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EDITORIAL

We feel honoured and privileged to present the Bi-Annual Peer Reviewed Refereed Journal, ISSN (Online): 2583-5203, Volume 4, No. 01, June, 2025 among our esteemed readers and academic fraternity.

This Journal is the outcome of the contributions of insightful research-oriented papers/articles by various eminent academicians, and research scholars in a highly organized and lucid manner with a clear and detailed analysis related to the emerging areas in the fields of Social Sciences and Allied Areas.

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We also express our sincere thanks and gratitude to all the contributors to research papers/ articles who have taken pain in preparing manuscripts, incorporating reviewer(s) valuable suggestions and cooperating with uxs in every possible way.

We also express our heartfelt gratitude to all the esteemed members of the Editorial Board, Esteemed Reviewer(s) who despite their busy schedules have given their valuable time, suggestions and comments to enrich the quality of the contributory resears paper(s) in bringing to light this June issue.

Last, but not least, we revere the patronage and moral support extended by our parents and family members whose constant encouragement and cooperation made it possible for us to complete on time.

We would highly appreciate and look forward to your valuable suggestions, comments and feedback at **editorbr2022@gmail.com**

June, 2025
West Bengal, India

PEMA LAMA
Editor-in-Chief

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RESEARCH ARTICLE

Implementation of Recent Trends of Mathematics in the New Education Policy 2020 - A Study

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ABSTRACT

The new education policy recognises the importance of Mathematics for holistic learning to build a competitive workforce for the 21st century and hence emphasises its integration into the curriculum. Mathematics is a fundamental academic discipline which plays a vital role in shaping the thinking and problem-solving skills of students. Furthermore, the new education policy aims to empower students to tackle real-world challenges and contribute meaningfully to society.

Mathematics is essential for enhancing cognitive development and nurturing logical reasoning among students, which is imperative for digital literacy and skill development. In this paper, we have shown the different impacts of mathematics on the new education policy.

1 INTRODUCTION

Education policies constitute the set of rules and regulations established by the Central and State Governments within their respective jurisdictions. The Ministry of Education of India has implemented the New Education Policy for making India a global hub of skilled manpower within the next 25 years, referred to as 'Amrit Kal'. The New Education Policy (NEP) started and approved with the name National Education Policy by the Union Cabinet on 29 July 2020, represents a significant milestone in the educational journey of India. Aligned with the vision of building a developed India by 2047, this New Education Policy is introduced in 2023 and supersedes a three-decade-old framework, marking a significant transformation in the education system. With a focus on digital literacy, skill development, and holistic learning, the New Education Policy is poised to modernise the education system, encompassing the necessary amendments to laws and regulations governing the academic landscape [8].

A Plethora of constructive reforms is recommended, which include: a) Holistic Development Focus: The New Education Policy is geared towards fostering comprehensive cognitive, emotional, and societal growth among students. b) New Curriculum Structure: NEP introduces a structured format of 5+3+3+4, where the Foundational Stage (5 Years), Preparatory Stage (3 years), Middle Stage (3 Years), and Secondary Stage (4 Years) for promoting experiential and skill-based learning. c) Vocational Education Goal: A key objective is to achieve a 50% enrollment in vocational education by 2025, contributing significantly to the nation's workforce. d) Regional Language Learning: The policy underscores the importance of regional language

and encourages learning up to Grade 5, cultivating a familiar and supportive learning environment. e) Tech-Driven Education: NEP advocates for the utilization of platforms like DIKSHA to facilitate widespread access to quality education through technological means [6]. f) Adaptive Evaluation System: The policy advocates a paradigm shift in assessments, moving from summative evaluations to a more comprehensive and adaptive evaluation system. g) Teacher Training: Recognising the evolving landscape of teaching methodologies, NEP prioritises continuous training and professional development for teachers to spearhead the NEP on the ground. h) Inclusivity and Equity: The policy is committed to ensuring inclusive education for all, irrespective of socioeconomic or physical barriers, thereby promoting equity in learning opportunities.

2 REVIEW OF LITERATURE

H. Demo (2021), In this study, the author aims to acknowledge the need for learning environments with different strategies, which poses an interdisciplinary research issue that requires the collaboration of two sub-disciplines in the area of educational studies, i.e., inclusive education and mathematics education. The study also focuses on the strength of interdisciplinary research for the pursuit if inclusive mathematics and high standards of learning. B. L. Gupta (2013), This study explores the idea of what makes a school effective, discussing its core meaning, essential elements, and notable traits. It also highlights how the external environmental shifts can affect the students' learning experiences at home. The authors suggest that for a school to be considered successful, it should possess a well-defined vision, uphold strong principles and ethical conduct, demonstrate capable leadership, and encourage shared responsibility in management. Additionally, such institutions strive for independence, set high attainable goals, continually seek growth, and promote a culture where learning is a collective effort (G. Yadav, 2021), This paper aims at the pedagogical structure for different stages of education. The challenges in the New Education Policy face by students are highlighted.

The comparison of a year's diploma and a four-year graduation course was pointed out. K. M. Sundaram (2020), This article presents a comparative study of the National Education Policy (NEP) 1986 and NEP 2020. The findings from the study indicate that NEP 2020 places a stronger focus on a multidisciplinary approach, providing a more expansive framework for the comprehensive development of students than its 1986 predecessor. P. Kalyani (2020), This paper investigates the effects of NEP-2020 on different stakeholders, such as students, parents, and teachers. The findings indicate that students consider various factors when choosing their subjects, with a strong emphasis on acquiring knowledge and skills that will enhance their future job prospects. It was also highlighted that parents significantly contribute to this decision-making process by offering guidance on subject choices and providing financial assistance to their children.

3 OBJECTIVES OF THE STUDY

The objectives of the study are as follows -

- To investigate how the mathematical analysis could impact on new education policy.
- To discuss the recent trends of mathematics in the new education policy.
- To analyse how mathematics is useful in other interdisciplinary areas.
- To analyse how mathematics is implemented in modern-day technology like Artificial Intelligence, etc.

4 METHODOLOGY

The nature of this paper is a documentary study and qualitative research. Various sources of information, like NEP-2020 draft, books, e-books, articles, journals, websites, written documents, reports, as well as newspapers, are used in primary and secondary data collection. The study is mainly based on the content analysis method

5 MATHEMATICS EDUCATION IN INDIA

The commitment to children's education reflects the spirit of modernity and the development of a nation. Given its rich mathematical traditions, Indian students

excel in mathematics at large. However, considering the challenges posed by obsolete education policy and the ongoing struggle to achieve the best-quality education. Despite these obstacles, India has, notably, produced mathematicians of great stature, such as Aryabhata, Bhaskara I, Bhaskara II, Brahmagupta, Srinivasa Ramanujan, Satyendra Nath Bose, and many more. The linguistic and cultural diversity in India accommodates multiple approaches and avenues of engaging with the mathematical experience and education. [8]

India's education system is structured by a) Foundational Stage: attaining foundational numeracy (i.e., understanding, and adding and subtracting with, Indian numerals); b) Preparatory Stage: development of concepts such as numbers, basic operations (including multiplication and division), shapes, and measurement; c) Middle Stage: the emphasis towards abstracting the concepts learned in the Preparatory Stage for more wide application; d) Secondary Stage: developing the ability to justify claims and arguments through logical reasoning, and e) Advanced Stage: Graduate education, and professional degrees which are regulated by Universities. However, key challenges are as follows: Mathematics education tends to lean towards a more 'robotic' and 'algorithmic' approach rather than fostering creativity and logical reasoning. Assessment methods often promote rote learning and repetitive practice, reinforcing the perception of Mathematics as a mechanical computation rather than a dynamic and conceptual field. The fear of mathematics is influenced by the nature of the subject itself, the teaching methodologies employed, and societal perceptions surrounding it.

6 AIMS AND IMPLEMENTATION OF MATHEMATICS IN NEP

Importance of Mathematics is highlighted in NEP as 'It is recognised that Mathematics and mathematical thinking will be very important for India's future and India's leadership role in the numerous upcoming fields and professions that will involve artificial intelligence, machine learning, data science, etc.' is quoted in [8]. To reap maximum benefit from schooling, the new education policy advocates for achieving strong foundational literacy and numeracy skills at the primary level. The New Education Policy mandates the use of mathematics across all stages, including in economics, from the preparatory stage to the secondary stage. Concepts like calculus, algebra, and statistics are fundamental for tasks ranging from optimizing costs to understanding market equilibrium. In essence, mathematics provides the language and tools for economists to estimate relationships between economic variables, enabling forecasting and policy evaluation.

The policy emphasises the importance of mathematical skills for logical thinking, data analysis, and problem-solving, which are crucial for a 21st-century knowledge society. Mathematics provides a holistic development and practical skills by developing:

Foundation of Critical Thinking

Learning mathematics is a foundation for critical thinking. Understanding the Mathematical concepts, equations and calculations, mathematical literacy is built, which helps to organise and interpret the world through a mathematical lens. Imperative skills like problem-solving, which help with the ability to analyse problems, break them down into simple parts, and find solutions. Logical reasoning is vital for identifying patterns and making logical connections between different pieces of information, and is among the frequently asked questions in any competitive examination.

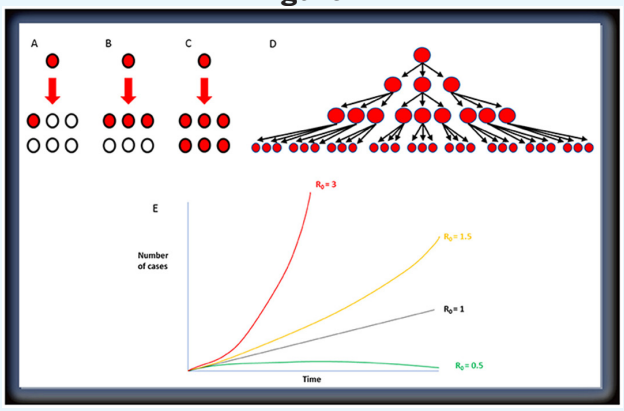
Similarly, being attentive to detail is one skillset learned, as in Mathematics, both precision and accuracy are of paramount importance. Last but not least, keeping creativity alive, a creative mindset helps to come up with different solutions and think outside the box to find the best solution. For example, Sudoku puzzles require deductive reasoning and eliminating possibilities based on existing numbers and constraints. Strategically using logic and pattern recognition to deduce the missing numbers.

Interdisciplinary Applications

Mathematics is also applied to other disciplines such as Biology, Chemistry, Economics, Finance, Medicine, Management, Linguistics, Social sciences, and more. Interdisciplinary research, bridging inclusive Education

and Mathematics Education, requires a teaching and learning model validated through theoretical connections and methodological implementation, which could be instrumental in achieving an inclusive mathematics education and high learning standards [7]. For instance, epidemiology is the study of the distribution, spread, and prevention of diseases and disorders such as coronavirus, polio, asthma, heart disease, and cancer.

Figure 1

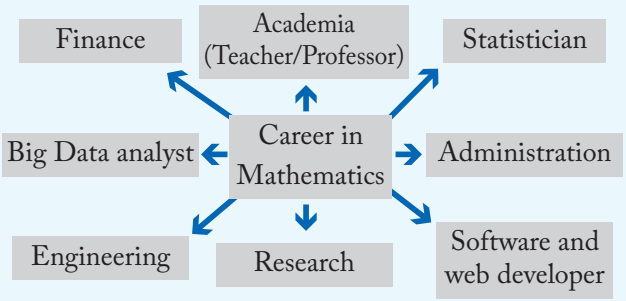


During the COVID pandemic, we learned about a parameter known as , which is the basic reproduction rate of infectious organisms (see Figure 1). This is used in epidemiology to estimate the contagiousness of infectious diseases, where represents the average number of cases caused by a single current case. For instance, an of 3 can lead to exponential growth, where one infected person can result in 27 cases if each person infects three others, emphasising the importance of reducing to control disease spread [1].

Career Opportunities

It is no wonder that Mathematical proficiency opens doors to a wide range of careers. A mathematics degree offers diverse career paths, allowing individuals to either pursue a teaching role or explore opportunities in various fields. By combining mathematics with specialised subjects such as economics, statistics, computer science, applied mathematics, engineering, and mathematical sciences, one can significantly enhance job prospects. For instance, engineers with strong mathematical skills can excel in chemical engineering and electronic engineering roles, where a solid understanding of the subject is crucial. The versatility of a mathematics degree extends to careers in business, science, social services, education, public sector undertakings, and specific technical fields like system design or risk analysis. This degree opens doors to a wide range of professions, providing a foundation for success in dynamic and interdisciplinary fields. Thus, having Mathematical knowledge not only provides for a holistic education but it can also serve as a versatile and foundational qualification that aligns with the emerging needs and opportunities in the diverse and dynamic landscape of New India.

Figure 2



Computational Thinking

Mathematical skills are crucial in understanding and navigating the digital world. Moreover, computational thinking is a fundamental aspect of Mathematics, which is crucial in the era of technology. Artificial Intelligence (AI) is transforming industries and our daily lives at an unprecedented rate, and Mathematics plays a fundamental role in this progress. The field of Linear Algebra serves as the foundational framework for a multitude of Artificial Intelligence (AI) algorithms, which enables the effective representation and manipulation of data, thereby facilitating essential tasks such as natural language processing, image recognition and the development of recommendation systems. As solution of mathematical problems requires creativity in selecting the problem-solving strategy, [2] these research findings lead to the conclusion that success in solving math problems is contingent upon possessing digital literacy skills.

Problem Solving for Global Challenges

Having a Mathematical perspective is imperative in addressing global challenges such as climate change, healthcare, and resource management. Mathematics plays a pivotal role in comprehending and addressing

the complexities of climate change where, Mathematical modeling provides the essential tools for modeling, analyzing data, predicting climate patterns, and devising strategies to address climate change. Its application in climate science help in the assessment of climate change like temperature anomaly [3].

Figure 3

Climate Change Model

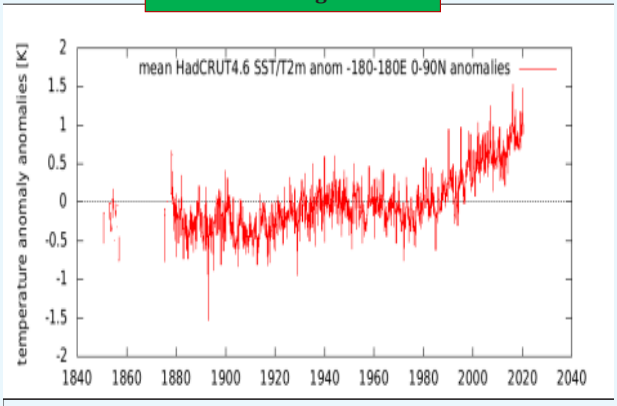


Figure shows the increase in Northern Hemisphere temperature. A comprehensive modeling strategy is designed to predict abrupt climate change using a hierarchy of mathematical models.

Figure 4

Disease Diagnosis

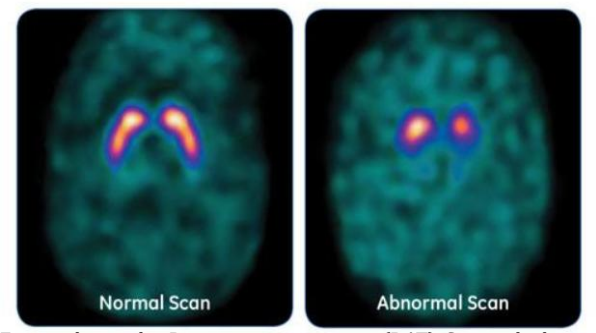


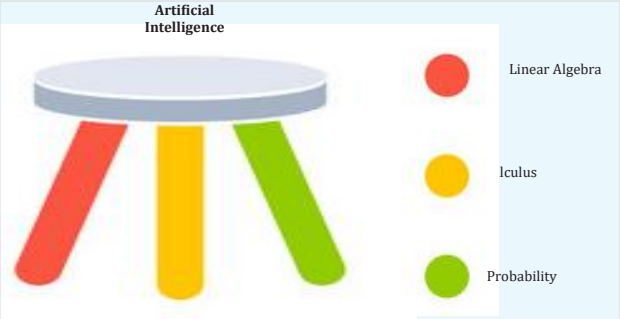
Figure shows the Dopamine transporter (DAT) Scan, which is a neuroimaging test to help diagnose Parkinson's disease - a neurodegenerative disease.
Mathematical algorithms enable image acquisition, reconstruction, and analysis. Additionally, it aids in extraction of relevant information for accurate diagnosis.

A comprehensive modelling strategy is designed to predict abrupt climate change using a hierarchy of mathematical models (see Figure 3), which can simulate the consequences of climate change on ecosystems, biodiversity, sea levels, and extreme weather events. This information is crucial for policymakers, enabling them to formulate effective strategies for mitigation and also enhancing our understanding of the challenges posed by environmental shifts and guiding informed decision-making towards a sustainable future.

Similarly, in healthcare systems, Mathematics plays a crucial role in the diagnosis of diseases as it enables healthcare practitioners to extract meaningful information from complex imaging data, ultimately contributing to improved patient care and treatment. For instance, Dopamine transporter (DAT) Scan (see Figure 4), which is a nuclear medicine imaging technique that helps visualise dopamine transporters in the brain, effectively diagnosing Parkinson's disease- a progressive neurodegenerative disease [4]. Mathematical algorithms enable image acquisition, reconstruction, and analysis. Additionally, it aids in the extraction of relevant information for accurate diagnosis.

New Frontiers in Learning - Artificial Intelligence

In AI algorithms and models, Mathematics serves as the backbone in empowering machines to process, analyse, and interpret vast amounts of data. Mathematics forms the foundational framework for AI algorithms and models, enabling machines to handle extensive data through processing, analysis, and interpretation. Fundamental concepts from linear algebra, calculus, probability theory, and statistics are imperative in designing machine learning algorithms. These algorithms make use of mathematical equations and functions to recognise patterns, make predictions, and classify information. Nevertheless, machine learning can also aid mathematicians in discovering new conjectures and theorems by discovering potential patterns and relations between mathematical objects, understanding them with attribution techniques and employing these observations to guide intuition and propose conjectures. This machine-learning-guided framework has also been successfully applied to current research questions in distinct areas of pure mathematics [5]. Since Mathematics and AI have the power to transform industries, improve our quality of life, and drive innovation. The New Education Policy (NEP) gives emphasis on Mathematics and computational thinking for AI, machine learning (ML), and data science, which will start in the foundational stage.



7 CHALLENGES OF NEW EDUCATION POLICY

The key Challenges are as follows -

- The new education policy emphasises digital literacy for teachers, but challenges remain, including a lack of training, infrastructure, and support. Many teachers may not be comfortable with technology or lack the skills to effectively integrate it into their lessons, particularly in rural areas with limited access and infrastructure. This can lead to resistance to change and a reluctance to adopt new digital tools.
- In terms of training and adapting to new frameworks, key challenges include the need for extensive pre-class preparation due to new syllabi, limited access to quality training programs and resources, and difficulties in integrating new technologies and pedagogical approaches. Furthermore, teachers face challenges in managing their work-life balance, adapting to organisational reforms, and addressing the digital divide, especially in rural areas.
- The NEP emphasises standardised exams and a performance-driven environment, which could lead to increased stress and pressure on students, potentially impacting their overall well-being. This focus may also narrow the range of subject choices and limit the exploration of interests beyond the core curriculum.
- While the NEP emphasises technology in education, the digital divide, particularly in rural areas and among disadvantaged groups, poses a significant challenge. Not all students have equal access to digital devices, internet connectivity, and the necessary resources for online learning.
- Barriers to higher education, such as poverty, gender discrimination, and lack of infrastructure, need to be addressed to ensure equitable access for all students. The policy needs to address issues of accessibility for students with disabilities and those from marginalised communities.

8 SUGGESTIONS FOR NEW EDUCATION POLICY

The major suggestions are as -

- Provide comprehensive training, ensuring adequate infrastructure, offering robust support systems, and addressing potential resistance to change. This can be achieved by offering ongoing professional development, equipping schools with necessary technology, and fostering a culture of collaboration and support.
- Training programs should equip teachers with the skills to not only use technology but also to integrate it effectively into their teaching practices. Utilise online platforms and professional development courses to provide flexible and accessible learning opportunities for teachers, especially in rural areas.
- Enhance inclusive education modules to provide educators with the resources necessary to support students with disabilities and diverse learning needs.
- Create modules that familiarise teachers with global educational trends, effective practices, and cultural awareness, equipping them for a more interconnected world.
- Teacher training programs should prioritise conceptual mathematics over rote methods.
- The NEP should aim to reform the education system, including curriculum and teaching methods, so it is crucial to assess whether these changes address or exacerbate math anxiety in future.

9 CONCLUSION

The New Education Policy (NEP) emphasises holistic development, interdisciplinary studies, and aims to empower students to address real-world challenges and contribute meaningfully to society. The study of Mathematics will help in various aspects which span from holistic development through critical thinking, interdisciplinary applications, digital literacy and computational thinking; offering diverse career opportunities and enabling new frontiers in learning. Mathematics also serves as the backbone for Artificial Intelligence (AI), playing a central role in developing algorithms and models.

Mathematics is an interesting subject for many students, which is set to become an engaging field of study through experiential learning. Beyond a mere numerical system, it permeates every facet of life, from domestic routines to business applications. The implementation of the National Education Policy 2020 reflects a progressive approach, tailored to meet the contemporary needs of learners. This policy holds the key to a meaningful and less rote approach to learning, emphasising critical thinking, discovery, inquiry, discussion, and effective teaching methods. As we strive for its efficient execution, we are paving the way for more enriching educational experiences and in doing so, shaping the future of our upcoming generations and contributing to the progress of our nation. More precisely, to transform India's education system and prepare students for the demands of a modern workforce, NEP's success hinges on equitable access to mathematics learning.

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