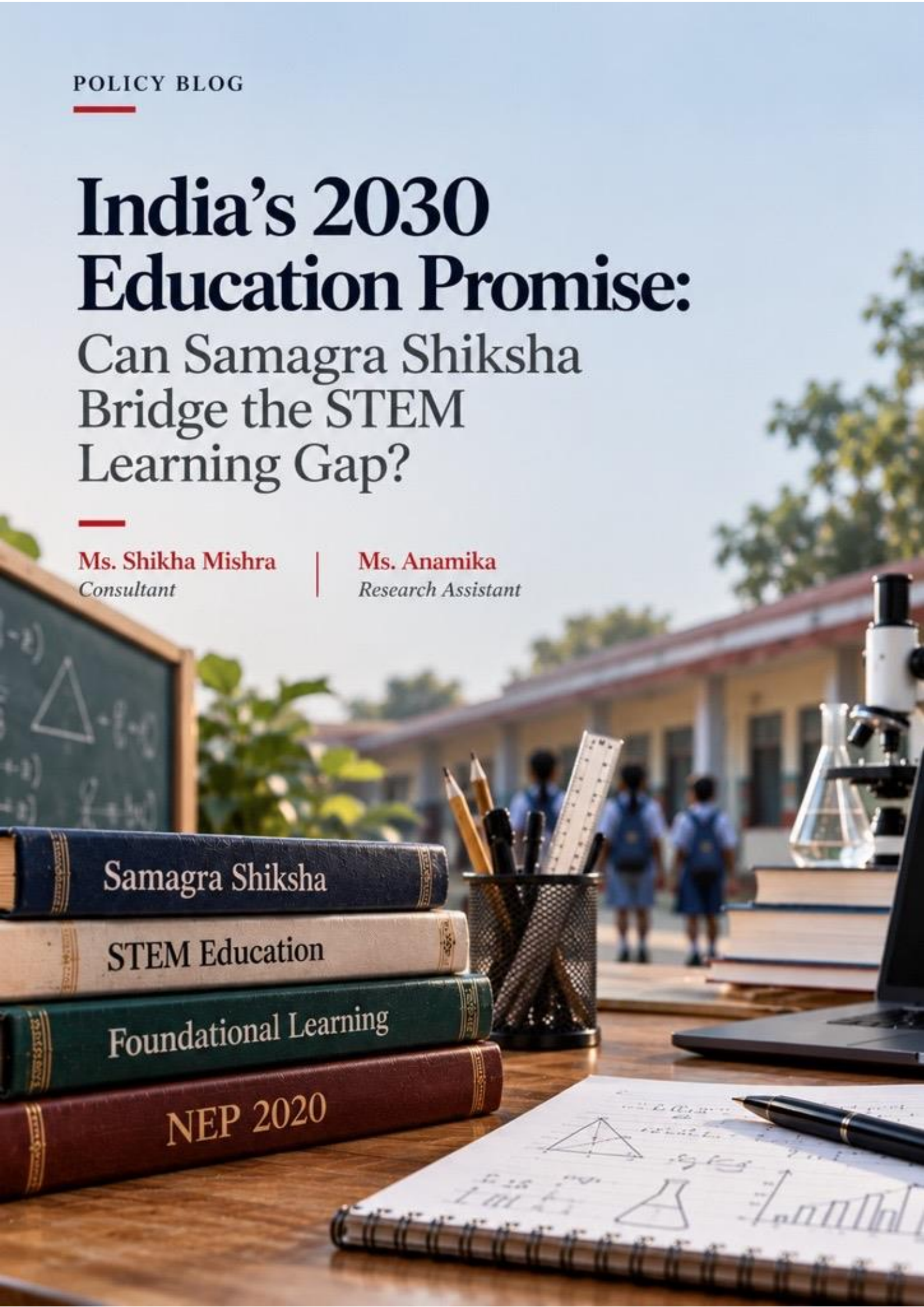
POLICY BLOG

India's 2030 Education Promise: Can Samagra Shiksha Bridge the STEM Learning Gap?

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Introduction

India has made significant progress in expanding access to school education over the past two decades, bringing millions of children into classrooms and improving basic educational infrastructure across the country. According to Unified District Information System for Education **("UDISE+")** 2024-25, school education in India serves nearly 24.69 crore students through more than 14 lakh schools,[1] reflecting the massive scale of the country's education system. Access to basic infrastructure has also improved significantly, with around 99% of schools having drinking water facilities, 97.85% having toilets, and over 95% having electricity.[2] These achievements indicate that India has largely succeeded in addressing many of the barriers that once prevented children from entering and remaining in school. As India works towards achieving Sustainable Development Goal 4 **("SDG 4")** by 2030, however, the focus is increasingly shifting from getting children into school to ensuring that they acquire the skills needed for the future.

The Emerging Science, Technology, Engineering, and Mathematics ("STEM") Learning Challenge

STEM education refers to an interdisciplinary approach to teaching that integrates the basic sciences, technology, engineering, and mathematics. This educational framework aims to foster critical thinking, problem-solving skills, and innovation among students.[3] Recent learning assessments suggest that although learning levels are improving, significant challenges remain in building strong foundational and STEM related competencies. According to Annual Status of Education Report **("ASER")** 2024, the share of Class 3 children able to solve a basic subtraction problem increased from 25.9% in 2022 to 33.7% in 2024,[4] reflecting progress in foundational numeracy. However, this also means that nearly two-thirds of children were still unable to perform a basic arithmetic task.

At the secondary level, The PARAKH Rashtriya Sarvekshan **("PRS")** 2024, India's national competency-based assessment aligned with National Education Policy **("NEP")** 2020, assessed 21,15,022 students across 74,229 schools in 781 districts covering Grades 3, 6 and 9. The findings are particularly concerning from a STEM perspective, as Grade 9 students scored only 37% in Mathematics and 40% in Science on average.[5] These results suggest that while more children are attending school, many are still not acquiring the

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[1] Ministry of Education, Government of India, UDISE+, https://udiseplus.gov.in/#/en/home, (Last visited 8 October 2026).

[2] Press Information Bureau, Government of India, UDISE+ 2024-25: Existing Structure Report (Aug. 28, 2025),https://www.pib.gov.in/PressNoteDetails.aspx?id=159575&NoteId=159575&ModuleId=3&reg=48&lang=2, (Last visited 8 October 2026).

[3] UNESCO, What is STEM Education? Meaning, Definition, https://www.unesco.org/en/query-list/s/stem-education (Last visited 9 October 2026)

[4] ASER Centre, Annual Status of Education Report (ASER) 2024: National Findings (Jan. 28, 2025), https://asercentre.org/wp-content/uploads/2022/12/India.pdf (Last visited 8 October 2026), pp. 2-3.

[5] PARAKH, NCERT, PARAKH Rashtriya Sarvekshan 2024: National Report (July 2025), https://parakh.ncert.gov.in/sites/default/files/2025-07/REPORT_India_IND.pdf (Last visited 8 October 2026), pp. 13 & 21.

mathematical and scientific competencies needed for higher education, future employment and participation in a technology-driven economy.

Why Samagra Shiksha Matters?

This raise an important question: Has India's progress in expanding school access translated into stronger STEM skills? This is where Samagra Shiksha becomes important. As India's flagship school education programme, it aims to improve learning outcomes, teacher capacity, digital education and school infrastructure. The key challenge is no longer just getting children into classrooms, but ensuring they develop the mathematical, scientific and problem-solving skills needed for the future.

Samagra Shiksha: From Access to Learning and Future Skills

Launched in 2018, Samagra Shiksha integrated Sarva Shiksha Abhiyan **("SSA")**, Rashtriya Madhyamik Shiksha Abhiyan **("RMSA")** and Teacher Education into a single scheme covering education from pre-primary to Class XII. The scheme was continued from 2021-22 to 2025-26 with a total financial outlay of INR 2,94,283.04 crore, including a Central share of INR1,85,398.32 crore, and covers 1.16 million schools, over 156 million students and 5.7 million teachers in Government and aided schools. Aligned with NEP 2020 and SDG 4, the scheme places a strong emphasis on Foundational Literacy and Numeracy **("FLN")** through NIPUN Bharat, teacher training through NISHTHA, digital initiatives such as Information and Communication Technology Laboratory **("ICT")** labs, smart classrooms and virtual classrooms, vocational education, and quality improvement measures. These interventions are directly relevant to STEM education as they aim to strengthen numeracy, digital skills, scientific learning and 21st-century competencies. The key question, however, is whether these investments are translating into improved mathematics, science and problem-solving outcomes among students.[6]

Are Schools Equipped for STEM Learning?

Digital infrastructure has emerged as an important enabler of STEM learning. According to UDISE+ 2023-24, 50.9% of schools had functional computers and 53.9% had internet facilities, reflecting gradual progress in expanding access to digital resources. However, the availability of advanced technology-enabled learning infrastructure remains limited, with only 24.4% of schools reporting smart classrooms. Similarly, access to science infrastructure remains uneven, as only 55.9% of schools with secondary sections had an Integrated Science Laboratory, while 57.2% of schools had internet connectivity. These figures indicate that although access to digital and scientific resources is improving, a substantial proportion of schools still lack the infrastructure needed to support effective STEM learning.[7]

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[6] Press Information Bureau, Government of India, Cabinet Approves Continuation of Samagra Shiksha Scheme for School Education from 1st April, 2021 to 31st March, 2026 (Aug. 4, 2021), https://archive.pib.gov.in/newsite/PrintRelease.aspx?relid=223866 (Last visited 8 October 2026).

[7] Ministry of Education, Government of India, UDISE+ 2023-24 Report on School Education in India (2025), https://dashboard.udiseplus.gov.in/report-new-v.6-

These infrastructure gaps have important implications for STEM education. Science and mathematics require opportunities for experimentation, practical activities, digital exploration and application-based learning.

Teacher Capacity: The Key to Stronger STEM Learning

Teachers are central to improving learning outcomes, making teacher development a key pillar of Samagra Shiksha. To support this objective, the Government of India launched NISHTHA **("National Initiative for School Heads and Teachers Holistic Advancement")** in August 20198 as a large-scale capacity-building program for teachers and school leaders. The program focuses on competency-based learning, foundational literacy and numeracy, assessment practices, and learner-centred pedagogy aligned with NEP 2020.The programme also supports the NEP recommendation that every teacher undertake at least 50 hours of Continuous Professional Development **("CPD")** annually to strengthen teaching practices and improve student learning outcomes.[9]

The scale of implementation has been substantial. According to data placed in Parliament in 2025, NCERT issued certificates to over 22.64 lakh teachers under NISHTHA Elementary, 13.58 lakh under NISHTHA FLN, 7.64 lakh under NISHTHA Secondary, and 1.55 lakh under NISHTHA ECCE programmes, reflecting the extensive reach of teacher professional development initiatives under Samagra Shiksha.[10] Emerging evidence also suggests positive outcomes from these efforts. A 2025 survey-based study on the effectiveness of NISHTHA found that participating teachers perceived the programme as beneficial in improving classroom practices, enhancing course engagement and strengthening continuous professional development. However, the key challenge is ensuring that large-scale training translates into better classroom instruction and improved STEM learning outcomes.[11]

Can Samagra Shiksha Bridge the gap

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demo2025/static/media/UDISE+2023_24_Booklet_nep.f2ab818294eb169c0adc.pdf (Last visited 8 October 2026).

[8] Press Information Bureau, Government of India, Press Release Page (4 August 2022), https://www.pib.gov.in/PressReleasePage.aspx?PRID=1847875&reg=48&lang=2 (Last visited 9 October 2026).

[9] Central Institute of Educational Technology (CIET), National Council of Educational Research and Training (NCERT), NISHTHA: National Initiative for School Heads' and Teachers' Holistic Advancement, https://ciet.ncert.gov.in/nishtha?lang=en (Last visited 8 October 2026).
Department of School Education & Literacy, Ministry of Education, Government of India, Lok Sabha Unstarred Question No. 4339: Teacher Training under NISHTHA (Sept. 2025), https://www.dsel-education.gov.in/static/uploads/2025/09/90879e44f2ac63a7cad41c67edd41ef4.pdf (Last visited 8 October 2026)

[10] Department of School Education & Literacy, Ministry of Education, Government of India, Lok Sabha Unstarred Question No. 2267: Implementation of NISHTHA Programme (May 2026), https://www.dsel-education.gov.in/static/uploads/2026/05/81c5adc7f475260f3ed69ee9eead08eb.pdf(Last visited 8 October 2026).

[11] Asian International Journal of Frontline Research, A Study on the Effectiveness of NISHTHA (National Initiative for School Heads' and Teachers' Holistic Advancement) Programme in Enhancing Teachers' Professional Development and Classroom Practices (2025), https://www.aijfr.com/papers/2025/5/1785.pdf (Last visited 8 October 2026).

Samagra Shiksha has laid an important foundation for improving STEM education through initiatives such as NIPUN Bharat, NISHTHA, ICT-enabled learning and science infrastructure. NIPUN Bharat focuses on foundational literacy and numeracy, NISHTHA strengthens teachers' professional development in line with the NEP 2020, and ICT-enabled learning integrates digital technologies into classroom teaching. While progress is visible, such as the improvement in Class 3 subtraction skills from 25.9% in 2022 to 33.7% in 2024, significant gaps remain. Grade 9 students continue to score only 37% in Mathematics and 40% in Science, and access to digital and science infrastructure remains uneven across schools. This suggests that although Samagra Shiksha has strengthened the conditions for STEM learning, translating these investments into consistently better learning outcomes remains a key challenge.

What Needs to Change Before 2030?

1. Strengthen Foundational Numeracy Early

Despite improvements, only 33.7% of Class 3 students could solve a basic subtraction problem in 2024.[12] Since mathematics forms the foundation for later learning in science and technology, strengthening foundational numeracy under NIPUN Bharat should remain a priority to prevent learning gaps from widening in higher grades.

2. Improve the Use of STEM Infrastructure

While access to digital infrastructure has expanded, only 50.9% of schools had functional computers, 53.9% had internet facilities, and 24.4% had smart classrooms.[13] The focus should therefore move beyond providing infrastructure to ensuring that computers, internet facilities and science laboratories are regularly used for STEM teaching and practical learning.

3. Make Teacher Training More STEM-Focused

NISHTHA has achieved large-scale coverage, with 22.64 lakh teachers certified under NISHTHA Elementary and 13.58 lakh under NISHTHA FLN alone.[14] The next priority should be strengthening mathematics and science pedagogy, inquiry-based learning and the use of digital tools to improve STEM learning outcomes.

Conclusion

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[12] ASER Centre, Annual Status of Education Report (ASER) 2024: National Findings (Jan. 28, 2025), https://asercentre.org/wp-content/uploads/2022/12/India.pdf (Last visited 8 October 2026).

[13] Ministry of Education, Government of India, UDISE+ 2023–24 Report on School Education in India (2025), https://dashboard.udiseplus.gov.in/report-new-v.6-demo2025/static/media/UDISE+2023_24_Booklet_nep.f2ab818294eb169c0adc.pdf (Last visited 8 October 2026).

[14] Department of School Education & Literacy, Ministry of Education, Government of India, Lok Sabha Unstarred Question No. 2267 regarding NISHTHA (May 2026), https://www.dsel-education.gov.in/static/uploads/2026/05/81c5adc7f475260f3ed69ee9eead08eb.pdf (Last visited 8 October 2026).

The scheme has already built a strong base. It has worked on basic reading and maths skills in the early years, trained a large number of teachers, and brought computers, internet and science labs into many schools. However, having these resources does not automatically mean that students understand maths and science. A school can have a lab and still not use it for real experiments, and a teacher can complete a training programme without changing the way they teach in class.

To reach the 2030 goal, three changes are needed. Children must learn basic maths well in the early years, because weak foundations make every later STEM subject harder. Computers and labs must be used regularly for practical learning, so that students learn by doing and not only by reading. Teacher training must also focus more on how to teach maths and science in simple, activity-based ways. If the scheme's success is judged by what students can truly understand and apply, rather than by how many schools, labs or teachers it reaches, India's 2030 education promise can still be achieved.