



Impact of National Policy of Education on Revamping the Pedagogical Techniques of Mathematics

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ABSTRACT

According to the 2017 National Achievement Survey, mathematics performance throughout the country gradually declined as grade levels increased. Additionally, most children lose interest in mathematics by the time they reach the secondary level (NCF, 2005). Curriculum and pedagogy play a significant role in shaping attitudes about the subject, whether they be good or negative. In mathematics classes, teachers frequently use instructional techniques that place more emphasis on procedural understanding than conceptual clarity. Many students have academic difficulties and disengagement because of the ongoing engagement barriers caused by instructional techniques. Curriculum and pedagogy reforms were suggested by NEP (2020), along with a paradigm change from content-based to experience-based learning. NEP (2020) proposed revamping curriculum and pedagogy and recommend the paradigm shift from content based to experience based learning. This article highlighted paradigm shift in pedagogy to engage the learner and make learning joyful.

Keywords: Pedagogical practices, Mathematics, NEP (2020)

1. Introduction

Education is fundamental for achieving full human potential, developing an equitable and just society, and promoting national development. Providing universal access to quality education is the key to India's continued ascent, and leadership on the global stage in terms of economic growth, social justice and equality, scientific advancement, national integration, and cultural preservation. Universal high-quality education is the best way forward for developing and maximizing our country's rich talents and resources for the good of the individual, the society, the country, and the world. India will have the highest population of young people in the world over the next decade, and our ability to provide high-quality educational opportunities to them will determine the future of our country.

Education, discipline that is concerned with methods of teaching and learning in schools or school-like environments as opposed to various non-formal and informal means of socialization (e.g., rural development projects and education through parent-child relationships). Education can be thought of as the transmission of the values and accumulated knowledge of a society.

Mathematics, the science of structure, order, and relation that has evolved from elemental practices of counting, measuring, and describing the shapes of objects. It deals with logical reasoning and quantitative calculation, and its development has involved an increasing degree of idealization and abstraction of its subject matter. Since the 17th century, mathematics has been an indispensable adjunct to the physical sciences and technology, and in more recent times it has assumed a similar role in the quantitative aspects of the life sciences.

2. Mathematics and National Policy of Education

Mathematics are extensive and diverse, by introducing the multidisciplinary curriculum and credit-based mechanism, NEP provides flexibility to students

to apply their knowledge. The branch of knowledge which deals with the study of numbers, i.e., Mathematics is one of the most distinguished disciplines which has a “continuum” of applications from “zero to infinite”. At times it “differentiates” between the “chaos” and the “stability”, sometimes it “integrates” different disciplines of knowledge. It takes us to the “limits” of truth and encompasses the different “dimensions” of expertise. It makes the “complex” things “real” and fascinates us with the notions of “games” and “probability”.

Mathematics is root of all the subjects in scholastic curriculum at every stage of school education due to its numerous applications in all walks of life. Every policy and commission recognized the importance of mathematics. The National Policy on Education (NPE,1986) stated that “Mathematics should be visualized as the vehicle to train a child to think, reason, analyze and to articulate logically”. Similarly, proposed National Education Policy (NEP, 2020) recognized importance of mathematics and mathematical thinking in upcoming research-oriented fields such as artificial intelligence, machine learning and data science.

Mathematics is considered as a science of numerous and calculations which is surrounded by totalitarianism of one right answer whereas in broader sense it is a subject of theories that produce logical approach. It is the study of abstract system built of abstract elements. Mathematics, therefore, is not only ‘number work’ or ‘computation’, but is more about forming generalizations, seeing relationships, and developing logical thinking and reasoning. Many students struggle with it and become disaffected as they continually face the obstacle in engagement (Anthony & Walshaw, 2009).

The National Focus Group on Teaching of Mathematics pointed out the problems of mathematics education and provided some recommendations in the year 2005 with reference to curriculum, pedagogy, and classroom environment. Although paradigm shift in all important aspects of teaching- learning process has been recommended in 2005, still the performance in mathematics is deteriorating (National Achievement Survey, 2017) across the nation. The National Achievement Survey (2017) was conducted throughout the country in November 2017 for third, fifth and eighth grade in government and government aided schools. The percentage of correct response in mathematics at national level was found 63% in third grade, 53 % in fifth grade and 43 % in eighth grade. A gradual deterioration in performance is reported with increasing order of grades. It is also evident that most of the students loosen their interest in mathematics up to secondary level and opted for a stream deliberately without mathematics. There exist many factors such as poor mathematical base, irregular study habits, parental non-involvement etc. behind this negative attitude of students towards mathematics (Vijyana,2014). Apart from these factors, teaching approaches, methods, strategies, and classroom environment also contribute to developing positive or negative attitude towards the subject. Generally, teachers adopt such teaching approaches, strategies and methods in mathematics classroom which focus on procedural knowledge rather than conceptual clarity.

3. Revamping the Interest and Techniques of Mathematics

NEP 2020 has taken the initiative to regain the interest of mathematics. It has taken the initiative to strengthen the literacy and numeral skills. The NEP has introduced the **NIPUN Bharat Mission** which laid stress on the understanding of mathematics among students.

Mathematics introduces essential skills and thinking strategies to be used in life. It helps in understanding of numbers, shapes, patterns, and the way data is handled in routine manner. It includes clarity in pre number concept, good mathematical vocabulary, and visualization. Main components of foundational numeracy consist of:

- Understanding of Numbers
- Counting Capability
- Development of Number Sense
- Active mathematical thinking

The structure of NIPUN Bharat mission has been prepared after in-depth consultations with experts from State and Union Territories keeping in mind the national and international studies. Under NIPUN Bharat Mission of NEP, they decided to introduce the collaborative and cooperative learning and use of strategies and techniques which are culturally accepted so that under the inclusive system every child can make the best use of his/her potential and there should be gender equality too.

To serve the objectives of holistic development of children, emphasis is laid on their good health and well-being (HW) as well as making them effective communicators (EC) and involved learners (IL), so that they are revamping of mathematics can be done.

4. Five Major Pedagogical Techniques

1. Constructivism

Constructivism asserts that it is necessary to find (or "construct") a specific example of a mathematical object to prove that an example exists. Contrastingly, in classical mathematics, one can prove the existence of a mathematical object without "finding" that object explicitly, by In might be

called non-constructive, and a constructivist might reject it. The constructive viewpoint involves a verified interpretation of the existential quantifier, which is at odds with its classical interpretation.. It considers learner as a participant and link the concept with its previous knowledge. It provides knowledge by using the mental level of the student so that a student can construct in his own terms and learn better. In this learning for mathematics, a teacher has a big role like

- To influence, to create and to motivate
- Take responsibility for creating problem situations
- Foster acquisition of prior knowledge
- Create the process of learning to the product of learning

2. Collaborative

Collaborative learning (CL) is an educational approach to teaching and learning that involves groups of learners working together to solve a problem, complete a task, or create a product. The collaborative learning approaches are:

- Online collaborative learning
- Jigsaw method
- Think-pair-share
- Integrated Approach
- Peer Tutoring

3. Integrative Learning

Integrative learning is the process of making connections among concepts and experiences so that information and skills can be applied to novel and complex issues or challenges. It is about making connections among learners and curriculum

Pedagogy of integration has four objectives

- Making sense of the learning process
- Differentiating the matter of relevance
- Applying the learning to practical situations
- Associating the learned elements

4. Inquiry Based approach

In inquiry-based learning, teachers use questions, problems and scenarios to help students learn through individual thought and investigation. Instead of simply presenting facts, the teacher encourages students to talk about a problem and draw on their intuition to understand it. Inquiry-based learning also focuses on letting students ask their own questions — essentially providing their own inquiry. Student-led questions follow teacher-guided solutions. Mathematics is all about the solution of the problems . With this method students can attain permanent learning in mathematics and can create new ways to make mathematics the easiest subject for them.

This type of learning provides connections among activities and can result in greater understanding for students.

- Process Focus
- Investigation
- Group Learning
- Discussion
- Real Life Applications

5. Conclusion

The role played by education in society is pervasive and imperative. Today, as society moves forward and progresses towards a world of acceptance and equality, it is crucial for our education systems and curricula to initiate the movement towards an inclusive world. NEP -2020 presented the progressive model of the education system. The change in pedagogical techniques of mathematics will show the realistic and innovative image of the world. It reduces the process and techniques of stereotypes methods and creates a new world which has interest in mathematics and want to explore it. India will be able to regain its love for mathematics.

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