EDUCATION: TREADING NEW PATHWAYS

11.11 Education plays a key role in developing an economy by cultivating individuals capable of rational thought and unleashing their agency to better themselves and society. Education and human capital development are among the foundational pillars of development. The National Education Policy 2020(NEP) is built upon this principle.[12] The NEP states that –

'It aims at producing engaged, productive, and contributing citizens for building an equitable, inclusive, and plural society as envisaged by our Constitution.'

School education

11.12 India's school education system serves 24.8 crore students across 14.72 lakh schools with 98 lakh teachers (UDISE+ 2023-24). Government schools make up 69 per cent of the total, enrolling 50 per cent of students and employing 51 per cent of teachers, while private schools account for 22.5 per cent, enrolling 32.6 per cent of students and employing 38 per cent of teachers. The NEP 2020 aims for a 100 per cent Gross Enrolment Ratio (GER) by 2030. The GER is near-universal at the primary (93 per cent) and the efforts are underway to bridge the gaps at the secondary (77.4 per cent) and higher secondary level (56.2 per cent), driving the nation closer to its vision of inclusive and equitable education for all.[13]

11.13 School dropout rates[14] have steadily declined in recent years, standing at 1.9 per cent for primary, 5.2 per cent for upper primary, and 14.1 per cent for secondary levels. However, challenges persist, with retention rates[15] at 85.4 per cent for primary (class I to V), 78 per cent for elementary (classes I to VIII), 63.8 per cent for secondary (classes I to X), and 45.6 per cent for higher secondary (classes I to XII). Improvements in basic facilities and infrastructure, including medical check-ups, sanitation, and information and communication technologies (ICT) availability, have been notable, reflecting a positive trend in school infrastructure development.[16]

12 National Education Policy 2020 (https://tinyurl.com/rdwuz8md).

13 UDISE+ 2023-24 (https://tinyurl.com/57c92kuv).

14 Dropout rate is the proportion of pupils from a cohort enrolled in a given level at a given school year who are no longer enrolled at any grade in the following school year.

15 Retention rate is the percentage of a cohort of pupils (or schools) enrolled in the first grade of a given level of education in a given school year who are expected to reach the last grade of the level.

16 Ibid note 13 above.

Table XI.1 Improving School Infrastructure

(percentage of schools with basic facilities out of total)

Year	2019-20	2021-22	2022-23	2023-24
Girls Toilet	96.9	97.5	97	97.2
Boys Toilet	95.9	96.2	95.6	95.7
Hand wash Facility	90.2	93.6	94.1	94.7
Library/Reading Room/ Reading corner	84.1	87.3	88.3	89
Electricity	83.4	89.3	91.7	91.8
Medical check-ups in school in a year	82.3	54.6	74.3	75.2
Computer	38.5	47.5	47.7	57.2
Internet	22.3	33.9	49.7	53.9
Source: UDISE+ 2023-24				

11.14 The government has been striving to achieve the objectives of NEP 2020 through a range of programmes and schemes, including the Samagra Shiksha Abhiyan (along with its sub-schemes such as NISHTHA, Vidya Pravesh, District Institutes of Education and Training (DIETs), Kasturba Gandhi Balika Vidyalaya (KGBV), etc.), DIKSHA[17], STARS[18], PARAKH[19], PM SHRI[20], ULLAS[21], and PM POSHAN[22], among others. The Economic Survey 2023-24 (Chapter 7, Table VII.4) highlighted the progress made under various government initiatives in school education.

11.15 The pivotal role of early years in development is well-recognised by the Indian education system, as 85 per cent of brain development occurs before the age of six years. To strengthen the Early Childhood Care and Education (ECCE) landscape, the government launched the National Curriculum for ECCE, *Aadharshila*, and the National Framework for Early Childhood Stimulation, *Navchetana*, in April 2024. *Navchetana* focuses on holistic development for children from birth to three years, offering 140 age-specific activities through a 36-month stimulation calendar. It emphasises the inclusion of differently-abled children, maternal mental health, and "*Garbh Sanskar*" (practices during pregnancy). *Aadharshila*, blending Indian and international research, promotes play-based learning with over 130 activities for children aged three to six years that support child-led and educator-led learning. It aims to lay a strong foundation for lifelong learning, aligning with the National Curriculum Framework for Foundational

17 Digital Infrastructure for Knowledge Sharing (DIKSHA).

18 Strengthening Teaching-Learning and Results for States (STARS).

19 Performance Assessment, Review, and Analysis of Knowledge for Holistic Development (PARAKH).

20 Prime Minister's Schools for Rising India (PM SHRI).

21 Understanding of Lifelong Learning for All in Society (ULLAS).

22 Pradhan Mantri Poshan Shakti Nirman (PM POSHAN).

Stage 2022 (NCF-FS) and improving the quality of ECCE through competency-based, user-friendly lesson plans. The objective is to improve the quality of ECCE delivered at the Anganwadi centre by prioritising competency-based lesson plans and activities presented in a simple and user-friendly manner.

Building strong foundations through literacy and numeracy

11.16 School education lays the foundation of a country's education system. The NEP 2020 stipulates that foundational literacy and numeracy (FLN) is critical for education and lifelong learning success. Towards this end, the Department of School Education & Literacy launched the National Mission, "National Initiative for Proficiency in Reading with Understanding and Numeracy (NIPUN Bharat),"[23] in July 2021 to ensure that every child in the country necessarily attains FLN by the end of Grade 3, by 2026-27.[24] It covers three years of FLN in preschool and Grades 1, 2 and 3. Towards this, the education system is deploying innovative pedagogies and teaching methods to ensure that every child achieves FLN. **Box XI.3** discusses one such innovation, viz. peer teaching.

Box XI.3: Peer Teaching: A pathway to achieving FLN

Achieving the vision of universal FLN by Grade 3 requires not only reaching every child but also overcoming the limitations of traditional lecture-based teaching to address diverse learning needs. While teacher-led instruction is valuable, it may not fully support individualised learning, especially for children who lag behind and need extra support to catch up.

State governments have launched programmes to tackle these challenges. Mission *Ankur* in Madhya Pradesh and Gujarat focuses on engaging schools and communities for the holistic development of primary students, ensuring they achieve FLN skills.[25] Similarly, Bihar's Mission *Daksh* aims to provide personalised mentoring for lagging students to achieve grade-level competencies by 2025. While these initiatives address key gaps, they heavily rely on teachers, highlighting the need for scalable, adaptable teaching strategies that offer personalisation without overburdening educators.

Peer teaching is a promising solution, where students learn by teaching and supporting their peers. In classrooms with limited resources and high student-teacher ratios, it provides scalable, accessible support tailored to students' needs. As 'Student Champions,' older or more knowledgeable students help guide younger or struggling peers through foundational concepts.

Peer teaching creates a collaborative environment where students learn from each other, boosting confidence and comprehension alongside teacher instruction. The NEP promotes

23 https://nipunbharat.education.gov.in/

24 PIB of Ministry of Education dated 5 July 2021 (https://tinyurl.com/yc5ejpu8).

25 Madhya Pradesh & Gujarat: PMU for FLN – The Education Alliance

peer tutoring to foster inclusion and personalised learning, ensuring every child can learn.[26] It also encourages using community volunteers and alumni as peer tutors in schools and communities. The SARTHAQ (Students' and Teachers' Holistic Advancement through Quality Education) guidelines for NEP 2020[27] emphasise peer tutoring to improve FLN and educational outcomes, highlighting the need for training peer tutors and integrating sessions into school schedules.

Global evidence supports peer learning, showing improved academic performance in math and reading in the US[28], enhanced problem-solving abilities and social skills in Australia[29], and better literacy outcomes in sub-Saharan Africa[30]. In sub-Saharan Africa peer-led programmes have successfully supported student-centred learning in under-resourced classrooms. Additionally, peer teaching fosters essential life skills such as leadership, empathy, resilience, and communication, benefiting both tutors and learners.

Experiments in integrating structured peer learning in India's Education system

The **Nalli-Kali (joyful learning in Kannada) programme**, launched in 1995 in Karnataka's Mysuru district, focuses on peer and group work to create a collaborative classroom environment that supports self-paced, personalised learning. It is now the primary pedagogy for Grades 1-3 in Karnataka to develop age-appropriate skills.[31]

The **Prerana model of education**, implemented in Andhra Pradesh, Karnataka, Maharashtra, Tamil Nadu, and Telangana[32] through the Sikshana Foundation, also emphasises peer learning and group work.[33] Small groups of four to five students collaborate on classroom activities, teaching and learning from each other.

Involve Learning Solutions Foundation[34] is working with educators in six districts across Uttar Pradesh, Bihar, and Karnataka states to integrate structured peer teaching into government schools, directly aligning with NIPUN Bharat's FLN goals. The model pairs among students identified as 'Student Champions' with 'Learners.' Each Student Champion, with better subject mastery, is trained further to support a group of four learners, their peers

26 The NEP in para 2.7 provides that, "Due to the scale of the current learning crisis, all viable methods will be explored to support teachers in the mission of attaining universal foundational literacy and numeracy. Studies around the world show one-on-one peer tutoring to be extremely effective for learning not just for the learner, but also for the tutor. Thus, peer tutoring can be taken up as a voluntary and joyful activity for fellow students under the supervision of trained teachers and by taking due care of safety aspects."; https://tinyurl.com/mxp5wpfz

27 https://tinyurl.com/yc3y7jz2

28 Fuchs, L. S., Fuchs, D., Yazdian, L., & Powell, S. R. (2002). Title: Enhancing First-Grade Children's Mathematical Development with Peer-Assisted Learning Strategies. Published in: School Psychology Review, Vol. 31, No. 4, pp. 569–583. DOI: 10.1080/02796015.2002.12086175.

29 Fawcett, L. M., & Garton, A. F. (2005). The Effect of Peer Collaboration on Children's Problem-Solving Ability. Published in: British Journal of Educational Psychology, Vol. 75, No. 2, pp. 157–169. DOI: 10.1348/000709904X23411.

30 Fry, K., Rogan, R., & Gruber, S. (2019). Improving Literacy Outcomes in Low-Resource Contexts Through Peer-Led Learning Approaches. Published by: Educational Development Journal, Vol. 35, No. 3, pp. 289–305.

31 https://tinyurl.com/yuaff8fc

32 Shikshana Foundation Annual report 2022-23 (https://tinyurl.com/cy5kr7fc).

33 https://www.sikshana.org/Program/Prerana/

34 https://involveedu.com/

who struggle to understand concepts, thereby facilitating their progress through 40-minute sessions three to four times per week.

Early evaluations in Karnataka's Anekal block show increased learning outcomes in numeracy for students by 15 per cent compared to students who did not participate in the programme.[35] Similarly, in Bhagalpur, structured peer interactions have helped bridge reading and numeracy gaps among children who could not meet age-appropriate learning milestones. Anecdotal evidence also indicates positive shifts in student engagement and academic outcomes.

To support NIPUN Bharat's mission, peer teaching can be integrated into India's FLN strategy. This involves incorporating peer teaching into teacher training, scaling successful models, assessing its impact on learning outcomes, and using data to refine the approach based on feedback from teachers, students, and administrators. This will help transform classrooms into dynamic spaces where every child receives the support needed to thrive.

Empowering minds: Unlocking potential with social and emotional learning

11.17 The success of school education hinges not just on the student's academic achievements but also on enhancing their social and emotional learning (SEL). A good education enhances a child's mental and physical health, academic performance, and life skills. In this context, ECCE under NEP 2020 aims to achieve foundational literacy and socio-emotional development. The NEP 2020 states that

'The overall aim of ECCE will be to attain optimal outcomes in the domains of physical and motor development, cognitive development, ***socio-emotional-ethical development****, cultural/artistic development, and the development of communication and early language, literacy, and numeracy.'*

11.18 **Box XI.4** discusses the importance of SEL in education, providing examples of how the pedagogy can be developed to incorporate socio-emotional-ethical development in the school curriculum.

Box XI.4: Empowering minds and hearts through SEL techniques

SEL has emerged as a critical pillar within holistic education frameworks that contributes significantly to SDGs, particularly SDG 3 (Good Health & Well-being) & SDG 4 (Quality Education). UNESCO[36] defines SEL as a process of *acquiring the competencies to recognise*

35 Pratibha Narayann, P. N., Anna Daniel, A. D. and Dhanashree Balaram, D. B. (2024), Promoting Individualized Learning: The Effectiveness of Peer Teaching Pedagogy. Published by: International Conference on Technology for Education (T4E), Zenodo. doi: 10.5281/zenodo.14004916.

36 UNESCO (2024) Strengthening social and emotional learning in hybrid modes of education: building support for students, teachers, schools and families: a UNESCO-IBE discussion paper; https://tinyurl.com/nnbafeat

and manage emotions, develop care and concern for others, establish positive relationships, make responsible decisions, and handle challenging situations effectively. SEL significantly contributes to individual well-being, social participation, and broader individual development. Incorporating SEL from an early age equips children with essential skills that foster resilience and academic success. It also plays a crucial role in preventing future mental health issues and setting the foundation for a healthier society.

CASEL (Collaborative for Academic, Social, and Emotional Learning)[37] outlines five core components of SEL, which serve as foundational pillars in fostering holistic development. These components—Self-Awareness, Self-Management, Social Awareness, Relationship Skills, and Responsible Decision-Making—equip students with the skills necessary to navigate life challenges, enhance mental well-being, and improve academic performance. Some successful models effectively implementing SEL programmes worldwide include the Social, Emotional, and Ethical Learning (SEE Learning) by Emory University,[38] and the RULER programme[39] by Yale Center for Emotional Intelligence.

According to some estimates, for every dollar invested in SEL initiatives, the estimated long-term economic return is USD 11, with outcomes around mental health, education, and employability.[40] Further, a 2020 UNESCO study[41], highlights that such investments not only yield immediate educational and behavioural benefits but also result in long-term economic gains, including a 30 per cent increase in per capita income. The literature indicates that integrating SEL components into classroom practices increases student commitment[42], participation,[43] cognitive problem-solving abilities,[44] attendance rates, and overall academic success.[45] Other than enhancing academic performance, these interventions also promote positive social behaviour and interpersonal relationships, mitigate behavioural issues and

37 CASEL's SEL Framework (2020) What are the Core Competence Areas and Where are they Promoted? https://casel.org/casel-sel-framework-11-2020/?view=true

38 Emory University (2022) SEE Learning: Social, Emotional and Ethical Learning Program. (https://seelearning.emory.edu/en/about).

39 Yale Center for Emotional Intelligence (2023) RULER Program Overview (https://www.ycei.org/ruler).

40 Belfield, C. et.al. (2015). The economic value of social and emotional learning. Journal of Benefit-Cost Analysis (https://tinyurl.com/36w8mft7).

41 UNESCO (2020) Rethinking learning: A Review of Social and Emotional Learning for Education Systems. (https://unesdoc.unesco.org/ark:/48223/pf0000373890).

42 Hawkins, J. D., Smith, B. H., & Catalano, R. F. (2004). Social Development and Social and Emotional Learning. In J. E. Zins, R. P. Weissberg, M. C. Wang, & H. J. Walberg (Eds.), Building academic success on social and emotional learning: What does the research say? (pp. 135–150). Teachers College Press.

43 Murdock, T. B. (1999). The social context of risk: Status and motivational predictors of alienation in middle school. Journal of Educational Psychology, (https://doi.org/10.1037/0022-0663.91.1.62).

44 Battistich, V., Solomon, D., Watson, M., Solomon, J., & Schaps, E. (1989). Effects of an elementary school programme to enhance prosocial behavior on children's cognitive-social problem-solving skills and strategies. Journal of Applied Developmental Psychology (https://doi.org/10.1016/0193-3973(89)90002-6).

45 Felner, R.D., Primavera, J., & Cauce, A.M. (1995). The impact of a comprehensive school-based intervention on the academic achievement of students: A longitudinal study. Journal of Educational Psychology, 87(1), pp. 1-14.; DePaoli, J.L., Elias, M.J., & Weissberg, R.P., 2017. Social and emotional learning: A framework for promoting academic success. Educational Psychologist, 52(1), pp. 1-11

psychological distress, and equip young people for success in employment, family life, and broader societal engagement.[46]

Developments in India

The NEP 2020 emphasises the development of social, ethical, and emotional competencies as essential to holistic child development. The National Curriculum Framework 2023[47] also advocates for SEL-based pedagogies to improve educational outcomes and foster children's well-being. The NIPUN Bharat mission guidelines 2021[48] emphasise the importance of SEL as a core component of the holistic development objectives for young children in India's foundational education system. It promotes activities that foster self-awareness, social awareness, and responsible decision-making, advocating for inclusive, child-centred practices to create safe, supportive learning environments that nurture both cognitive and emotional growth.

SEL is increasingly being recognised as integral to India's educational and developmental priorities. Initiatives like SEE Learning India[49] and the Life Skills Collaborative[50] are paving the way for SEL in structured approaches. They are being adopted in the states of Maharashtra, Mizoram, Uttarakhand, and Rajasthan. SEL interventions are also being carried out in programmes implemented by the governments of Tripura and Uttarakhand etc. In several programmes, state governments have collaborated with non-profit organisations like Dream a Dream Foundation[51] and Labhya[52]. Under these models, classrooms are envisaged as emotionally safe environments wherein children experience interactive group sessions, mindful practices, and spaces for reflection sharing to cope with various challenges and improve their well-being and learning outcomes. Through organisations such as the Aparajitha Foundation, students are taught important life skills, i.e., social and interpersonal skills, that can help them make informed decisions, communicate effectively, and develop coping and self-management skills (See **Box XI.5**).

The evidence supporting the benefits of SEL is robust. The imperative of integrating SEL with educational frameworks is underscored by its profound impact on mental health, academic success, and long-term life outcomes. This is particularly crucial in India, which is characterised by a youthful population poised to enter the workforce. The implementation of SEL, therefore, serves as a strategic investment in the nation's future.

46 Elias, M.J., 2014. Social-emotional learning and its impact on societal engagement. Journal of Educational Psychology, 106(3), pp. 1-10; Jones, S.M. and Kahn, J., 2017. The evidence base for how learning happens: A consensus on social, emotional, and academic development. American Educator, Winter 2017-2018 (https://files.eric.ed.gov/fulltext/EJ1164389.pdf).

47 Ministry of Education, Government of India (2023) National Curriculum Framework 2023. (https://tinyurl.com/47z2b2m3).

48 Ministry of Education, Government of India (2021) NIPUN Bharat Mission: National Initiative for Proficiency in Reading with Understanding and Numeracy- Guidelines 2021. (https://tinyurl.com/mvxnc7k5)

49 SEE Learning India (2024) SEE Learning India About https://www.seelearningindia.com/Home/about

50 Life Skills Collaborative (2024). Life Skills Collaborative Overview https://lifeskillscollaborative.in/

51 Dream a Dream Foundation (2024). Dream a Dream Foundation Overview https://dreamadream.org/

52 Labhya Foundation (2024) Labhya Foundation Overview. https://labhya.org; https://www.labhya.org/what-we-do/model

11.19 NEP 2020 emphasises holistic schooling by integrating vocational and digital education with a supporting, well-equipped school infrastructure to enable the smooth transition of a GER of 100 per cent at the secondary level by 2030.

11.20 The importance of skill education in schools has grown significantly with the advent of Industry 4.0, a highly dynamic and skill-intensive era defined by automation, artificial intelligence (AI), internet of things (IoT), big data, and robotics. This industrial revolution has reshaped production and distribution across sectors like manufacturing and agriculture, significantly increasing the demand for a skilled workforce. Alongside technical proficiency, soft skills such as adaptability, problem-solving, and collaboration have become critical for navigating this evolving landscape. **Box XI.5** discusses the *Tim Tim Tare* initiative for imparting life skills.

Box XI.5: Imparting life skills: The Tim Tim Tare initiative

Tim Tim Tare (TTT)[53] is a pioneering initiative that aims to impart essential life skills to adolescent students across India. Unlike vocational training, which focuses on technical skills, TTT places emphasis on soft skills—key components of personal growth, effective communication, emotional intelligence, and social well-being. Through TTT, students are empowered to face life's challenges confidently and clearly.

This initiative equips students with essential life skills to navigate the complexities of modern life. Built on the World Health Organization's (WHO) Life Skills Framework, TTT addresses a wide range of 16 core life skills (such as empathy, critical thinking, etiquette, time management, etc) and over 100 related topics designed to meet the evolving needs of today's youth. These skills enable students to make informed, thoughtful decisions personally and professionally and equip them with the skills and attitudes necessary to thrive in their studies and beyond.

TTT's approach stands apart from traditional education due to its student-focused methodology, delivering content in an engaging, immersive manner and creating transformative experiences enabling students to absorb, internalise, and retain key concepts effectively. Each topic is designed with activity-based learning, such as experience sharing, role plays, sing-along songs and interactive games. This approach ensures that every lesson is lively, impactful, and engaging, allowing students to experience the learning process actively.

Started in 2009 in Tamil Nadu, TTT has now expanded to other states[54] in a phased manner, reaching millions of students across India. In addition to empowering students, TTT has prioritised training thousands of teachers across these states, ensuring that the programme's benefits are deeply rooted and widely disseminated.

A critical focus of TTT has been its commitment to understanding and addressing the needs of its stakeholders. Feedback from students, teachers, principals, and parents has been

53 https://tinyurl.com/5yxkwerv

54 Such as Gujarat, Madhya Pradesh, Rajasthan, Uttar Pradesh, etc.

systematically collected over the years. This feedback consistently highlights the programme's positive impact on individuals and communities and is a testament to TTT's transformative power and ability to create lasting change.

The TTT programme currently reaches more than 10 crore students, with a significant presence in central India and Gujarat. It is implemented in various types of schools, including government schools, *Navodaya Vidyalayas, Kendriya Vidyalayas, Kasturba Vidyalayas*, juvenile homes etc. It is also accessible through various platforms such as PM eVidya channels, state government relay centres, YouTube, and WhatsApp groups.

The State Council of Educational Research and Training (SCERT) officially approved the TTT programme, which adds credibility and ensures alignment with national educational standards.

Bridging the gap: Digital technology in education and the essentiality of digital literacy

11.21 Digital literacy ensures that students remain competitive by mastering skills like analysing, synthesising, and communicating digital information. The World Economic Forum (WEF) identifies ICT skills as foundational for the 21st century.[55] UNESCO defines digital literacy as– '*Includes competencies that are variously referred to as computer literacy, ICT literacy, information literacy and media literacy*'.[56] Digital literacy ranges from basic hardware and software use to advanced programming and network management.

11.22 Data from the Comprehensive Annual Modular Survey 2022-23 reveals a rural-urban digital divide in India with lower internet-searching capabilities in rural areas, especially among females.[57] Sixty-three per cent of males and 55 per cent of females in rural areas can search the internet for information compared to 74 per cent males and 69 per cent of females in urban areas. The results highlight the need for focused efforts to close the digital gap.

11.23 The NEP 2020 emphasises technology's role in improving education, removing barriers, and ensuring inclusivity for *Divyang* students. Schemes like DIKSHA,[58] Study Webs of Active Learning for Young Aspiring Minds (SWAYAM)[59], e-VIDYA[60], Pradhan Mantri Gramin Digital Saksharta Abhiyan (PMGDISHA)[61] and e-content for *Divyang* are in place to achieve the objective of inclusive digital education. The government

55 New Vision for Education. World Economic Forum (WEF) https://tinyurl.com/39m36x5h

56 A Global Framework of Reference on Digital Literacy Skills.UNESCO. https://tinyurl.com/3e832sct

57 Comprehensive Annual Modular Survey, 2022-23, MoSPI https://tinyurl.com/yxrtez7e

58 https://diksha.gov.in/data/

59 https://swayam.gov.in/explorer?category=SCHOOL

60 https://pmevidya.education.gov.in/

61 PIB release of Ministry of Electronics and IT dated 26 July 2024 (https://tinyurl.com/4w2bzwsa).

launched PM e-Vidya DTH Channel for Indian Sign Language, a significant step towards an inclusive and accessible education system for hearing-impaired students in India.[62] The ICT and Digital Initiatives component of *Samagra Shiksha* provides financial assistance to establish ICT labs and smart classrooms and covers government and aided schools having classes VI to XII across the country.

11.24 The rapid pace of technological change requires educators to stay up-to-date on new digital trends and teaching methods. In an effort to leverage technology towards enhancing the capabilities of educators and preparing them for the demands of the 21st century, the government has launched TeacherApp[63], a cutting-edge digital platform. The application offers over 260 hours of resources, including courses, videos, podcasts, and live expert sessions. It also features Teaching Kits with 900 hours of content, providing teachers with essential tools such as lesson plans, worksheets, and project-based learning activities. The application empowers teachers with essential skills and continuous capacity-building through innovative content and community-building features. It is accessible across multiple devices and offers practical strategies for improving pedagogical practices and student engagement.

11.25 Investments in skills, research, innovation ecosystems, government-academic partnerships, and faculty development are pivotal for efficiently delivering education services and improving learning outcomes. Technology acts as a powerful enabler, driving scalability, equity, accessibility, and sustainable learning opportunities across diverse groups, including schools, polytechnics, higher education institutions, out-of-job youth, and working professionals. **Box XI.6** discusses this further.

Box XI.6: Leveraging technology for efficient and effective education delivery.

The integration of technology, including AI, has become essential in addressing the rapidly evolving dynamics of the education system. AI-powered learning systems enable personalised learning experiences tailored to individual students' pace and comprehension, contrasting with traditional approaches that rely on a standardised curriculum and uniform pace for all learners. Additionally, AI facilitates adaptive assessments, aligning with students' unique needs and fostering growth at their own pace. The incorporation of technology also presents cost-effective solutions, making quality education more accessible and inclusive for a broader population.

To improve education systems, technology integration may be focused on three key areas: using AI for teacher development and student tutoring, integrating industry-relevant skills and certifications, and creating personalised learning software. These are discussed below.

62 PIB release of Ministry of Education dated 6 December 2024 (https://tinyurl.com/59ka4zpb).

63 PIB release of Ministry of Education dated 25 November 2024 (https://tinyurl.com/2znktf6u).

Leveraging AI for teachers' professional development and providing AI-driven personal tutors for students

AI can automate tasks like lesson planning, assessment development, and fostering critical thinking, freeing teachers to focus on instruction and mentoring. AI tutors can assist across subjects, offering students the necessary support and allowing them to learn at their own pace and requirements. AI personal tutors may enhance learning with resource guidance, career counselling, and problem-solving strategies. Additionally, AI-driven analytics help teachers tailor their methods to students' needs, and AI-powered platforms can recommend personalised professional development to support teachers' growth. AI can also help both teachers and students in conducting automated assessments and helping in personalised learning of the student.

The government is envisioning and developing e-learning through digital pedagogy as a long-term strategy for the education sector. Various initiatives, such as PM eVidya, DIKSHA, and SWAYAM, are part of this effort. The government has also announced the establishment of a platform under DIKSHA to incorporate advanced technologies like AI and machine learning (ML).[64]

Integrating industry-relevant skills and certifications into education

Incorporating industry-relevant skills and certifications into the educational curriculum will improve the workforce's employability. This may be achieved through the provision of certifications into education through partnerships with industry and certification bodies, practical training modules and AI-driven learning experiences.

Realising the importance of the industry-academia linkage, the Ministry of Education introduced the Apprenticeship Embedded Degree/Diploma Programme in 2020-21 to improve students' employability. Additionally, the National Credit Framework (NCrF) allows for the creditisation for apprenticeship learning hours subject to assessment/ evaluation of the same. NCrF also recommended the expansion of the Academic Bank of Credit (ABC) to include credits earned through apprenticeships, internships, project work, etc.[65] The National Apprenticeship Promotion Scheme provides financial support to industrial establishments undertaking apprenticeship programmes under the Apprentices Act, 1961.

Building personalised learning software layers & developing AI labs for research, learning and skilling

AI personal tutors in such labs can enormously benefit students across all disciplines and can be a huge aid for them. Virtual Science and AI labs offer unique, beyond-the-classroom experiences. These innovations enhance learning, strengthen foundational skills, and offer cost-effective solutions.

64 https://pmevidya.education.gov.in/diksha.html

65 https://tinyurl.com/36dy8t8w

Taking a step in this direction, Atal Innovation Mission (AIM) has introduced Frontier Technology Labs (FTLs) on the foundation of Atal Tinkering Labs (ATLs). FTL will provide students access to advanced technologies, including AI, AR/VR, blockchain, cybersecurity, robotics, 3D printing, and IoT. Building on the foundation of ATLs, which have been established in 10,000 schools across 722 districts, FTLs are designed to equip students with the skills required for the evolving technological landscape.[66]

In conclusion, it is crucial to leverage technology to transform the educational landscape in India. By doing so, a more efficient, effective, and future-ready education system can be created.

11.26 While online learning and digital technology have expanded access to education, the traditional method of learning through physical methods in the classroom still holds merit. The Tamil Nadu government launched a cost-effective remedial programme to bring education to students' doorstep to bridge the learning gaps created by the covid 19 pandemic and ensure equity leading to improvements in learning (**Box XI.7**).

Box XI.7: Tamil Nadu's Illam Thedi Kalvi (Education at Doorstep): Innovation in public education

The Illam Thedi Kalvi Scheme was launched by the Tamil Nadu government to bridge the education gap brought about by the Covid-19 pandemic and the digital divide. The initiative focuses on education through physical methods, which is the primary goal of the *Illam Thedi Kalvi*.[67]

The scheme was designed during Covid-19 to reduce students' reliance on internet resources for their learning, with volunteers assisting them. These volunteers conducted door-to-door efforts to educate the students. The initiative is helping close the educational gap by providing every student in Tamil Nadu the opportunity to receive education through this scheme.

The State Planning Commission conducted a rapid assessment of the programme's impact through a comprehensive survey in September 2022. This assessment involved the active participation of volunteers, teachers, headmasters, and parents from 362 schools across six districts: Ariyalur, Cuddalore, Nagapattinam, Salem, Thiruvarur, and Villupuram.[68] Parents reported a noticeable improvement in their children's learning experiences, noting that education has become a more enjoyable activity for them. At the same time, the teachers confirmed that the play-based approach has reignited children's interest in learning. As a result, students were interacting more freely and actively participating in regular classes. Students showed a greater interest in mathematics and made significant progress in language skills in their standard classrooms.

66 PIB release of NITI Aayog dated 6 March 2024 (https://tinyurl.com/3x4tw78x).

67 https://illamthedikalvi.tnschools.gov.in/Welcome

68 https://tinyurl.com/29f74ccs.

The scheme continues, post the pandemic, to provide necessary support to the students through remedial lessons. The scheme's volunteers work year-round to integrate out-of-school children into mainstream education, with particular attention to girls, Children with special needs (CwSN), transgender children, and those from migrant worker families. The volunteers can apply online to be a part of the programme and are also given monthly pay. The programme is managed with effective use of technology. To monitor the learning levels of primary school children, volunteers have been given achievement charts to record their progress.

Children with Special Needs (CwSN): Developing a culture of inclusivity

11.27 The National Education Policy (NEP) 2020 envisions a future where every child, including Children with Special Needs (CwSN), feels valued, supported, and included. Recognising their unique potential, the NEP emphasises creating inclusive classrooms where diversity is celebrated. It calls for barrier-free infrastructure, compassionate teacher training, and the integration of assistive technologies to ensure that CwSN can learn alongside their peers. The Samagra Shiksha scheme is in alignment with NEP 2020 and Rights of Persons with Disabilities (RPWD) Act 2016. Under Samagra Shiksha, dedicated funds have been allocated to support CwSN through aids and appliances, assistive devices, allowances, Braille materials, and therapeutic interventions including infrastructure strengthening. Infrastructure improvements include ramps in 11.35 lakh schools, handrails in 7.7 lakh, and accessible toilets in 5.1 lakh schools. The Accessibility Code for Educational Institutions (2024) examines the physical barriers and information & communication barriers of access to school facilities for CwSN.

11.28 Efforts have been made to boost CwSN enrolment at all levels, with notable increases observed in secondary and higher secondary enrolments. Although the COVID-19 pandemic caused a temporary decline, recovery efforts are ongoing to reintegrate out-of-school CwSN into formal education. According to the latest UDISE+ report (2023–24), 16.8 lakh CwSN are enrolled at the elementary level, 2.87 lakh at the secondary level, and 1.18 lakh are enrolled at the higher secondary level.[69] The various initiatives for CwSN are elaborated as below.

69 Unified District Information System For Education Plus (UDISE+) 2023-24: https://tinyurl.com/3rjucf44

Chart XI.4. Initiatives for CwSN

PMeVidya Series

NCERT's *'Teaching learning interventions for inclusive classrooms'* promotes inclusive pedagogy with ISL interpreters for accessibility.

Inclusive Cell in CBSE Schools

To facilitate equitable and barrier free environment and full participation

Disability Screening- PRASHAST

Covers 21 disabilities, available in 23 languages through a mobile app.

Over 10 lakh users and 61.57 lakh screenings completed since 2022.

Accesible content

4250+ ISL Videos, 10,500-Word ISL Dictionary on DIKSHA, 24/7 educational channel on PM eVidya, and DTH Channels.

377 NCERT Talking Bookson e-Pathshala and third-party TTS apps , and 4048 Audio Chapters on DIKSHA

Inclusive Education

National Guidelines and Implementation Framework on Equitable and Inclusive Education (NGIFEIE) (2021–2030) has been developed to provide a roadmap for creating inclusive schools, ensuring no child is left behind.

Capacity Building and Training

5-day capacity-building program for **60 lakh** teachers under NISHTHA (2023-24).

Additional **online training** for 15,964 teachers on digital resources and assistive technologies.

Module on Inclusive Education for in-service **training of general teachers under Samagra Shiksha.**

Source: Department of School Education and Literacy, MoE

Higher education

11.29 India's higher education system ranks among the largest globally, with 4.33 crore students enrolled in 2021-22, a 26.5 per cent increase from 3.42 crore in 2014-15[70]. The GER for the 18–23 age group also increased from 23.7 per cent to 28.4 per cent during this same period (2014-15 to 2021-22).[71] To achieve the government's goal of increasing GER to 50 per cent by 2035 in higher education, there is a need to double the educational network and infrastructure.

11.30 Over the years, there has been a significant transformation in higher education, ecosystem. The number of Indian Institutes of Technology increased from 16 in 2014 to 23 in 2023, while Indian Institutes of Management grew from 13 in 2014 to 20 in 2023.[72] Similarly, medical colleges experienced remarkable growth, increasing from 387 in 2013-14 to 780 in 2024-25.[73] Universities have also seen substantial expansion, rising from 723 in 2014 to 1,213 in 2024, registering a growth of 59.6 per cent.[74] Total Higher Education Institutions (HEIs) increased by 13.8 per cent from 51,534 in 2014-15 to 58,643 in 2022-23.[75]

70 All India Survey on Higher Education (AISHE) 2021-22: https://tinyurl.com/ykn75ump

71 Ibid note 70

72 PIB release dated 22 April 2023 https://tinyurl.com/58a9ntna

73 Ministry of Health and Family Welfare (MoHFW)

74 PIB release of Ministry of Education 17 December 2024 https://tinyurl.com/47e2e4sn

75 Ibid note 74 above

11.31 The NEP 2020 visualises a paradigm shift in the Indian higher education system through a restructured system. It highlights key aspects of the system like Multi-disciplinary and Holistic Education; Research, Innovation, and Entrepreneurship; Governance and Capacity Building of Teachers; Quality, Ranking, and Accreditation; Digital Empowerment and Online Education; Equitable and Inclusive Education; Promotion of Indian Languages and Indian Knowledge Systems; Skill Development and Employability and Internationalisation of Higher Education.

11.32 Importantly, the NEP envisages autonomy for institutions to innovate on these foundational aspects. It recognises that '*regulation of higher education has been too heavy-handed for decades…*' and that the '*regulatory system is in need of a complete overhaul in order to re-energise the higher education sector and enable it to thrive*.' Towards this end, the NEP suggests several institutional reforms. It asks that regulation must be `light but tight' aimed at financial probity and good governance. Regulation must also ensure transparency of key aspects in the functioning of a university such as finances, procedures, infrastructure, and faculty. Hence it calls for accreditation of institutions based on basic norms, public self-disclosure, good governance and outcomes.

11.33 By 2040, all HEIs are to become multidisciplinary institutions. The measures to achieve this aim include greater opportunities for outstanding public education; scholarships by private/philanthropic universities for disadvantaged and underprivileged students; online education and Open Distance Learning (ODL); and all infrastructure and learning materials accessible and available to learners with disabilities. The policy calls for making 'India a global knowledge superpower.'

11.34 Effective implementation of NEP 2020 requires collaboration across the centre, states, UTs, HEIs, and regulatory bodies. The University Grants Commission (UGC) has introduced several initiatives like Guidelines for Multiple Entry and Exit in Academic Programmes, Common Universities Entrance Test, Regulations on Academic collaboration with foreign HEIs for Joint and Dual Degree Programmes, Guidelines for Professor of Practice, Guidelines on Pursuing two Academic Programmes simultaneously, Guidelines for Internship/Apprenticeship embedded Degree programme, Guidelines for Admission and Supernumerary seats of International Students in Undergraduate and Postgraduate Programmes in HEIs in India, Guidelines for the Establishment of Research and Development Cells in HEIs, Guidelines on Fostering Social Responsibility and Community Engagement in HEIs in India 2.0 etc.

11.35 India's higher education sector exhibits considerable multiplicity where several institutions have achieved excellence, and many others are aspiring to reach that

standard. The challenges faced by the institutions vary, requiring tailored solutions. The regulatory framework (UGC/AICTE) currently includes over 50 regulations addressing different aspects of education and research. However, this approach does not fully align with the 'light but tight' regulatory model envisioned by the NEP.[76] For example, the UGC specifies minimum credits for various course categories (e.g., skill enhancement', `value-added') and prescribes the sequencing of courses over four years, aspects that could be entrusted to the institutions themselves.

11.36 Standardisation of key parameters and consistency of programmes across institutions is perhaps the objective of these regulations. Achieving compliance with UGC norms may be an excellent way for institutions to achieve credibility in the eyes of prospective students, faculty, and employees. On the other hand, such compliance is not essential for quality institutions. These have already achieved strong reputations in teaching, research, and placement of their students. These institutions have innovated on some dimensions of their functioning, and they should be encouraged to follow that path since that is the only way to compete with global institutions.

11.37 It should be explicitly stated that compliance with regulations beyond the minimum accreditation requirements (proposed in NEP) is voluntary. Such compliance will be desired by institutions wishing to signal their capability and credibility.

11.38 Institutions that desire to stand by their own hard-won reputations should be free to carve out their own path. There is no greater accountability than that demanded by the market through prospective faculty, students, their parents, and collaborating academic and non-academic institutions. In the spirit of good governance and transparency, these institutions should be required to publicise prominently that they are not complaint-certified by the regulator. It is important to embrace diversity and to trust the genius of faculty and students to come up with frameworks that are novel, creative, and impactful on society.

11.39 Further, there is an increasing focus on strengthening the ecosystem for professional/technical streams of education such as medicine. Emphasis on regulatory reform and enhancement of standards is being made. **Box XI.8** discusses the medical education landscape's challenges and measures taken to address them.

76 https://tinyurl.com/bpn69rvx

Box XI.8: Challenges to medical education and action

The medical education ecosystem in the country has made significant strides, with notable achievements that lay a strong foundation for future growth. However, there are exciting opportunities to further enhance the system and ensure it fully aligns with broader policy objectives. While the regulatory framework has made progress, there is an opportunity to evolve and keep pace with the dynamic needs of the healthcare sector.

The number of candidates aspiring to study MBBS has increased consistently over the years, from around 16 lakh in 2019 to around 24 lakh in 2024.[77] The National Eligibility cum Entrance Test – Under Graduate (NEET-UG) is the single mode of entry through which students enter into medical education, MBBS courses in India and abroad. There has been a sustained increase in the number of opportunities available for medical education in the previous ten years. Since FY19, the number of medical colleges grew from 499 to 648 in FY23 to 780 in FY25, during which time the MBBS seats increased from 70,012 to 96,077 in FY23 to 1,18,137 in FY25 and post graduate seats increased from 39,583 to 64,059 in FY23[78] to 73,157 in FY25.

There are 13.86 lakh practitioners of modern medicine registered as of July, 2024,[79] which converts into current availability for the whole population of the country in the ratio of 1:1263.[80] The WHO standard norm of 1:1000 seems to be attainable by 2030 with a conservative 50,000 doctors being licensed every year till 2030. Thus, numerical shortage of physician availability in India is perhaps no longer a primary concern. However, there are some larger concerns warranting attention. These are discussed below.

The issue of affordability

Unlike other professional education streams, fees for medical education is highly regulated. In case of government medical colleges, the respective state governments are responsible for fixation of fees. In the case of private unaided medical colleges, the fee structure is decided by a committee set up by the respective state government under the chairmanship of a retired High Court Judge in pursuance of the directions of the Hon'ble Supreme Court of India.[81] The National Medical Commission (NMC) has issued guidelines for determination of fees and all other charges in respect of 50 per cent of seats in private medical institutions and deemed to be universities. Despite such measures, fees remain high – at ₹60 lakh to one crore or more[82] in the private sector which holds 48 per cent of MBBS seats. This highlights the opportunity to make medical education more accessible and affordable for all, particularly

77 National Testing Agency, Press release 26 July 2024 (https://tinyurl.com/3nxf8uru).

78 Lok Sabha Reply to Starred Question No. 7 on 2 February 2024. https://tinyurl.com/34ezez47

79 Lok Sabha Reply to Starred Question No. 7 on 2 August 2024 https://tinyurl.com/cbtfvemj

80 Physician availability is calculated at 80 per cent of registered doctors, as per norms-and population of 140.07 crore for 2024, as projected in the Report of the Technical Group for Population Projections, Ministry of Health, and Family Welfare available at https://tinyurl.com/3bn4mrym

81 Lok Sabha Unstarred Question No. 391 on 21 July, 2023 https://tinyurl.com/cks2yr5z

82 157th Report on Quality of Medical Education in India, Department related Standing Committee on health and Family Welfare February, 2024. https://tinyurl.com/472h232h

for those from less privileged backgrounds. By reducing the cost of medical education, we can contribute to lowering healthcare service costs. If universal coverage is the goal, prioritising cost and equity in medical education will be key to achieving it.

The consequence is that every year thousands of students go abroad to around 50 countries especially those with lower fees such as China, Russia, Ukraine, Philippines, Bangladesh.[83] Medical education abroad entails hardships of studying abroad and productive years of youth invested in repeated attempts at exams - the NEET-UG before taking admission, the Foreign Medical Graduates (FMG) Exam[84] on completing the course and then complete compulsory internships of 12 months in India.

FMGs in China (during COVID lockdowns) and Ukraine (as the conflict escalated), had to return to India dropping their education and faced uncertain prospect. The subsequent regulatory issues in addressing the difficulties faced by FMGs and the need to maintain standards in allowing them to practice in India has been a challenge and has required interventions of the courts in more than one occasion. The very low pass percentage of FMGs in the qualifying exam (16.65 per cent in 2023[85]) indicates sub-par quality of medical education abroad including lack of clinical training. As policy intervention to dissuade medical education abroad is crafted, keeping costs is India within reasonable limits is essential.

Geographical reach

The availability of opportunities for medical education appears to be geographically skewed, apparent from the fact that 51 per cent of undergraduate seats and 49 per cent of post-graduate seats are in the southern states.[86] Further, the availability is skewed in favour of urban areas with the urban to rural doctor density ratio being 3.8:1.[87] These patterns tend to follow the pattern in availability of healthcare services in general. It has been estimated that 75 per cent of dispensaries and 60 per cent of hospitals are in urban areas, where 80 per cent of doctors serve.[88] The imbalance in distribution can be attributed to the state/region level of economic development, demand for and expansion of healthcare services, and increasing market for medical value travel.

The growth in the number of medical practitioners offers a prospect to improve the distribution of healthcare professionals across regions. While many graduates and specialists prefer to practice in their home states or in major cities due to better amenities and professional opportunities, this presents a chance to enhance healthcare access in rural and underserved

83 Country-wise Performance in FMGE 2023 https://tinyurl.com/yc2k6zuz

84 The FMGE is conducted twice a year and the average pass percentage in 2023 was 16.65 per cent with 61,616 candidates appearing, showing that the quality of education abroad is not on par with standards in India and FMG then require multiple attempts to qualify. Students may require anywhere between a minimum of 8-10 years to become eligible to obtain the license to practice.

85 Ibid 83 above

86 As per numbers available for Andhra Pradesh, Karnataka, Kerala, Puducherry, Tamil Nadu, Telangana and Maharashtra in Lok Sabha Reply to Starred Question No. 7 on 2 February 2024. https://tinyurl.com/34ezez47

87 FAQs on National medical Commission (Bill) 2019 https://tinyurl.com/b4y43cv3

88 Mishra, S., Mohanty, S.K. Out-of-pocket expenditure and distress financing on institutional delivery in India. Int J Equity Health 18, 99 (2019). https://doi.org/10.1186/s12939-019-1001-7

areas. By offering incentives, improving infrastructure, and fostering professional growth in these regions, we can attract and retain healthcare professionals, ensuring a more balanced and equitable distribution of doctors to strengthen public healthcare services nationwide.

Specialisations

There is also a skewed distribution of seats in favour of specialisations like radiology, dermatology, gynaecology, cardiology while specialities like psychiatry, geriatrics etc., are neglected. The current shortage of specialists across specialities will further aggravate in streams that are currently not preferred but will be required in the future. Demand for post graduate education is not restricted by the need for clinical practitioners, these doctors form the resource pool for research and development in advanced fields of medicine, pharmaceuticals, biotechnology etc. They are also crucial as faculty and trainers of the next generation. While we focus on increasing facilities for specialisations it is also necessary to maintain distribution across geographies and streams.[89]

Remuneration

Market estimates indicate that remuneration of fresh graduates is around ₹ 5 lakh and senior doctors earn between ₹12.5 -18.4 lakh per annum in cities.[90] This is almost similar or lower to the packages that are available to other graduates at the entry level. The attraction towards the medical profession, as seen from the consistently increasing number of aspirants, seems to arise more from the social status attached to it rather than its earning potential. This may mean that the availability of meaningful work and commensurate remuneration may reduce with increase in the number of doctors available in the future. This would reinforce the already occurring migration of doctors from India into greener pastures. The OECD countries reported in 2021 that there were close to 19,000 physicians from India in their workforce and migration in 2021 alone was over 2800 physicians. Increased public and private sector investments into medical education is in effect creating a global health workforce. The trends in migration need to be factored while incentives for service in public health system are calibrated to ensure availability of doctors in rural areas.

Other issues

Quality of education is directly related to the availability of qualified and experienced faculty and the clinical exposure at the hospital. Regulatory requirements in terms of both are robust. Non-compliance carries penalties including the cancellation of recognition of courses. The NMC is empowered to monitor and penalise such non-compliance. Measures such as CCTV cameras and an Aadhaar based attendance system which are centrally monitored by the national regulator have been put in place. The granularity of regulations may appear necessary given that medical profession deserves to be of the highest quality possible but also seem overbearing in terms of associated compliance and monitoring costs. Despite the

89 The 157th Report on Quality of Medical Education in India, Department related Standing Committee on Health and Family Welfare February, 2024 – Para 2.7 -2.15

90 https://tinyurl.com/5573epev.

elaborate regulations and monitoring, issues like shortage of faculty, ghost faculty, low patient load in hospitals etc., continue to affect the quality of training. There may be need to revisit the incentive-disincentive and design of regulatory measures to improve compliance, reduce costs and prevent associated rent-seeking.

The success of any policy, including regulatory ones, lies in its execution. If outcomes do not align with our goals or if there are unexpected effects, it is essential to take a step back and refine these policies to make them more meaningful and impactful.

Conclusion

To address the uneven distribution of seats and to expand the availability of seats, the central government is supporting the states through three centrally sponsored schemes, viz., the construction of new medical colleges, creation of infrastructure for expansion of MBBS and post graduate seats.[91] The regulatory reform process started with the setting up of the NMC in 2019. NMC has since brought into effect broad based regulations specifying minimum standards for establishment of colleges, increasing number of seats, opening new courses, introduction of a competency-based curriculum, minimum qualification, and training of teachers etc. In collaboration with the Quality Council of India, a rating and accreditation system for medical colleges has also been proposed.

With all these efforts being made and the private sector remaining an active participant, the medical education landscape presents large opportunities for the future and presents a bigger challenge to policymakers than any other field of professional education does.

TOWARDS A HEALTHY NATION

11.40 Health is a crucial component of human capital and a valuable asset for a prosperous and stable economy. It boosts productivity, reduces healthcare needs, enhances life expectancy, and supports social development. Furthermore, good health is foundational for the young generation to achieve their aspirations and contribute to society. The emphasis on health is important given that India is emerging into an economic powerhouse driven by its youthful population. Through concerted efforts by individuals, communities, and policy interventions, a robust and healthy generation of adults can be raised. Government initiatives, including preventive measures, universal access to high-quality healthcare, strengthened public health infrastructure, and advancements in medical education, have collectively contributed to making healthcare in India more accessible and affordable for all.

91 https://mohfw.gov.in/?q=pressrelease-33