process. Seeing patterns in nature and expressing them in precise words is a part of mathematics itself. There is a particular way of learning mathematics. Concepts in mathematics are built on one another. If addition does not occur, multiplication does not occur. If subtraction does not occur, division does not occur. One has to go through small steps to achieve big success. Small success leads a person to big success. Different experiences should be given. For that, different difficulty levels should be solved. First give questions of less difficulty level and then give questions of higher difficulty level. The teacher should emphasize that every student should get quality education.

3. Two-step method: In this method the study is divided into two parts. In the first stage students should understand the concept properly. Then in the second stage, based on that, you should do the math and experience the demonstrations. The whole subject of mathematics can be taught in this way. Specially designed mathematical materials can be used for quality study teaching. Materials can be created using the concept of sustainable from waste. Prepare workbooks for practice. Teachers should be trained in these two-step methods and given Mathkits and workbooks for teachers to use in all classrooms. A meeting of the teachers and experts should be held once a month and a discussion should be held to see if 10 to 15% progress is being made in each stage.

4. Collaborative Learning: Collaborative study is an important phase in study teaching. will come It can be said that In order for students to learn together and help each other, teachers should try to create an atmosphere in the classroom that is cooperative rather than competitive. In cooperative learning there is no unnecessary competition among students. There will be no burden on the student to meet the expectations of teachers and parents. Every student gets a chance to find out what he likes. Students can focus on their favorite sports as a hobby and make good use of the available time for studies. Benefits of collaborative learning demonstrated by research
1) Increases acquisition, memory, motivation, thinking skills.
2) Relationships improve, friendship with peers increases, teachers begin to like school.
3) Improves mental health, increases self-confidence, increases stress tolerance.

That is, the principle of democracy is used in cooperative learning. Study teaching process was enjoyable. That is, the need of the hour has arisen to have a study process based on Constructivism. Once the students understand the concept properly, they will be able to apply it on the basis of previous experiences and construct new knowledge so that the studied element/topic will be remembered for a long time.

5. Technology based Teaching-Learning: It is very important to understand the nuances of mathematical concepts. A student should get practice in thinking more. For that one has to practice with the help of example. Technology can be used in different ways to practice this e.g. If animation is used in explaining the concepts using power point, students should be given detailed information on how to study through different apps. SCERT has given QR code in the textbook and through Diksha app students can prepare material as much as they want and when they want. Such material is also widely available on YouTube. Ashan is available in large quantities.

6. Mathematics Hobby Group: When some people work together motivated by a specific goal, it is called a circle. Mathematics science circle is useful for cultivating common interests of students. Such circles exist in India and outside India for many years. Isaac, Newton, was the president of the scientific board. In this circle, one can study the place of song in daily life. Personality development of the board members can be achieved through this. Mathematical skills can be cultivated. Discussions can be held on various topics and ideas can be exchanged and a sense of cooperation is created among the students.

7. Mathematics Laboratory: Every school should have a mathematics laboratory. Various materials should be included while preparing this laboratory, it is necessary to create curiosity in the student to do mathematical experiments from these materials. It is necessary to increase the research attitude.

8. Action Research (for teachers): In our daily life we do many things. When things are not what we want. What shortcomings did we have in that matter at that time? We try to find out how to overcome those shortcomings. If the whole idea of improving it and repeating the same action is to be done in a scientific manner, the study of works is useful. The purpose of action research is to get to the root of the problem and solve the problem as it is an ongoing process. It continues until your problem is satisfactorily answered

CONCLUSION

There are many types of strategies that can be used in teaching and learning of mathematics. There is no doubt that both teachers and students will be enriched by the experience if they study all these principles and use them in teaching and learning through knowledge. Due to this, everyone's fear of mathematics will be reduced and everyone will like mathematics.

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