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Education and Skilling for Employment: From Credentials to Learning Outcomes

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By

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Abstract

This paper examines India's education and skilling system within the context of the country's employment eco-system. This is an incredibly complex task. The first challenge is in comparing India with its 1.4 billion people and 36 States and Union Territories (UTs), with countries of different sizes and levels of per capita GDP (PCGDP). The second challenge is to find consistent and comparable data for this vast and diverse Nation to evaluate the evolution of education and skills over time. This challenge is multiplied manifold when comparing the 28 States and 8 UTs, with diverse education, skilling and testing systems, and different levels of Per capita State domestic product (PCNSDP).

Though the focus of the paper is on Education, Skilling and Employability, the analysis cannot be divorced from some of the unique features of India's labor market. Only 23% of workers are regular wage or salaried employees, with a substantial fraction of these in the informal sector. 58% of these workers are "self-employed" – better described as "micro-entrepreneurs", whose skilling needs and requirements, are seldom recognized in the employment literature. The remaining 19% of "casual workers" have their own unique needs for education, skills and job placement. Much of literature focuses on the top end of regular, formal jobs, constituting roughly 10% of workers in India, but for most of India's micro-entrepreneurs, "*Skills and Jobs are two sides of the same coin*."

This paper conceptually simplifies the employment ecosystem into a set of three pyramids; The education pyramid, with three layers of primary, secondary and tertiary education; the Skills pyramid with un/low skilled, semi (medium) skilled and (highly) skilled; and the Jobs pyramid with low/minimum wage, average wage, and high wage employees.

The education pyramid is a relatively recent phenomenon in India, with the education system better characterized as a cylinder in earlier years. The relative neglect of schooling in the first 50 years after independence, is reflected in low adult literacy, and low share of adult population with different levels of schooling.

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The change in attention in past 15 years is reflected in the better youth literacy rates. This in turn is due to the improvement in the primary enrolment and completion rates over the decades. With access to primary education having improved, the focus has shifted to improving quality of learning outcomes. Learning outcomes depend on pedagogy, teaching at the right level, repeated testing to sharpen focus on slow learners, and teacher re-training. International comparative analysis shows, that national learning outcomes correspond to our Per Capita GDP, but it will be a challenge to raise them to High Income PCGDP levels in 25 years.

One intriguing finding is that in a cross-country comparative context, almost all educational indicators are positively corelated with per capita GDP. In contrast, in an inter-State comparative context (within India), almost all education indicators are un-corelated with Per capita Net Domestic product (PNSDP). Despite considerable variability across States & UTs and across time, the paper finds little or no correlation between minimum learning outcomes and PCNSDP. There is no evidence that variation in school infrastructure, teacher pay, or subsidies to child's family, improve learning at primary & lower secondary levels.

Some States have made notable progress in improving learning outcomes in primary schools, during the past decade (2014-24). Children (Std V) with Minimum reading proficiency (MRP) has increased by 11.7% points in UP, 10.9% points in Jharkhand and 7.6% points in Odisha. Children with Minimum Arithmetic proficiency (MAP) have increased by 13.7% points in UP and 10.4% points in Odisha. This is far above the all-India increase of 0.6% points in MRP and 4.6% points in MAP during the same period. Share of children with MAP are however 63% of children with MRP, showing that pedagogy is a greater challenge in arithmetic/math than in reading.

The New Education Policy (NEP, 2020) has recognized the links between education and job skilling. Besides exploring the links between education, skills and jobs, this paper also explores the missing links between stake holders, market participants and State governments. There is an urgent need to deepen cooperation between Govts (C&S), Industry and NGOs/NPOs to improve employability. Private markets are functioning adequately to connect the top levels of the three pyramids. They only need a positive environment (EODB) from State & Central Governments. Market connectivity and efficiency, is poor at the middle levels of the three pyramids, and virtually absent at the bottom of the pyramids, despite efforts by Govts and NGOs. Much greater effort is necessary, by State & Local Govts and NGOs, supported by Central Govt, and Private Industry with its experience in job skills and CSR funds. Every skill advisory committee at the State and local level should have a majority of representation from the most dynamic entrepreneurs and exporters of the State & local area respectively. By strengthening the middle of the skilling pyramid, we can make India the human capital supplier to the World: "*Skill for India, Skill for the World.*"

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1. Introduction

In the context of India's goal of sustained, fast, inclusive growth to achieve a Viksit Bharat, education and skilling are critical for employment and wage growth. Education builds human capital which has been recognized as an important complement to Physical Capital. Education implies learning, and only learning outcomes matter for subsequent acquisition of job skills and productive employment. Education cannot be measured by the certificates issued for primary school, lower secondary school and upper secondary school, if they merely indicate the number of years spent in school, if the majority of students don't have minimum proficiency in Reading and Arithmetic. Such certificates do not necessarily create human capital.

Since 1960, economists have emphasized the importance of schooling in economic development and growth. Human capital was commonly measured in terms of average years of schooling of the labor force, in the empirical literature on production and productivity. In the early 2000s economists began to question the use of simple measures like primary or secondary school enrollment or years of schooling (formal completion rates), in determining growth. Several researchers found that the link between average years of education & similar indicators, and actual learning, was tenuous. They hypothesized that there was a gap between years of schooling and accumulation of human capital. As Pritchett (2001) put it, "the true problem is that years of schooling do not reflect learning." "The education system has failed, so a year of schooling provides few (or no) skills." Internationally comparable test results showed large differences between average marks of children in many developing countries, and those from East Asian & OECD countries. This suggested low quality of schooling in the former, relative to the latter.[2]

Quality of education and cognitive ability of labor force was recognized as a key differentiator of the quality of human capital. In particular, the performance on internationally comparable tests of math and science was shown to be highly significant factor in economic growth. Since then, the importance of international tests of language and math learning outcomes, such as PISA, TIMSS and NAEP have received more attention across the World. Over the last decade OECD and others have tried to directly measure literacy, numeracy & problem-solving ability (PIAAC) of adults across the OECD. Based on this data, researchers have constructed learning adjusted years of schooling.[3] And other indices, which combine quantity & quality of schooling. This data also allows researchers to directly link adult workplace skills to productivity and employment outcomes.[4]

[2] "Low quality of schooling is consistent with the macroeconomic evidence and is obviously consistent with the household evidence of little or no wage increment from additional schooling." Pritchett (2001)

[3] World Bank/Angrist et al. (2021).

[4] Survey of Adult Skills-PIAAC [OECD (2023)]

A recent review by Nancy Birdsall (2025) of the economic growth of the "miracle growth" East Asian economies like South Korea, Taiwan, Malaysia and Thailand has re-emphasized this point. To quote "the key to the unusually high total factor productivity growth of the East Asian economies, which distinguished them from most other developing countries, was the "technological learning" associated with their export push (as exporters learned from and through interactions with importing firms abroad). But behind technological learning at the factory level, was the high level of good-quality schooling of managers and workers. In other words, a key lesson from East Asia is the emphasis, going back decades, on high-quality primary and secondary education and on secondary and post- secondary technical education." (Birdsall (2025))

The goal of Primary education is to ensure that students master literacy and numeracy by grade three (approximately age 10) so they can access the broader school curriculum. Children who cannot read by grade three struggle to catch up, eventually falling so far behind that no learning occurs at all. The core ingredients of this element include learning assessments of each child, reading and math assistance for students in grades one to three who need additional support, and an assessment at the end of grade three to identify children at risk.[5]

India's NEP has adopted some of the lessons learnt, but there are significant gaps in our understanding of the quality of education and of learning outcomes across India. Public knowledge about skilling and skill development systems is even more limited. This paper uses available data to present a more detailed view of India's Education system, with particular focus on learning outcomes. It also explores India's skilling system and the links between education, skill development and employment

Education and employment are typically dealt with in separate silos. Vocational and Technical education is often another separate silo. Job placement & matching skills to jobs is seldom the primary responsibility of any public institution. Lifelong learning is now a buzz word, but few understand the importance of "learning by doing" and the links to the quality and appropriateness of education and skilling.

Skilling is both a necessary response to the limitations of the current education system as well as a job creator in itself. Poor foundational learning leads to dropouts at both primary and later stages. Even those who formally complete school or higher education often lack practical, job related, competencies. Therefore, improving the quality and relevance of education is essential not only to reduce dropout rates, but also to ensure that young people can acquire relevant, job-ready skills. At the same time, students who do leave the system early, must be provided with alternate skilling pathways, so that no young person remains idle or excluded from the economy. The large share of self employed in employment (58%) is an additional important reason for emphasizing vocational education & training.

[5] World Development report (WDR) 2019.

This paper explores the system of schooling, skilling, placement and employment, a system riddled with information and co-ordination problems, incomplete and missing markets. Historically, controls and restriction on provision of education by private commercial and non-commercial organizations, constraints on size of firms, labor regulations and even constitutional requirements and judicial interpretations, have contributed to slow development of markets for human capital. This paper attempts to fill the information gap by examining general, vocational education & training, technical & professional education, job skilling, job placement, learning by doing & firm provided training, and wage growth, as parts of an integrated view of the employment eco-system. It also explores critical parts of the system for creating employment, higher paying jobs and wage growth.

As India aims to become a developed country by 2047 under the PM's vision of "Viksit Bharat", improving the productivity of its young population is essential.[6] While access to education has expanded, learning outcomes remain weak. There is a gap between the credential or degree and the learning expected of students with those qualifications. There is also a gap between what is learned in school & college and the basic requirement of jobs; many students earn degrees but lack the job skills needed to secure matching jobs. As a result, formal education alone does not guarantee better wages or economic mobility.

Section 2 provides an overview of the paper, an executive summary for policy makers. Section 3 provides a framework within which the education & skilling system is analyzed. The New Education Policy NEP (2020) is a key part of the framework, as it is designed to address these issues. The NEP is summarized in this section. Section 4 takes stock of 75 years of education since independence; in terms of the education levels of the adult population compared against global benchmarks. Section 5 focuses on primary education, presenting international comparisons on primary school enrollments, completion rates and foundational learning. It also explores rural learning outcome, disparities across states. Section 6 moves to secondary education; Starting with the transition from primary to secondary education it then analyzes enrollment and completion rates using available data on learning outcomes. Section 7 highlights school level issues including pupil teacher ratio, gender parity, school types and the state of digital infrastructure such as internet and computer access in schools. Section 8 presents available data on student retention and school dropout rates, as a point of transition for many youths in India, from school to jobs, and the corresponding unfilled need for training for low skill jobs. Section 9 provides an overview of the complex employment eco system. Section 10 addresses the skilling landscape by assessing the scale and structure of vocational education, formal training by firms, and the role of institutions like ITIs and NCVT. Section 11 covers tertiary education, with a focus on enrollment, completion, and the quality of skills training in relation to employability. Section 12 focuses on adult education, particularly the size and scalability of India's educated labor force in comparative perspective. Section 13 examines research and innovation through indicators such as doctoral completions, R&D

[6] Reference is to labor productivity and the role of education & job skills in enhancing it.

expenditure, researcher and technician density, firm-level investments, innovation outputs, and patent activity. Section 14 concludes the paper.

2. Overview

The paper starts with the analysis of the post-independence structure of education during the first 50 years or so and the legacy it left in the form of adult literacy and education. Partly as the result of the cylindrical structure of education with a narrow base and over emphasis on higher education, adult literacy rate, and the share of adults with primary and secondary education were still below the level appropriate for our per capita GDP. Tertiary education was, in contrast at or above the level expected at our per capita GDP.

Positive adjustment in the education system in the last 15 years or so are reflected in Youth literacy rates, which were 14% higher than the minimum expected at our Per capita GDP level. This in turn reflects the good performance in Pre-primary and primary education enrolment. Primary enrolment and completion rates were significantly above the benchmark rates for our per capita GDP. Somewhat surprisingly the average quality of teaching and learning as measured by minimum reading proficiency was also above the international comparative benchmarks. There is however a challenge before us, to raise the minimum learning outcomes to the benchmarks appropriate for the per capita GDP levels which we are aiming to reach by 2047. This challenge is much higher for raising Minimum arithmetic proficiency than for raising Minimum reading proficiency.

The next stage in the education pyramid is the retention rate/drop-out rate of students between primary and secondary education. In international comparative perspective India's retention rates are above the benchmark rates for its per capita GDP. The enrolment rate in secondary school is just above the benchmark rate. State enrolment rates are found to be the only education indicator corelated with PCNSDP, in both lower secondary and upper secondary school. The completion rates in both lower secondary school and upper secondary school are significantly above the benchmark for our per capita GDP. Only a modest effort is needed to achieve the lower secondary completion rates expected for a high-income country, the achievement of benchmark levels for upper secondary completion rates will be more challenging. All India rates would have to rise from the current 63% to 79% in 20 years.

The limited information available on Minimum learning proficiency in Lower secondary school (Std VI to VIII), however, introduces a note of caution. In rural areas, 42% of Std VI, 36% of Std VII and 29% of Std VIII students cannot read a Std II level text. Though we don't have direct data for urban areas we estimate that MRP may be 10%-12% points better than in rural areas. The situation is even more challenging with respect to minimum arithmetic proficiency (MAP); 64% of rural students in Std VI, 59% in Std VII and 54% in Std VIII cannot do division.

International comparisons of Indian skilling parameters were a lot less encouraging. The share of secondary students enrolled in Vocational and Technical training was 13% points below the international benchmark for a country at India's per capita GDP. International comparative data on the share of adults who have taken post-secondary training and share of adults who have taken tertiary, short cycle courses show a somewhat better picture. Compared to the benchmarks for its Per capita GDP, India's adult population is only (-)6% points below the benchmark for post-secondary and (-)3% points below the bench mark for tertiary courses. A number of schemes and portals have been launched in the past ten years to remedy this situation, but raising them to UMIC and HIC benchmarks in five and 25 years respectively, will require a herculean effort.

Firms providing formal training to their employees, is 7.7% in India, 8.7% in Vietnam and 8.4% in Indonesia. This could be partly due to more competitive labor markets for corporate employees. The incentives can be changed by allowing Companies and large firms to use a much greater fraction of their funds to train both employees and to upgrade ITIs and Polytechnics. This will be critical, if we want Indian private sector to compete with Thailand, Malaysia and Mexico, with 18%, 24% and 38% of their firms have employee training programs.

India 's tertiary education is comparatively well placed in international comparative frame. India's tertiary enrolment rate is almost at the exact benchmark for its per capita income. Its Adult population with Bachelor's degree is slightly above, and Master's degree a little below the benchmark for its per capita income. Given its enormous population this makes its total, tertiary educated adult population, the second highest in the World after China.

A critical goal of the education and skilling system is employment. The Global employability Test (GET) is one way to measure its effectiveness. Employability of those trained by this system can be divided into three categories. Those graduating from Vocational institutions (VET) like Industrial Training Institutes (ITI) and Polytechnics have the lowest employability, and those graduating from professional institutions such as Engineering (BE/BTech, Computers (MCA) and Management (MBA), have the highest employability. Graduates of the University-college system (BA, BCom, BSc, MA) fall in middle of the employability spectrum. At the top of the system are the Professional Institutions with employability in the 70-78% range in 2025. Next come the Universities(-colleges), with employability in the 55-58% range. Then come the ITIs at just over 40% and finally the Polytechnics at a little under 30%. The good news is, that Employability has improved across the board during the past six years for which data is available. The simple average increase of employability is 10% points for Polytechnics, 20% points for universities, and 28% points for professional institutions (2019-2025).

The benchmark used in this paper are generally a function of per capita GDP. Absolute numbers of educated and skilled population, labor and work force is relevant when we defining comparative advantage relative to both our comparator countries and vis-à-vis other countries. Future comparative advantage depends on the relative numbers of school & university educated being graduated from its schools & colleges respectively. Even with India's school completion rates lower than higher income comparator countries, the comparative numbers are higher than China's and often exceed it. The number of children completing primary education in India (137 mil) were 1.25 times those in China and more than 2.5 times the combined total of Vietnam, Indonesia, Thailand and Mexico (MIC4). The number of children completing lower secondary school (65 mil) were 1.2 times those of China. The number of children completing upper secondary school (98 mil) were also 1.2 times those China and 3.7 times those of the MIC4 (Vietnam, Indonesia, Thailand & Mexico) combined. The number of students enrolled in tertiary education (52 mil) was more than double those of the four comparators combined.

The current stock of adults with different levels of education, also compares well with relevant comparator countries. Broadly India has a larger number of adults with Tertiary education (Bachelors & Masters) than China, while China has a higher number of adults with primary & secondary education; India's adult population with bachelor's degree was 1.4 times China's, while its adults with secondary education were 0.85 China's. India's stock of adults with primary, lower and upper secondary education was 1.8 to 2 times the corresponding numbers for MIC4 (combined).

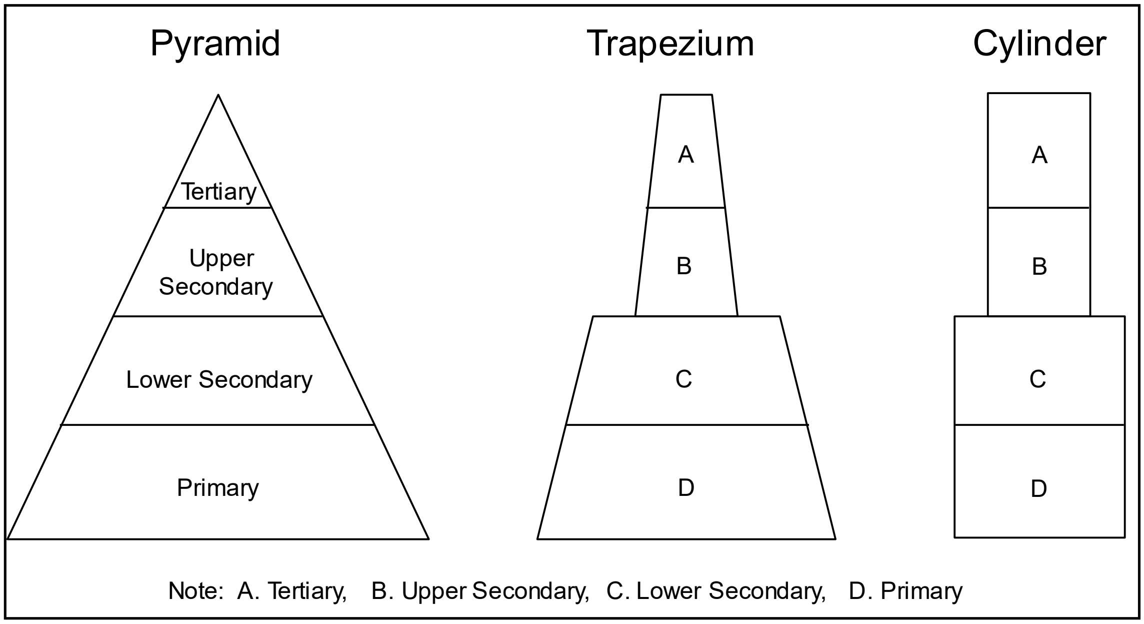
3. Framework and Methodology

The development of Indian education was framed by the constitution. Education including Universities was entry No. 11, in List II (State list) of the constitution. The 42nd amendment of the constitution in 1976, effective January 1977, deleted this entry and inserted Education as entry 25, in list II (concurrent list) of the constitution. Parliament obtained the right to set All India norms, while all other rights remained with the States as long as they do not collide with union law (Art 254). Entries 63-65, List I (Union list) in which Parliament had the right to declare institutions of National importance, establish agencies for specialist training & research, and legislate academic standards in institutions of higher education and research, continued unchanged.

This meant that Primary and Secondary education (primary, middle and high school) was the sole responsibility (and right) of the States, from independence in 1947 to 1976, when education was moved to the concurrent list of the constitution. Thus for 30 years, Indian States had the complete and full responsibility to provide education to its residents and the national result in primary & secondary education, were a mere aggregation of different results obtained by States each with own goals and priorities. The constitutional position was therefore one of decentralization, similar to the USA in some ways, but very different in others.

The USA had an even more decentralized system for education than India, with local authorities playing a big role in primary and secondary education, financed by local taxes. USA successfully built a *pyramidal system* of education, with a wide base, a narrower middle and a highly effective and efficient high end (Figure 1**,** left panel). At the other end of the development policy spectrum, the USSR, with a very centralized national education system, also created a pyramidal structure of education, but with a much narrower middle than the USA.[7]

Figure 1: Education structures: Pyramid, Trapezium and Cylinder



In contrast to both USA and USSR, India created a *cylindrical structure* of education in the early decades (right end of Figure 1). This was partly due to the constitutional division of responsibilities, in which National government had a substantial role in higher education, but States had absolute authority and control over primary and secondary education for four-five decades. The adult literacy rate was 40.8%, and youth literacy rate was 53.8% in 1981, despite the shift of Education from the State list to the Concurrent list of the constitution in 1977. The adult population with "lower secondary" education, was 16.2% of all adults 25 years old & over (1981). The low youth literacy rate reflected the primary school enrolment rate of 61% in 1971 (Table 1).

The USA's success in Primary and secondary education was driven by local Govts and communities. They created the Govt (public) education system, using local taxes to create universal access to Primary education by 1910 and near universal secondary education (~73%) by 1940, from ~19% in 1910 and ~50% in 1930. At the State level India's education system, with Primary & secondary education centralized in the State capitals, with no decentralization to local rural and urban levels, was more akin to the USSR's centralized national system. USSR raised the primary enrolment rate from 40% in 1914 (Tzarist Russia) to 60% in 1928 (post revolution recovery) to 95% in 1932.[8] India in contrast had a primary enrolment rate of 79.5%, and a primary completion rate of 75.3% in 2000, 50 years after independence. India did not

[7] Like Eiffel tower

[8] USSR was much less successful in raising the secondary enrolment rate which was 15-18% in 1930 and ~21% in 1940, with only10-15% completing secondary School.

have universal primary education, and its secondary school gross enrolment rate of 47.2% (2000), was half way between that of the USA and USSR in their education system development phase (1930-1940).

Table 1: Education Indicators: 1971, 1981, 2000, 2011 and 2018

Education Indicator (% of relevant group)	1971	1981	2000	2011	2018
Adult Literacy (% of pop 15+)		40.8	61.0	69.3	73.7
Youth literacy (% of pop 15-24)		53.8	76.4	86.1	94.6
Primary education, pop25+ (%)			39.0	51.4	59.6
Lower Secondary education, pop25+ (%)	5.0	16.2		37.6	46.1
Upper Secondary education, pop25+ (%)			9.8	26.9	32.3
Bachelor Education, pop25+ (%)				9.1	10.8
School enrollment, primary (% net)	61.0		79.5	90.4	
Primary completion rate, (% of relevant age)			75.3	93.3	
School enrollment, secondary (% gross)			47.2	67.1	76.0
School enrollment, secondary (% net)					
Lower Sec Completion, (% of relevant age)				77.4	
School enrollment, tertiary (% gross)			9.9	23.3	28.4

Data source: World Development Indicators, December 2025. Historical data is available for selected years for each variable.

USA's private sector (including endowments and trusts) was welcomed and encouraged to play a role in USA's highly successful higher education system, Indian Courts have historically restricted private for-profit education.[9] The USSR succeeded in creating a highly educated (STEM) industrial workforce and in achieving specific technological milestones, especially in defense and space.[10] India can learn much from the experience of USA's highly successful higher education system, but the USSR and PRC experience is also relevant, because much of India's higher education and R&D system is still administered by Government.

Table 2 illustrates the evolution of India's education system from a cylindrical structure through a Trapezoid to a Pyramid, based on regression equations for adult education, shown in Figure 2. Figure 2 uses available data on adult qualifications (primary, lower secondary, upper secondary and Bachelor) in different years to run an intertemporal regression. The best fitting equations are then used to interpolate & extrapolate the data (upper panel of Table 2).

[9] In *Unni Krishnan v. State of Andhra Pradesh* (1993), the Supreme Court ruled that education is a fundamental right under Article 21 but cannot be commercialized or treated as a business for profit, prohibiting "profiteering" while allowing only reasonable surplus for expansion. In T.M.A. Pai Foundation v. State of Karnataka (2002), it reinforced this by permitting private unaided institutions autonomy but mandating they avoid profit motives, aligning with Article 30 (minority rights) and public policy against education as trade.

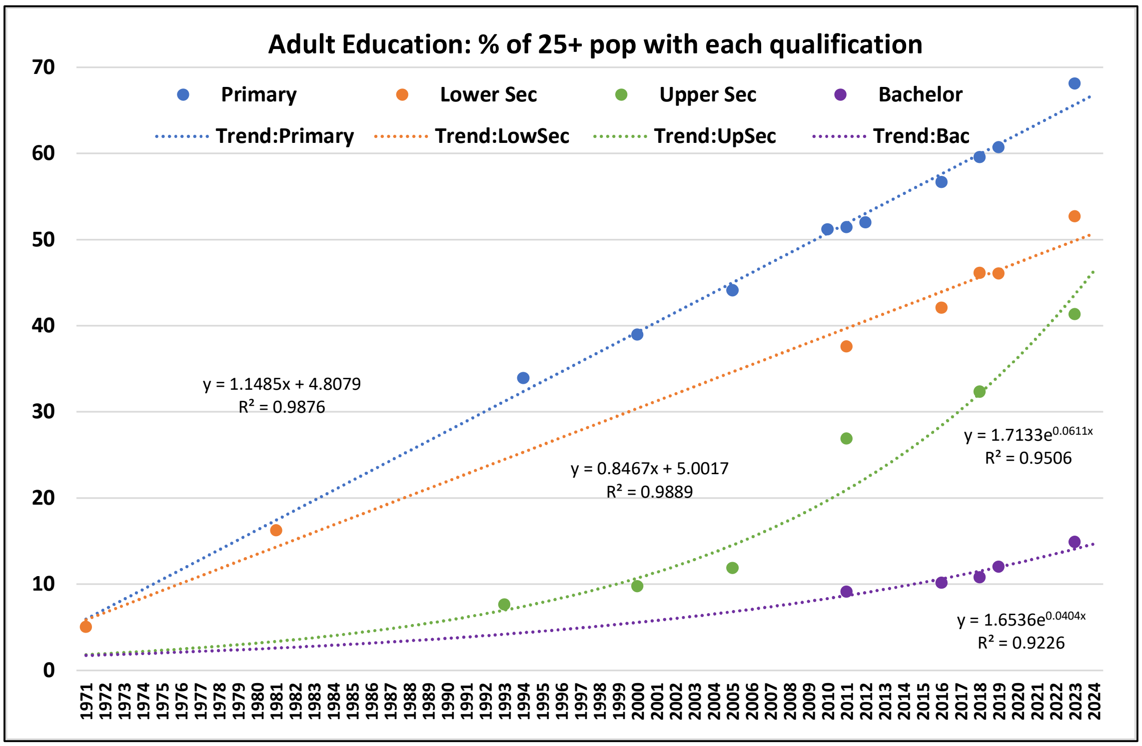
[10] The state provided Universal Access at the Base, rigorous Selection for Advancement, Structured Academic and Career Ladder, and Elite Institutions at the Top. Competitive exams and specialized tracks (such as physics-maths schools and Olympiads) enabled academically gifted students to rise through the system. Advancement through institutional hierarchies provided structured mobility for those who met performance standards.

Table 2: Projection of Adults age 25+ with different Qualifications based

	1971	1981	1991	2000	2011	2019
Qualification	***Estimated Value based on regression***					
Bachelor Degree	1.7	2.6	3.9	5.6	8.7	12.0
Upper Secondary	1.8	4.9	5.8	10.8	22.4	34.7
Lower Secondary	5.8	14.3	22.8	30.4	39.7	46.5
Primary	6.0	17.4	28.9	39.3	51.9	61.1
	Ratio of estimated value to Primary					
Bachelor Degree	0.29	0.15	0.13	0.14	0.17	0.20
Upper Secondary	0.31	0.28	0.20	0.27	0.43	0.57
Lower Secondary	0.98	0.82	0.79	0.77	0.77	0.76
Primary	1.00	1.00	1.00	1.00	1.00	1.00

Source WDI, Dec 2025.Authors calculations based on intertemporal regressions in fig 2.

Figure 2: Long term trend in Adult Education (% of 25+ pop with each qualification)



Source WDI, Dec 2025. Lines represent intertemporal regressions. Equation & R^2 are shown.

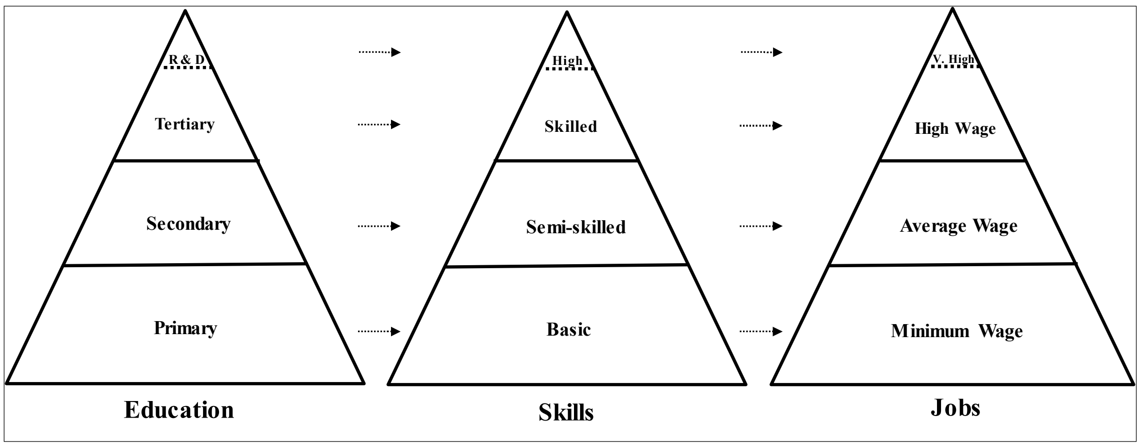
In 1971 the structure was a double cylinder (Figure 1, right panel), with the ratio of Bachelors to Primary and Upper secondary/primary an estimated 0.31 and 0.29 respectively, with lower secondary/primary at 0.98 (rows 7, 8 & 9, Table 2).[11] By 1981 these ratios had become 0.15 for bachelors/primary and 0.28 for upper secondary/primary, transitioning to a double trapezoidal structure (Figure 1, middle panel). Pyramidal structure began to emerge during 2000-2011 with Bachelor/primary ration of 0.14, upper secondary/primary ratio of 0.27 and

[11] Literally a cylinder on top of a trapezium.

lower secondary/primary ratio of 0.77 in 2000 and ratios of 0.17, 0.43 and 0.77 respectively in 2011 (Table 2, lower panel).

As we survey the human capital eco-system in India today, education, job skills and employment opportunities can be viewed as three pyramids. The education pyramid is built on a base of primary education, with secondary education in the middle and tertiary education at the top and researchers at its pinnacle or tip. Similarly, the Skills pyramid is built on basic/low skills, with "semi-skilled" in the middle, and skilled on top (Figure 3).

Figure 3: Education, Skill, and Job Pyramids: Interlinking challenge



The education and skill pyramids cannot grow if either the foundations are weak or the connectivity between education and job skills at each level, is poor. Finally, the job pyramid consists of minimum/low wage, Average/medium wage and high wage employment (figure 3). Each level of the employment pyramid must be linked to the appropriate levels of the skill pyramid and the education pyramids to generate the most productive employment, on average. Real wage growth within each layer, also depends on "on-the-job training" and "learning by doing," and movement between layers on upskilling and re-education.

The connectivity between the Tertiary level of education, skilled persons and High wage jobs is far better than for semi-skilled worker and individuals with primary education or less. The demand from large firms creates profitable opportunities for private placement agencies and skill providers. The semi-skilled (medium skills) level is less profitable but much more important in India than in other middle-income countries (MICs). Self-employed workers constitute 57.7% of all workers, of which about 11.8% are professionals. Thus 45.9% of them need sound secondary education and training in semi-skilled occupations. As regular salary and wage employment constitutes only 23.2 per cent of the labor force, while 19 % are casual labor, the latter need better primary education and basic skills to operate efficiently in a modern economy. Labor market linkages in the informal sector are either weak or non-existent, and even within the formal sector, the efficiency of job matching mechanisms varies across semi-skilled and skilled occupations.

The above framework seems to underly the National Education Policy, given that Vocational education and Training was covered by it, and the emphasis NEP placed on training & activities outside the boundaries of the conventional, formal academic curriculum. It is therefore necessary to understand the goals and suggestions of NEP (2020), before placing Indian education and skilling system in an international comparative framework.

3.1 National Education Policy (NEP 2020)

India's National Education Policy (NEP 2020) is a policy framework that aims to address many of the persistent challenges in the Indian education system. It structured Indian education system into four key stages: Foundational Stage: Pre-primary to Class 2, Preparatory Stage: Class 3 to 5, Middle Stage: Class 6 to 8, Secondary Stage: Class 9 to 12.

Foundational Learning and numeracy (FLN) were identified as the highest priority, with the goal of having every child able to do basic reading, writing and arithmetic by Grade 3.[12] A National Mission on FLN was launched, with States & UTs expected to prepare implementation plans with targets, and track progress. Supporting measures included filling local language teacher vacancies, daily practice of reading and arithmetic, extra "bridge" modules in early grades, and intensive early-year *play-based modules*. NCERT/SCERT were to *develop activity-based workbooks, and a national repository of FLN materials* to be made available on the DIKSHA platform. Peer-tutoring and community volunteer programs were to be mobilized to reinforce FLN. *Libraries (physical and digital*) were to vastly expanded with high-quality, age-appropriate books (including local-language translations) to build a reading culture.[13]

NEP 2020 emphasized, that "*pedagogy* must evolve to make education more experiential, holistic, integrated, inquiry-driven, discovery-oriented, learner-centered, discussion-based, flexible, and enjoyable. The *curriculum* must include basic arts, crafts, humanities, games, sports and fitness, languages, literature, culture, and values, in addition to science and mathematics." "Experiential learning was to be adopted, including hands-on learning, arts-integrated and sports-integrated education, story-telling-based pedagogy," was to be adopted at all stages. among others, as standard pedagogy within each subject, and with explorations of relations among different subjects.[14] To close the gap in achievement of learning outcomes, classroom transactions were to shift, towards competency-based learning and education. The assessment tools were to be aligned with the learning outcomes, capabilities, and dispositions as specified for each subject of a given class."

NEP (2020) recommended a number of activities to make learning more enjoyable and create job-oriented skills. (1) Grades 6-8 students to take a fun course, which gives a survey and hands-on experience, of a sampling of important vocational crafts, such as carpentry, electric work, metal work, gardening, pottery making, etc., as decided by States and local communities

[12] The original, pre-covid, target date was 2025.
[13] Greater emphasis needed on library of teaching/training videos and videos of experiment to stimulate interest in natural phenomena.
[14] Nature study and exploration of plants, insects, animals, and geology (rocks, need- weather to develop scientific exploration.

and as mapped by local skilling needs. 2) A practice-based curriculum to be designed by NCERT while framing the NCFSE 2020-21(grades 6-8). 3) All students were to participate in a 10-day bagless period during grades 6-8, where they intern with local vocational experts such as carpenters, gardeners, potters, artists, etc. 4) Similar internship opportunities to learn vocational subjects were to be made available to students throughout Grades 6-12, including holiday periods. 5) Vocational courses through online mode to be made available. 6) Bagless days to be encouraged throughout the year for various types of enrichment activities involving arts, quizzes, sports, and vocational crafts. 7) Children to be given periodic exposure to activities outside school through visits to places/monuments of historical, cultural and tourist importance, meeting local artists and craftsmen and visits higher educational institutions in their village/Tehsil/District/State[15]. 8) Develop a clear action plan with targets and timelines, to have at least 50% of learners through the school and higher education system, exposed to vocational education.

NEP (2020) recommended that teachers be given more autonomy in choosing aspects of *pedagogy,* so that they may teach in the manner they find most effective. Teachers should also pay attention to *socio-emotional learning* - a critical aspect of any student's holistic development. Teachers would be recognized for novel approaches to teaching that improve learning outcomes. Each teacher was expected to participate in at least 50 hours of CPD opportunities every year for their own professional development, driven by their own interests. CPD opportunities would cover the latest *pedagogies* regarding foundational literacy and numeracy, formative and adaptive assessment of learning outcomes, *competency-based learning*, and experiential learning, arts-integrated, sports-integrated, and storytelling-based approaches.

A National Assessment Centre, PARAKH (Performance Assessment, Review, and Analysis of Knowledge for Holistic Development), was set up as a standard-setting body under MHRD, to set norms, standards, and guidelines for student assessment and evaluation for all recognized school boards of India, and help school boards to shift their assessment patterns towards meeting the skill requirements of the 21st century. It is also to guide the State Achievement Survey (SAS) and undertake the National Achievement Survey (NAS), monitoring learning outcomes in the country. PARAKH is also mandated to advise school boards regarding new assessment patterns and latest researches, promote collaborations between school boards, sharing of best practices among school boards, and for ensuring equivalence of academic standards among learners across all school boards.

3.2 Methodology: International Comparison

The paper includes numerous international comparisons using data from World Bank, World Development Indicators (WDI). A common methodology is followed in this comparison. For each indicator (Y), the data is collected for all countries (i) and for the latest available year (t);

[15] Op cit

e.g., enrolment rates, completion rates, literacy rate, proportion of population with primary education. For each country the Per capita GDP at PPP in constant 2021 international prices, is collected for the same year (Xit), to create matched pairs of the indicator and PCGDP for same year. Most social indicators (Y) are positively corelated to Per Capita GDP (X), i.e., Y = f(X).[16] Assuming a polynomial function, this can be written as,

$$Y = A + B X + C X^2, \quad (1)$$

And the estimation equation is,

$$Yit = A + B\,Xit + C\,Xit^2 + Eit,$$ where Eit is the error term, t is the year, i = 1 …………. N (2)

The cross-country regression for the latest available year t, yields estimate of A, B and C. Using the estimates, we can calculate the "***expected value***" of the indicator (Yo) for any specific value of PcGDP (Xo), as

$$Yo = A + B\,Xo + C\,Xo^2 \quad (3)$$

The Gap between the actual value of the indicator and the expected value, can be calculated using equation (2), as

$$GAPi = Ei = Yi – (A + B\,Xo + C\,Xo^2) \quad (4)$$

These can also be depicted on an XY graph, with a regression trend line through the data points. This line represents the "*expected value*" of the indicator at each level of Per capita GDP at PPP. The GAP is the vertical distance between the data point and the line, with points above the line having a positive gap and those below the line having a negative gap.

In this paper we also use two key threshold levels for PcGDP PPP in 2021 international dollars: One is $12,800 (X1), the PcGDP PPP of Indonesia after it became an Upper middle country (UMIC) in 2019, and the second is $37,000 (X2), the PcGDP PPP (2021) of Romania when it became a High-Income country (HIC) in 2019. By inserting these in the right side of equation (3) in place of X, we can calculate the values of the indicators as Y1 and Y2, respectively. These are used as minimum benchmarks for a lower income country like India, aspiring to become a UMIC or HIC.

The latest year for which data is available for a country (j) is sometimes very old (e.g., 2013), relative to that of most countries (generally 2023). In this case we ***estimate*** a value for the indicator for the country j by assuming the GAPj (2013) which prevailed in 2013, remains unchanged till 2023, when the PCGDP is X3. The estimated value of indictor is as follows,

$$Yj\,(2023) = GAPj\,(2013) + (A + B\,Xj3 + C\,Xj3^2),$$ where Xj3 = PCGDP-PPPj (2023) (5)

The paper also uses a *baseline projection* of India's PCGDP PPP to determine when it will cross the above mentioned UMIC & HIC thresholds of per capita GDP PPP of $12,800 and $37,000 respectively. PCGDP projection used in this paper, is based on an average growth of

[16] In this illustration we use a polynomial functional form. In the paper we have also used linear, log and exponential functions.

PCGDP PPP (const 2021 Int$), of 6.4% in current decade, 5.4% in next decade and 4.4% in third decade, with an overall three-decade average of ~5.5%. In this base case, India will cross the UMIC PCGDP PPP threshold of $12,800 around 2030 and the HIC threshold of $37,000 around 2050 [Virmani (2024)]. If growth rates are higher than this base case, then every education and job skilling challenge outlined in this paper, will be even tougher than stated in the paper.

4. Legacy of State Efforts

75 years have passed since independence the literacy and education levels of the population today are the outcome of policies pursued by the State Govts and (to a lesser extent) by the Central Government programs to nudge the States to improve the education system. This section analyses the results of 75 years of adult education in terms of literacy (sec 4.1) and qualification of the population (section 4.2). The position of India is also compared with other countries with varying per capita GDP, to see where we stand and what improvements are needed in our quest to become Viksit/Developed. The failure of most States to build the base of the education pyramid during the first 30 years of independence, and the slow acceleration by many States during next 20 years, is reflected in the shortfalls we see in the education attainments of the adult population today.

4.1 Adult Literacy

The adult literacy rate (ages 15 and above) increased from 69.8% in 2012 to 81.7% in 2023 an improvement of 11.9 per cent points. The youth literacy rate (ages 15-24) also rose from 90.0% to 97.0% during the same period (+7.1), indicating near-universal literacy among younger age groups (Table 3).

Table 3: Improvement in Literacy Rates (%)

Education Indicators	**Latest available year**		**Year for comparison**		***Change***
Literacy rates		Rates		Rates	
Adult total (% of people ages 15+)	2023	81.7	2012	69.8	11.9
Youth total (% of people ages 15-24)	2023	97.0	2012	90.0	7.1

Source: World Development Indicators, December 2025.

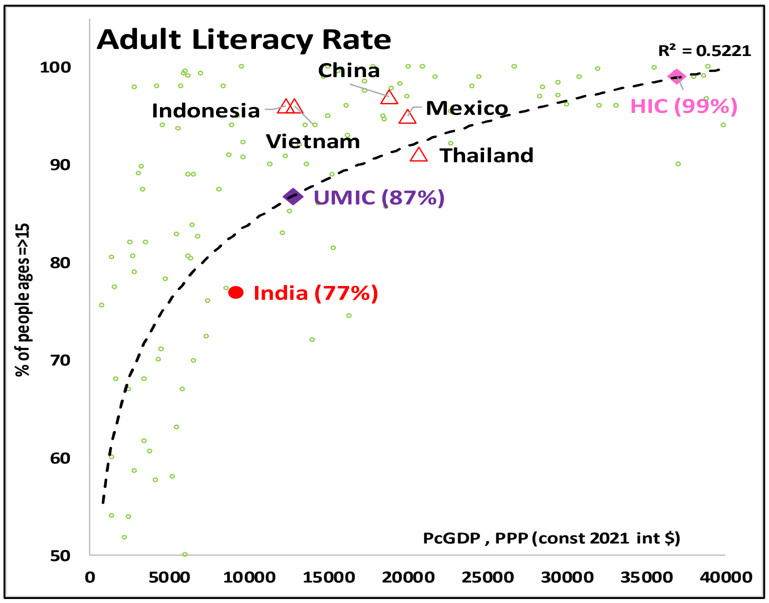
Figure 4 is the plot of literacy levels of every country in the World relative to its Per Capita GDP, for the year in which each country's latest available literacy data. The dotted regression line can be seen as the expected level of literacy for each level of per capita GDP. When viewed against this benchmark, India's adult literacy rate is below the benchmark. The current literacy rates are a legacy of 65 years of post-independence education, inside and outside the schooling system. As low literacy is often associated with low and stagnant wages, the elimination of absolute poverty (1% in 2023-24), reduction in LMIC poverty rate (or vulnerable population) to 15% (2023-24), and reduction of multi-dimensional poverty rate to 15% (2019-21), is noteworthy.[17] It suggests that Government social welfare programs, such as subsidized

[17] Bhalla and Bhasin (2025), EPW, July 13, 2024, Vol LIX, No 28; and 2025. Multi-dimensional poverty from NITI.

food, cooking gas, toilets, housing, and electricity, water & telecom connections, have played an important role.

However, we need to move towards universal literacy to improve the productivity and wages of the bottom quarter of the adult population. To achieve this, the literacy rate needs to be raised by at least 10 per cent points to attain the 87% points level (UMIC, purple diamond) in five years, and by 22% points to 99% by 2047 (pink diamond). This challenge can be met, given that the youth literacy rate is already 99% (Figure 4).

Figure 4: Adult Literacy Rate (Age 15 and above)



Source: World Development Indicators, December 2024.

4.2 Adult education levels

Adult education levels reflect the enrolment and completion rates in primary, secondary and tertiary levels over 75 years, as well as short- and long-term courses offered over the years. The educational attainment of the population aged 25 years is available only for years in which surveys are connected by different countries. The per cent of population (25+) with primary education increased by 11.4% points, since 2016 to 68.1% in 2023 (Table 4). Over the last 12 years from 2011 to 2023, the adult population with lower secondary education has increased by 15.1% points to 52.7%, and upper secondary by 14.5% points to 41.3%. The proportion of population (25+) with post-secondary education, however increased by only 6.1% over the same period, to 16.1% (2023).

In 2023, 3.1% of population (25+) had Master's degree or equivalent, 14.9% had Bachelor's degree or equivalent and 41.3% had passed secondary school (Table 4). The detailed breakdown for tertiary short cycle courses, Bachelor's degrees and Masters degrees is not, however, available for the same years, in the World Bank data set. However, the available data suggests that increase in population of those with Bachelor's degrees or equivalent, is higher than the average increase in tertiary education, while increase in per cent with short cycle courses is about average and the acquisition of master's degrees is much lower.

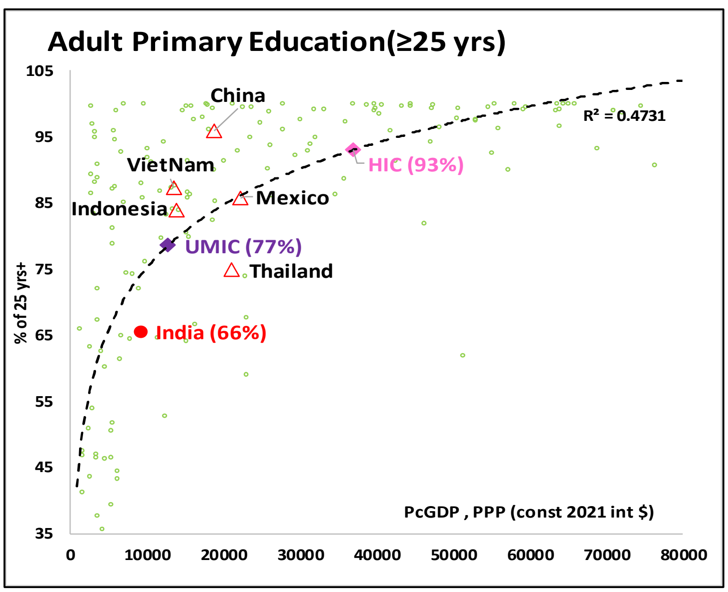
Table 4: Improvement in Educational Attainment Rate (%)

Education Indicators	**Latest available year**		**Year for comparison**		***Change***
Educational attainment, total (%)		Rates		Rates	
Primary	2023	68.1	2016	56.7	11.4
Lower secondary	2023	52.7	2011	37.6	15.1
Upper secondary	2023	41.3	2011	26.9	14.5
Post-secondary	2023	16.1	2011	10.0	6.1
Short-cycle tertiary	2012	8.9	2005	6.4	2.5
Bachelor's or equivalent	2023	14.9	2018	10.8	4.1
Master's or equivalent	2023	3.1	2018	2.4	0.7

Source: World Development Indicators, July 2025.

We use the same international data to compare adult education in India with other countries, organized by per capita GDP of each country in the year for which latest survey data for adult education is available. This is plotted in Figure 5, with the cross-country regression (dashed) line, denoting expected or average level of the index for each level of per capita GDP.[18] The per cent of adults with primary education in India is lower than the expected level for its per capita GDP. This compares with Indonesia, Vietnam and China which are well above the percentage of primary educated population expected for their Per Capita GDP, and Mexico, which is on benchmark line (Figure 5). The sharp increase in per cent of youth who have completed primary education in India, and the 99% completion rate for children, means that the per cent of adult population with primary education will continue to rise.

Figure 5: Adults with Primary Education (% of population 25+)



Source: World Development Indicators, December 2024

[18] Note: The international comparison is based on WDI December 2024, the data for India in Table 4, is from WDI July 2025, and is different for primary education in 2023.

It will be a challenge to raise the share of the primary educated population to 78.6% in next 5 years and to 93.0% in next 25 years, the minimum level expected for an Upper middle-income country (UMIC) and a high-income country (HIC) respectively (Figure 5 &Table 5). This can however play a key role in raising the productivity and wages of the vulnerable population, and reduce the need for Welfare payments.

Table 5: Benchmark adult education rates by Per capita GDP

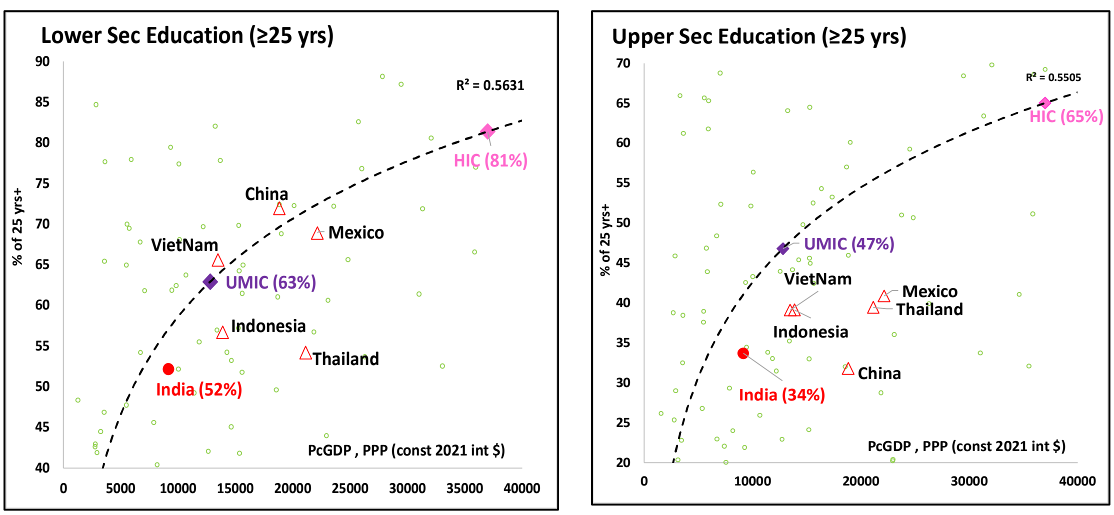
Year	PCGDP	Primary	Lower Sec	Upper Sec	Bachelor	Masters
2022	**$8,545**	62.8	49.8	31.6	12.1	3.2
2023	**$9,160**	65.6	52.2	33.7	13.2	3.5
Benchmarks/Targets (based on PcGdp regression)						
2023	**$9,160**	74.0	57.1	41.1	13.0	4.2
2030	**$12,800**	78.6	62.9	46.8	15.6	5.4
2050	**$37,000**	93.0	81.4	65.0	23.9	9.2

Data Source: World Development Indicators, December 2024

Note: Data includes projections for 2030 (UMIC, $12,800) and 2050 (HIC, $37,000) based on target per capita GDP levels.

The gaps in secondary school achievement of the adult population, are less than for primary education. For lower secondary, the gap between the actual ratio in 2023 and the appropriate level for India's per capita GDP, was less than 5% in absolute value. Thailand (-)17.4%, Indonesia (-)7.7% had even larger gaps than India, while Mexico (-)3.5% was less, and Vietnam and China were close to the level expected at their PCGDP, while (Figure 6, left panel).

Figure 6: Adult with Secondary Education (% of population ages 25+)



Source: World Development Indicators, December 2024

To raise the share of adults with lower secondary education to Upper-Middle-Income Country (UMIC) benchmark of 62.9% would require an increase of 11% points. To increase it to High-Income (HIC) benchmark of 81.4% by 2050, it would require a more daunting increase of 29% points.

The shortfall from benchmark is higher for upper than for lower secondary, but the GAP is less negative than all the peer competitors; India's upper secondary attainment for adults

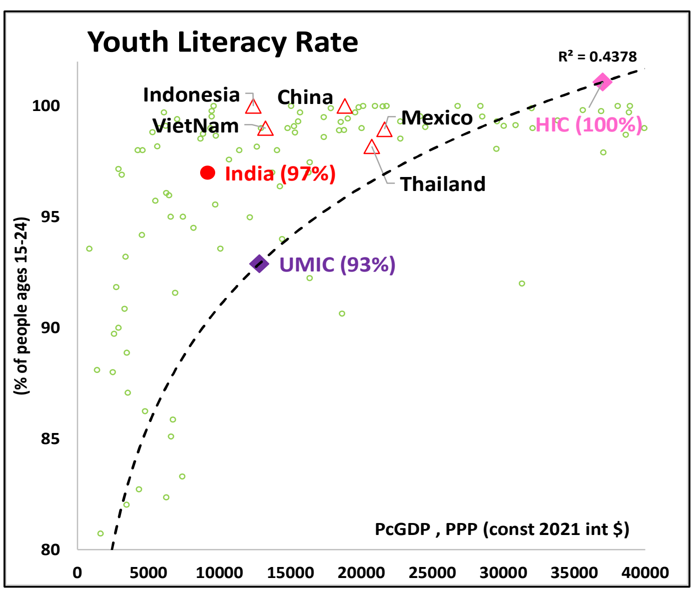
(33.7% in 2023) is below the level expected at its per capita GDP (Figure 6, right panel). Vietnam (-)8.6%, Indonesia (-)9.1%, China (-)21.7%, Thailand (-)16.0% and Mexico (-)15.3% are all below their expected levels. To reach the UMIC benchmark of 46.8% by 2030, India needs to increase its rate by about 13% points, and to meet the HIC benchmark of 65% by 2050, the required rise is around 31% points. To raise the proportion, of adults with secondary education to the minimum benchmarks for a High-income County is a very challenging, 25-year, task.

As far as the tertiary educational attainment of the adult population is concerned, India's performance is very good at the bachelor's level and somewhat inferior at the Masters level (Table 5), post-secondary and short-cycle education are covered in Section 10 (Skilling), Bachelor's and Master's levels will be discussed in greater detail in in Section 11 on Tertiary Education, and Doctoral education in Section 13 on R&D [19].

4.3 Youth Literacy

Youth literacy reflects the recent achievements in primary education in the last decade. These rates are compared with other countries in (Figure 7) Youth literacy of countries relative to the level expected at their level of Per capita GDP, based on cross-country regression. India's youth literacy rate in 2023 was 97.0%, which is 6.7% points above the level expected at its per capita GDP. All comparator countries are also above their expected level, with Indonesia +7.4% points above its benchmark, Vietnam +6.0% above its benchmark, China +4.1%, Thailand +1.6% and Mexico +2.0%. India's performance is therefore better than all its comparators, relative to the benchmark for each.

Figure 7: Literacy rate, youth total (% of people ages 15-24)



Source: World Development Indicators, December 2024

[19] Doctoral completion rate for India has been revised down for 2023 from 3.5% to 0.1%.

Since the percentage for India exceeds the UMIC (2030) benchmark of 92.9%, sustaining efforts at their current level would be sufficient to achieve the 100% HIC benchmark, well before the 2050 deadline. These results also provide a positive signal for the future of adult literacy, as the rise in youth literacy will result, ipso facto, in a gradual rise in the percent of adults in population.

As youth literacy largely reflects recent performance of the education system, we can start by looking Primary education.

5. Primary Education

Conventional identification of education with general human development and human rights, is encapsulated by the following statement: “Education is a human right, a powerful driver of development, and one of the strongest instruments for reducing poverty, improving health, promoting gender equality, peace, resilience, and adaptation to climate change. It delivers large, consistent returns in terms of income, and is a critical factor to ensure equity and inclusion.”[20] Much less attention has been paid in the post war era, to the role of education in creating Human Capital as an important factor of production, and driver of economic productivity and real wage growth. Accounting for and focusing on the direct linkage between education and jobs is a relatively recent phenomenon, and still paid less attention in many education departments around the World and by academics & educators within India. NEP (2020) is a policy effort the change this situation.

India, with its vast and diverse population, operates one of the largest education systems in the world. Spanning from early childhood education to higher education, it caters to over 24.8 crore students across 14.7 lakh schools, supported by 98 lakh teachers[21]. While this scale represents a significant achievement in terms of access, less attention has been paid to quality of education and learning outcomes. The diversity across States and UTs, therefore, also means greater variance in learning outcomes This section, focuses on learning outcomes in terms of cross-country comparisons, and evolution of outcomes over time in India.

5.1 Enrollment & Completion

Primary enrolment and completion rates in India are now fairly satisfactory. As in other countries, the GER is much larger than the NER. The setback during the pandemic is being reversed. Data on net enrolment is not available for India, after 2013. So, we can only determine the change in gross enrolment since then. The Primary enrolment rate (gross) increased from 112.4% in 2014 to 120.5% in 2024 (+8.1), including over-age and under-age students enrolled in primary grades (Table 6). The share of students enrolled in private primary

[20] World Bank, Education Factsheet, November 2024.

[21] UDISE+ 2023-2024. UDISE data is only available from 2018-19.

schools also grew from 35.0% in 2014 to 43.8% in 2019 (+8.8), suggesting a gradual shift toward private schooling within the primary education system (Table 6).

Table 6: Improvement in Primary enrollment and completion rates (%)

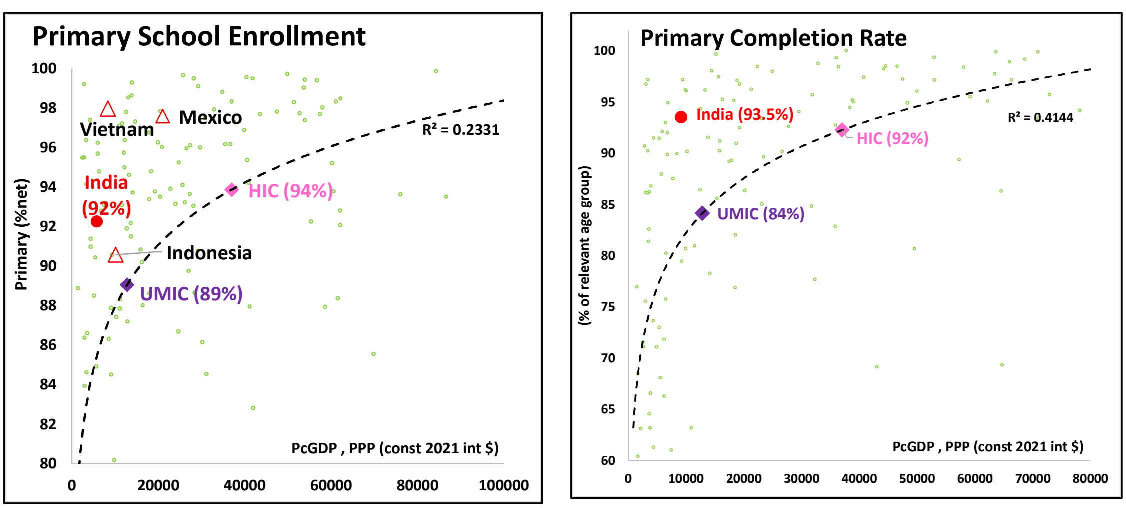
Education Indicators	Latest available year		Year for comparison		*Change*
Primary Enrolment rate (% gross)	2024	120.5	2014	112.4	8.1
Primary enrolment in private schl (%)	2019	43.8	2014	35.0	8.8
Primary completion rate(relevant age grp)	2024	94.5	2014	99.6	-5.1

Source: World Development Indicators, 2025.

In contrast, the primary completion rate declined slightly from 99.6% in 2014 to 94.5% in 2024. There are however, many data gaps in this record, with available data showing high volatility. Two waves of pandemic, in 2020 and 2021, and the lockdown for some months during the first wave, contributed to the data gaps and the decline in completion rates. However, the average completion rate, increased marginally from an average of 97.4% during 2005-2014, to an average of 97.8% during 2015-2024.

The latest available year for Net Enrolment in primary schools for India is 2013. We can compare its performance with other countries. India's primary net enrolment rate was 92.3% in 2013 (Figure 8), which is 6.8 points above the expected level at its per capita GDP. Vietnam (+10.9), Indonesia (+2.6) and Mexico (+6.3) are also above their expected levels in 2013 (latest available year). The base for India in Figure 8**,** is 2013; therefore, we estimate the value for NER in 2023 assuming that the gap remains 6.9% points. This gap is then added to the expected benchmark for India at its 2023 per capita GDP. This estimate (94.4%) is above the HIC benchmark of 93.9%. We can therefore set a higher target of 99% to 100% to be at level of the most advanced countries by 2047.

Figure 8: Primary Enrollment & Completion Rate



Source: World Development Indicators, April 2025; Note: 1. The year 2013 was chosen as the base year for primary enrollment, as it is the most recent year for which data is available in India.
2. Data points with primary completion rates over 100% have been excluded for accuracy.

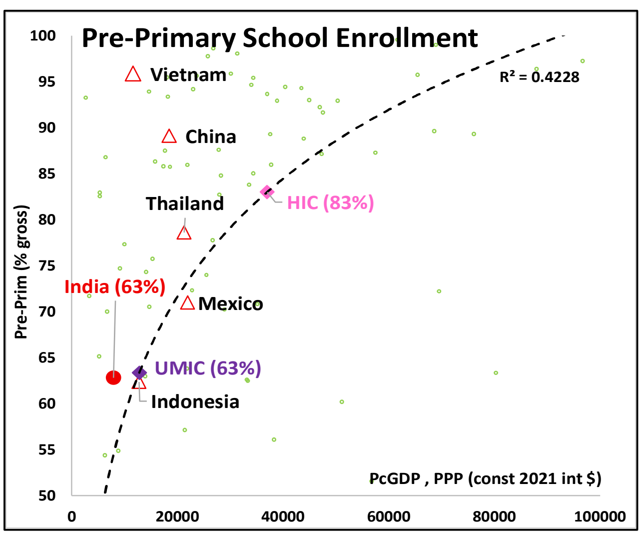
India's primary completion rate was 93.5% in 2023 (Figure 8, 2nd panel), which is 11.9% points above the level expected at its per capita GDP. China (+15.2), Vietnam (+13.5), Indonesia (+13.0), Thailand (+9.9) and Mexico (+9.7) are also above their expected levels. India is already above the UMIC (2030) benchmark of 84.1% and the HIC (2050) benchmark of 92.3%. The greatest focus on primary schooling since 1999 has produced results in terms of improvement of formal credentials. Focus has now to shift to learning outcomes in line with NEP (2020).

5.1.1 Pre-primary

NEP 2021 has laid emphasis on Pre-primary education to create the foundation for further learning by children. This is particularly important for under-privileged infants and children whose family and home environment may not be as stimulating as that of a normal middle-class family. Pre-primary education enrollment in India has shown considerable variation over recent years.[22]

The Gross Enrollment Ratio (GER) was 60.5% in 2017, peaked at 62.8% (2019), and declined to 51.7% by 2021 likely due to disruptions caused by the COVID-19 pandemic. Given this fluctuation, 2019 has been used as reference year for international comparison, representing India's highest pre-pandemic enrollment level. In total, 147 countries reported pre-primary enrollment data in 2019, while 8 additional countries had submitted data in 2018. These were included in the comparison using their corresponding per capita GDP for the reported year. India's pre-primary GER was 62.8% in 2019 (Figure 9), which is 8.3 points above the level expected at its per capita GDP.

Figure 9: School enrollment, Pre-Primary (GER)



Source: World Development Indicators, April 2025. Note: The year 2019 was selected as the baseline since it represents the period before the pandemic. For 8 countries without data for 2019, data from 2018 was used instead.

[22] Gross enrollment ratio is the ratio of total enrollment, regardless of age, to the population of the age group that officially corresponds to the level of education shown. Preprimary education refers to programs at the initial stage of organized instruction, designed primarily to introduce very young children to a school-type environment and to provide a bridge between home and school.

Vietnam (+34.3), China (+19.0) and Thailand (+5.8) are also at a pre-primary enrolment rate, which is higher than the benchmark for their per capita GDP. Indonesia (-)1.0 and Mexico (-) 2.4 were below their benchmark or minimum expected levels for their PCGDP in the year for which the data was available.

The data for India in Figure 9 is for 2019, therefore we estimate the pre-primary enrolment rate for 2023 assuming that the gap remains the same (8.3% points). This gap is then added to the benchmark/min expected (57.2%) for India at its 2023 per capita GDP. Based on this estimate of 65.5%, we calculate that we are already above the UMIC benchmark of 63.4%, and need an increase of 17.5% points to reach the benchmark of 83% for HIC.

WDR (2019) review of the literature highlighted the following: A study of preschools in a Nairobi slum found that while participation was high, the *curriculum and pedagogy* were not age-appropriate, limiting learning, as children aged 3 to 6 were exposed to academic-oriented instruction and even sat for exams. Similarly, in Peru, the Wawa Wasi program offered safe, community-based daycare and nutritious meals for children aged 4 to 6 in impoverished areas, but it failed to improve children's language skills. In Indonesia, playgroup programs showed positive effects on children's language and other development. Similarly, in Tonga, organizing playgroups for children up to age 5 significantly improved early-grade reading skills. Among structured approaches, the Montessori model with its multi-age classrooms, student-chosen learning activities, and minimal instruction has been more effective than traditional models in improving children's executive functions.

Good models for supporting literacy and numeracy by Grade 3 are available, and they are both cost-effective and scalable, even where resources are limited. In Liberia and Malawi, training teachers to better evaluate their students, combined with additional materials significantly improved learning in early grades. In Singapore, all students are screened at the onset of grade 1. Children who do not attain the appropriate early literacy skills are supported through the Learning Support Program. These are straightforward approaches: they train teachers to assess their students through ongoing, simple measurements of their abilities to read, write, comprehend, and do basic arithmetic. Children who need additional support receive targeted materials and undertake targeted activities. These models have been tested with success in Ghana, India, Jordan, and Kenya, and serve as a basis for precise design and budget estimates.

5.2 Learning Outcome Surveys

Formal completion of primary education does not guarantee that all children have a basic knowledge of the curriculum prescribed for primary school. Worse, all those having a certificate of primary school completion, may not meet the minimum proficiency levels (MPL) including reading and learning, as per international or domestic standards. These minimum levels are critical, both for low skill jobs in a modern economy, and for further study above the primary level.

The World Development Indicators (WDI), report the share of pupils who are below the Minimum Proficiency Level (MPL) in reading, at the end of primary school. MPL is a benchmark developed by the Global Alliance to Monitor Learning (GAML). MPL is defined as the ability of a child to independently and fluently read simple, age-appropriate texts, identify explicitly stated information, interpret key ideas, and provide basic explanations or personal opinions about the content. In other words, a pupil reaching MPL is able to read and understand a short passage of narrative or factual text suitable for their grade level. This benchmark is used internationally to track progress toward SDG indicator 4.1.1b, which monitors the proportion of children achieving minimum learning proficiency in reading and mathematics at the end of primary education.

In 2002, NCERT carried out a national-level learning assessment of Class 5 students. The results were published in 2006 and marked the first official attempt to collect such large-scale data on *learning outcomes*. Around 90,000 students were tested in language, mathematics, and environmental science. According to *Kingdon (2007),* the national average scores from this NCERT test were low: students scored about 46.5% in math, 50.3% in science, and 58.6% in language. These results broadly confirmed the ASER (2006) survey's finding that ***learning levels*** in India were ***low***, among children in Grade 5.

We use the latest available surveys (ASER, NAS, FLS, PRS) to create a picture of learning outcomes in India. This requires an understanding of the design of these surveys, so that we can compare results and decide on the utility of outcomes which appear to be inconsistent between surveys.

5.2.1 Survey Design and Comparability

Since 2011, India has multiple large-scale assessments, each with different objectives and methods (Table 7). The Annual Status of Education Report (ASER), led by ASER center, Pratham, since 2005, is a household survey in rural India. It uses a two-stage sampling design with Census 2011 as the frame; first selecting 30 villages per district using Probability Proportional to Size (PPS), then randomly sampling 20 households from each village.

Table 7: Major learning assessment surveys in India

Year	Class/Std 3	Class/Std 5	Class/Std 6	Class/Std 8	Class/Std 9	Class/Std 10
2016	ASER	ASER	ASER	ASER		
2017	NAS	NAS		NAS		NAS
2018	ASER	ASER	ASER	ASER		
2021	NAS	NAS		NAS		NAS
2022	FLS;Aser	ASER	ASER	ASER		
2024	PRS;Aser	ASER	PRS;Aser	ASER	PRS	

Note: Colored survey has been used for comparison in this study.

The National Achievement Survey (NAS) was conducted periodically from 2001 to 2021. It has now been updated and replaced by, what is referred to as the PARAKH Rashtriya Sarvekshan (PRS), first conducted in 2024 by NCERT. PRS also uses a two-stage PPS sampling design based on the UDISE+ 2022-23 database, starting with schools, then sections, and finally students; up to 30 students per grade are surveyed. The Foundational Learning Study (FLS), carried out in 2022, followed a multistage PPS sampling design, selecting schools by management type and allocating samples based on enrollment, with students drawn from Grade 3 or newly admitted Grade 4.

The focus and mode of assessment also vary across these surveys. *ASER* is a one-on-one household survey assessing rural children based on basic reading and arithmetic abilities and testing time is about 7-8 minutes per child in one of the 19 Indian languages. *PRS*, building on the earlier NAS, is a written school-based assessment designed to evaluate competency-based learning outcomes, covering foundational stage competencies in Grade 3, language, mathematics, and environment in Grade 6, and language, mathematics, science, and social science in Grade 9. It is conducted as a pen and paper test with OMR for data capture, lasting 90 minutes for Grade 3 and 6 and 120 minutes for Grade 9, in 23 languages. The *FLS* (Grade 3) was a one-on-one oral and performance-based school test focusing on foundational literacy (oral comprehension, decoding, fluency, reading comprehension) and numeracy (number operations, fractions, patterns, data handling), with testing time up to 35 minutes per student per subject in one or more of 20 languages.[23]

The surveys differ in their comparability and accessibility of data. ASER has used standardized and consistent tools since its inception, making its results comparable over time, but it is limited to rural areas.[24] NAS 2021 is comparable to NAS 2017 in principle, but as the former was taken in the middle of the Covid epidemic, its results are distorted by this once in a century pandemic, and is therefore not useful for determining Medium-Long term trends. PRS 2024 was administered for the first time using a new and more comprehensive strategy, and its results are not comparable with earlier NAS rounds (*Kar et al (2024*). The FLS was conducted once to establish benchmarks for foundational literacy and numeracy and does not have cycles for comparisons over time; its data and reports are available, but the tools are not in the public domain (*Kar et al (2024)*).

Two decades ago, *Kingdon (2007)* concluded that, "Inter State comparisons in India, are hampered by the absence of national standardized tests for secondary school. Each State Board set its own *syllabus* and *exam papers*, so comparing pass rates between states was not useful. For instance, in 2004, the high school pass rate was 37% in Manipur and 80% in Andhra Pradesh, but because each state uses different exams, these numbers can't be directly compared"

More recently*, Johnson and Parrado (2021)* examined how learning outcomes are measured in India and found that while numerous assessments and various state-level surveys have emerged, there is limited coordination between them. The study highlights that most assessments lack consistency in frameworks, subjects, and reporting formats, making

[23] In 36 States and UTs, this meant one of 19 regional languages plus English.

[24] Data from official surveys (NAS & PRS) shows that there is little Urban-Rural difference in MRP and MAP.

comparisons over time or across systems difficult. The authors emphasized the need for a coherent national learning assessment strategy that links classroom practice with policy. They also noted that while ASER has been regularly conducted since 2005, other assessments like NAS have faced implementation challenges. Overall, the paper argues that improving learning in India requires not just better teaching but also better measurement of learning outcomes through coordinated and reliable assessment systems.

5.3 International Comparison of Outcomes (MRP)

The World Development Indicators (WDI) define "Minimum Reading Proficiency (MRP)" as the share of pupils at the end of primary schooling who cannot independently and fluently read simple, short narratives or expository texts, locate explicitly stated information, or interpret key ideas. This measure reflects learning deprivation among children who complete primary education but lack fundamental reading skills. [25] In this section we present the results of our cross-country comparative analysis using this data. This allows us to judge the performance of Indian Primary education relative to other countries at different level of Per Capita GDP.

5.3.1 Methodology for calculating MRP

WDI uses the 2017 National Achievement Survey (NAS) for Grade 3 and 5 in English language and Mathematics for calculating the Minimum Proficiency Level (MPL) in India. A policy linking exercise carried out by UNESCO Institute for Statistics and NCERT in 2019 mapped NAS performance levels to the global MPL benchmark. The India Policy Linking Pilot Workshop (Nov 2019) was part of a global effort to establish a method for reporting on SDG Indicator 4.1.1. Led by UIS with support from MSI, DFID, and Gates, and hosted by NCERT and MHRD in New Delhi, the pilot aimed to link India's 2017 National Achievement Survey (NAS) for Grade 3 and 5 in English and mathematics to global benchmarks.

The policy linking method, developed through the Global Alliance to Monitor Learning (GAML), is based on the Global Proficiency Framework (GPF). The GPF provides four Global Proficiency Levels (does not meet, partially meets, meets, exceeds minimum proficiency), with descriptors by grade and subject. Before benchmarking, a content alignment exercise was carried out to check how well NAS items matched the GPF. Two four-day workshops were held (Nov 12-15 for Grade 3, Nov 18-21 for Grade 5). The NAS assessments used had 25 multiple-choice items, equated using Item response theory, and were administered in representative schools in 2017. Four groups of 18 panelists (72 in total mostly teachers and head teachers, plus experts) participated.

The process followed the Policy Linking Toolkit, involving three main tasks: Firstly, Checking alignment of NAS assessments with the GPF. Each item was rated on a three-point scale: Complete Fit (C) signifies that all of the content required to answer the item correctly is

[25] WDI reports the percentage of pupils below minimum reading proficiency (MRP). To present learning outcomes, we subtract this from 100% to get percentage of pupils above MRP.

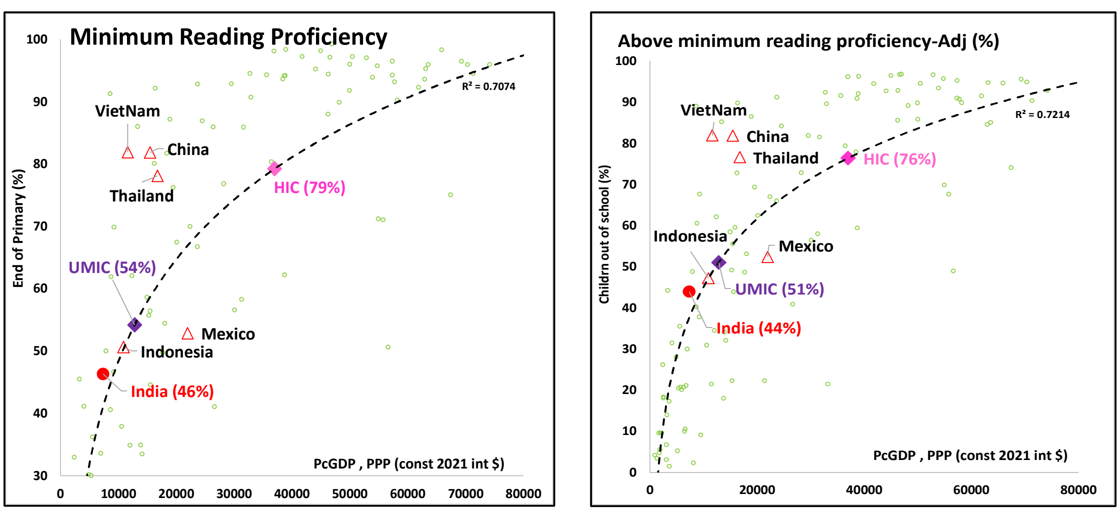
contained in the subconstruct, i.e., if the learner answers the item correctly, it is because they completely use knowledge of the subconstruct; Partial Fit (P) signifies that part of the content required to answer the item correctly is contained in the subconstruct, i.e., if the learner answers the item correctly, it is because they partially use knowledge of the subconstruct; No Fit (N) signifies that no amount of the content required to answer the item correctly is contained in the subconstruct, i.e., if the learner answers the item correctly, it is because they do not use knowledge of the subconstruct.

Secondly, matching NAS items with global proficiency levels and descriptors and finally applying the Yes-No Angoff method, where panelists judged how a minimally proficient learner would perform on each item. Two rounds of ratings were conducted. In Round 1, Class3 English showed the highest percentage at meets or exceeds (60.6%), while Class 3 mathematics was lowest (36.5%). Round 2 confirmed consistent results, with Class 5 English the lowest (35.6%). Reliability measures (Standard errors of measurement (SEM) < 1.0, inter- and intra-rater consistency > 0.70) indicated strong consistency, particularly for Class 5 [UNESCO (2019)].

5.3.2 Minimum Reading Proficiency (MRP)

India's share of pupils achieving minimum reading proficiency was 46.3% in 2017, which was 5.3% points above the benchmark/minimum expected level for its per capita GDP in 2017 (Figure 10, left panel). Vietnam, China, Thailand, were well above their benchmarks, Indonesia was marginally above its bench mark by 0.3% points, while Mexico was below its expected level by (-)14.1% points (Figure 10, left panel).

Figure 10: Minimum reading proficiency at end of primary (% of students)



Source: World Development Indicators, December 2024

As the data for India in Figure 10 is for 2017, we estimate a MRP for 2023 (51.6%) assuming that the gap between benchmark and actual remains the same as in 2017 (i.e., 5.3% points). This gap is then added to the expected expected/benchmark for India at its 2023 per capita GDP to obtain 46.3% in 2023. Based on this we estimate the improvement needed to reach

UMIC & HIC benchmarks. This shows that we need to improve Minimum reading proficiency by ~ 2.6% points to reach the UMIC benchmark of 54.2% and by ~27.6% points to reach the HIC benchmark of 79.2% for HIC. This is a challenge which can be met by each State focusing on Foundational Literacy and Numeracy (FLN) and Minimum Learning Proficiency in Reading (MRP) and Arithmetic (MAP).

The above data is for children who are in school. There is also a small share of children who are not in school. India's overall end-of-primary reading proficiency (adjusted for out-of-school children) was 43.9% in 2017 (Figure 10, 2nd panel), which was 6.2% points above the benchmark/min expected level at its 2017 per capita GDP. Vietnam (33%), China (+26% pts), Thailand (+19% pts) were above their benchmark, Indonesia at its min expected level, while Mexico was below (-)11.7% pts its benchmark.

The World Development Indicators (WDI), reported India's minimum reading proficiency at the end of primary using NAS 2017 (Section 5.3.1). However, no such effort has been made by international agencies to use subsequent Indian surveys to estimate changes in Minimum Learning Proficiency as per international benchmarks. We examine large scale Indian surveys to extract some results which are consistent with international benchmarks. These surveys include the Annual Status of Education Report (ASER), the National Achievement Survey (NAS), Foundational Learning Study (FLS) and PARAKH Rashtriya Sarvekshan (PRS).

5.4 Minimum Learning Outcomes (ASER)

The Annual Status of Education Report (ASER), is based on a survey of households in rural India, carried out by ASER Center, an autonomous research unit of the PRATHAM Research Foundation (NGO/NPO). Its aim is to assess children aged 5-16 years, in basic reading and arithmetic skills, rather than by school standard. This is the only survey which is available, from the mid-2010s to the current time, using a broadly consistent methodology and sampling procedure. Given the small differences in rural-urban performance, indicated by official surveys (section below), it is a reasonable measure of the minimum learning proficiency of primary school age children, at the national level.[26] We use this to assess the position of learning outcome in language and arithmetic as of 2024, and the trends over past two decades. As the data covers all Std from I to VIII, we focus on foundational learning (Std III) and primary level (Std V).

ASER's rural household-based survey is the most reliable domestic benchmark because its tests are clearly defined and consistent over time. In language, ASER classifies children by whether they can read letters, Words, Std I level text, or Std II level text, while in mathematics it assesses number recognition (1-9 and 10-99), subtraction, and division. The percentage of students who are at Std II level text reading level are assumed to also meet the Std I level

[26] NAS 2021: Difference between Total and Rural, is (1) For MRP: in class 3 is-2.5%, in Class 5 is +2.4%, and class 8 is +5.3%. (2) For MAP: in class 3 is -4.5%, in class 5 is -3.8% and class 8 is +3.8%; of the Rural percentages from NAS 2021.

reading level. Similarly, the students who can do division are assumed to also be able to do subtraction. In this paper we use Standard (Std), Class and Grade, interchangeably.

5.4.1 Minimum Learning Proficiency: India 2024

As of 2024, across foundational learning, 68.2% of Std I age children can read letters, 52.2% of Std II age children can read/understand words and 47% of Std III age children can read/understand Std I level text. The flip side of this coin, is that, 30.8% of Std III age children cannot read words, and 15.1% of Std II age children cannot read letters. The starkest indicator of the credentialism is that 8.2% of Std III age children, cannot even read letters (Table 8).

In arithmetic, 73.7% of Std I age children can recognize single digit numbers (1-9), 55.9% of Std II age children can recognize two-digit number (10-99), while only 33.7% of Std III age children can subtract. The first two outcome are superior to that in reading but the last is weaker by 10% points. This suggest that teachers are unable to adequately link the concept of subtraction to real world/physical examples which children can relate to (Table 8).

Table 8: Foundational Literacy & Numeracy skills (% of students)

Standard =>	**Std I**	**Std II**	**Std III**	**Std I**	**Std II**	**Std III**
Reading (% of children)	**Can read**			**Can't read**		
Letter	68.2			31.8	15.1	8.2
Word	29.4	52.2			47.8	30.8
Std 1 level text	12.2	29.0	47.0			53.0
Arithmetic (% of children)	**Can do**			**Can't do**		
Recognise no. 1-9	73.7			26.3	10.6	5.5
Recognise no. 10-99	33.8	55.9			44.1	29.2
Subtraction	7.2	18.7	33.7			66.3

Source: ASER Report, 2024, Note; The figures represent cumulative learning levels.

In Std IV and V, it's more appropriate to set the minimum language proficiency in terms of reading standard II level text and the minimum learning in arithmetic, to ability to do division. Reading levels are consistently higher than arithmetic skills across primary grades. By Std V, nearly 48.7% Std II level text (Table 9). In arithmetic, while basic subtraction improves by 22% points by Std V, more complex operations like division remain weak relative to reading ability (Std 2 level text). Std V children who can who can read do division are 37% less than those who can do division. This gap compares with the minimum learning gap of 28% in Std III. The widening of the gap, suggests that schools need to pay more attention to the pedagogy of teaching foundational numeracy & arithmetic.

Table 9: Learning outcomes in Primary (% of students)

Standard =>	Std IV	Std V	Std IV	Std V
Reading (% of children)	Can read		Can't read	
Word	80.0	84.2	20.0	15.8
Std 1 level text	62.0	70.0	38.0	30.0
Std 2 level text	40.0	48.7	60.0	51.3
Arithmetic (% of children)	Can do		Can't do	
Recognise no. 11-99	81.4	85.9	18.6	14.1
Subtraction	47.3	55.8	52.7	44.2
Division	21.5	30.7	78.5	69.3

Source: ASER Report, 2024, Note; The figures represent cumulative learning levels.

Muralidharan and Singh (2021) review shows, that NEP reflects many insights from research, such as focusing on early learning (FLN), improving teacher motivation, and reorganizing small schools. They suggested three principles for better implementation; focus use of independent measurement, rigorous evaluation, and cost-effective strategies.

5.4.2 Minimum Learning Proficiency: 2006 to 2024

ASER provides consistent data on children's learning since 2006, making it possible to track trends from 2006 to date. As Std I, III, V are landmark standard in the development of child, this sector depicts inter-temporal changes in minimum learning proficiency. From 2006 to 2014, there was a decline in reading levels across primary; the share of Std I students who could recognize letters, declined by (-)10% points, the share of Std III children who could recognize words declined by (-)17% points, and the proportion of Std V children who can read Std I text declined by (-)13.9% points. The only exceptions to this broad decline were small gains in Std I level text reading among Std I children, and Std II level text reading among Std III children (Table 10).

Table 10: Minimum Reading Proficiency, MRP (% of children): 2006 to 2024

MRP(%)	2024				2014			
	Can read				Can read			
	Letter	Word	StdItext	StdIIText	Letter	Word	StdItext	StdIIText
Std I	68.2	29.4	12.2	5.3	51.3	21.1	9.0	4.5
Std III	91.8	69.2	47.0	27.0	85.2	60.2	40.2	23.6
Std V	95.9	84.2	70.0	48.7	94.3	81.5	67.2	48.1
Change	2014 to 2024				2006 to 2014			
Std I	16.9	8.3	3.2	0.8	-10.4	-2.3	2.4	1.9
Std III	6.6	9.0	6.8	3.4	-8.5	-17.0	-7.7	3.7
Std V	1.6	2.7	2.8	0.6	-3.6	-11.5	-13.9	-4.9

Source: ASER reports 2024, 2014 and 2006

Between 2014 and 2024, recovery in Std III and Std V happened across the board, while in Std I it is more nuanced. In Std I, letter recognition improved strongly (+17%) after the earlier fall. In Std III, there was an improvement in word recognition (+9%), reading of Std I level text (6.8%) and reading of std II level text (3.4%). Similarly, there was an improvement in Std V, but less than in Std III (last line, Table 10)

Minimum Arithmetic Proficiency (MAP) shows a similar trend of decline between 2006 and 2014, followed by recovery from 2014 to 2024. From 2006-2014, the proportion of children in all three standards with ability to subtract and divide fell across the board. The decline was somewhat higher for Std III students (~50%) than for Std V (Table 11). The decline in Std V was higher in terms of percent points than for Std III, but it was higher in percent terms for Std III than for Std V, subtraction dropped by (-) 29% points (-36%) while division fell by (-)19% points (-42%). Std III saw a decline of (-)23% points (-48%) and division a decline of (-)8% points (-51%).

Table 11: Minimum Arithmetic proficiency, MAP (% of children): 2006 to 2024

MAP(%)	2024				2014			
	Recognize nos		Can		Recognize nos		Can	
	1-9	11-99	Subtract	Divide	1-9	11-99	Subtract	Divide
Std I	73.7	33.8	7.2	2.0	57.7	23.8	4.5	1.1
Std III	94.5	70.8	33.7	11.4	90.1	60.7	25.4	7.4
Std V	97.7	85.9	55.8	30.7	96.1	80.7	50.6	26.1
Change	2014 to 2024				2006 to 2014			
Std I	16.0	10.0	2.7	0.9			-3.3	-1.0
Std III	4.4	10.1	8.3	4.0			-23.1	-7.8
Std V	1.6	5.2	5.2	4.6			-28.7	-19.2

Source: ASER reports 2024, 2014 and 2006. Note; Recognition of no. by single digit (1-9) and double digit (11-99). is NA for year 2006, so we cannot determine change between 2006 and 2014.

From 2014-2024, there is clear improvement. In Std III, gains were visible across all indicators, with children who can subtract increasing by 8.3% points (+33%) and those who can divide improving by +4% points (54%). Improvements are smaller for Std V, with those who can subtract improving by 5.2% points (10%) and those who can divide increasing by 4.6% points (18%) of children.

5.4.2.1 Effect of Right to Education Act (RTE,2009)

The Right of Children to Free and Compulsory Education Act or Right to Education Act (RTE, 2009) was enacted by the Parliament of India in 2009 and came into effect on April 1, 2010 establishing free and compulsory education as a fundamental right for children aged 6 to 14 and setting minimum standards for elementary schools. As the constitution already enjoined Government to provide education to every child in India, the important change was in terms of the wages and benefits of teachers and increased administrative procedures to be followed by Govt, private aided and private (NGO/NPO) schools. The goal of the Act was to improve the quality of teaching and access to education. The results belied these expectations.

Table 12 shows reading outcomes before and after the Right to Education Act (RTE, 2009), i.e., for 2006, 2010, and 2018. Before RTE (2006-2010), reading levels showed small improvements in early grades as letter recognition (+4.2% points, Word recognition (+1.4% points) and reading ability of Std I level text (+1.2% points) increased. In Std III and V, there were decline in per cent of children reading words (-)1.9% points and (-)1.8% points, respectively and Std I level text (-)2.2% points and (-)2.6% points, respectively. After RTE came into effect, the 2010-2018 period saw either a decline instead of improvement or faster decline in reading ability across all standard, with two exceptions. Minimum reading ability of Std I children (Std I level text +3.2% points) improved and so did the minimum reading ability of Std V children (Std II level text, +7.2% points).[27]

Table 12: Effect of RTE on Minimum Reading Proficiency (% of children)

MRP(%)	In Year 2018				In year 2010			
	Per cent of cildren who can read				Per cent of cildren who can read			
Standard	Letter	Word	StdItext	StdIIText	Letter	Word	StdItext	StdIIText
Std I	57.3	24.7	11.0	5.8	65.9	24.8	7.8	3.4
Std III	87.9	65.3	44.5	27.2	94.1	75.3	45.7	20.0
Std V	94.1	82.4	69.4	50.3	97.9	91.2	78.5	53.4
Change	Post-RTE Act: 2010-2018				Pre- RTE Act: 2006-2010			
Std I	-8.6	-0.1	3.2	2.4	4.2	1.4	1.2	0.8
Std III	-6.2	-10.0	-1.2	7.2	0.4	-1.9	-2.2	0.1
Std V	-3.8	-8.8	-9.1	-3.1	0.0	-1.8	-2.6	0.4

Source: ASER reports 2018, 2010 & 2006

Similarly, arithmetic skills in Table 13 were already weakening as Std III dropped in subtraction (-)12%, and Std V fell sharply in both subtraction and division (-)9%. After the RTE, the decline continued. Std, I decline in number recognition while Std III saw declines in subtraction. Std V shows the steepest fall, especially in subtraction (-)18% and division (-)8% except for Std 1 number recognition (+3.5%) and Subtraction (+0.4%).

Table 13: Effect of RTE on Minimum Arithmetic Proficiency (% of children)

MAP(%)	In Year 2018				In year 2010			
	Recognize nos		Children who can		Recognize nos		Children who can	
	1-9	11-99	Subtract	Divide	1-9	11-99	Subtract	Divide
Std I	64.3	27.2	5.9	2.0	65.8	23.7	5.5	2.1
Std III	92.5	65.6	28.1	8.5	94.3	73.3	36.4	9.4
Std V	96.6	82.8	52.3	27.8	97.9	90.1	70.3	35.9
Change	Post-RTE Act: 2010-2018				Pre- RTE Act: 2006-2010			
Std I	-1.5	3.5	0.4	-0.1			-2.3	0.0
Std III	-1.8	-7.7	-8.3	-0.9			-12.1	-5.8
Std V	-1.3	-7.3	-18.0	-8.1			-9.0	-9.4

Source: ASER reports 2018, 2010 & 2006

The goal of the Right to education Act was to improve the access to quality education. The learning outcomes were if anything contrary to these expectations. RTE (2009) seems to have had a broadly negative impact on learning outcomes, affecting both minimum reading proficiency and minimum proficiency in arithmetic. While the pre-RTE period (2006-2010) showed declines with stability in a few grades/standards, the post-RTE years (2010-2018) showed greater declines in most grades.

[27] This was partly due to a reduction of students, due to the closing of NGO/NPO schools.

5.4.2.2 Effect of Covid 19, Pandemic

Another event which affected school education was the COVID 2019 pandemic. No ASER survey was done during the pandemic. Data is therefore only available for 2018, 2022 and 2024. We therefore compare trends during 2022-2024 with the trends during 2018-2021.

During the pandemic years 2020-2021, reading outcomes declined across all standard and all reading metrics. Among Std I children the share of children recognizing letter and words declined by (-)1.2% points and (-)4% points respectively. Share of Std III children who could read Std I level text fell by (-)8.9% and those who could read Std II level text declined by (-)6.7% points. The corresponding deterioration in Std V was (-)6.7% points for Std I level text and (-)7.5% for Std II level text (Table 14).

Table 14: Effect of Pandemic on Minimum Reading Proficiency (% of children)

MRP(%)	In year 2024				In year 2022			
	Percent of children who can read				Percent of children who can read			
	Letter	Word	StdItext	StdIIText	Letter	Word	StdItext	StdIIText
Std I	68.2	29.4	12.2	5.3	56.1	20.8	8.8	4.5
Std III	91.8	69.2	47.0	27.0	85.6	58.0	35.6	20.5
Std V	95.9	84.2	70.0	48.7	94.0	79.1	62.7	42.8
Change	Post-Pandemic: 2022-2024				During Pandemic: 2018 to 2022			
Std I	12.1	8.6	3.4	0.8	-1.2	-3.9	-2.2	-1.3
Std III	6.2	11.2	11.4	6.5	-2.3	-7.3	-8.9	-6.7
Std V	1.9	5.1	7.3	5.9	-0.1	-3.3	-6.7	-7.5

Source: ASER reports 2018, 2010 & 2006

In the post-pandemic period, there was strong, across the board, recovery in minimum reading proficiency. The recovery during 2022 to 2024 was greater than the decline during 2018-2022 in all but a few cases. The main exception was the share of Std V children who could read Std II level text-these increased by only 5.9% points, after declining by (-)7.5% points. The biggest per cent jump (40%) was in Std I, with children who could read words increasing by 8.6% points and those who could read Std I level text improving by 3.4% points. The second highest per cent jump (30%) was in Std III, with reading of Std I level text improving by 11.4% points and of Std II level text improving by 6.5% points (Table 14).

Similarly, arithmetic skills declined across all primary standard and metrics from 2018-2022 In Std I recognition of both single- and two-digit numbers fell by 1-2%, Std III-V saw decreases across subtraction, and division (Table 15). Post-pandemic (2022-2024), there was a clear recovery. Students in Std I recognizing numbers (1-9 & 10-99) improved (by +11.3% & 8.2% points). Children in Std III and Std V able to subtract increased by 7.8% &5.9% points respectively, while those able to do division increased by +3.1% & 5.1% points respectively.

Table 15: Effect of Pandemic on Minimum Arithmetic Proficiency (% of children)

MAP(%)	In year 2024				In year 2022			
	Recognize nos		Children who can		Recognize nos		Children who can	
	1-9	11-99	Subtract	Divide	1-9	11-99	Subtract	Divide
Std I	73.7	33.8	7.2	2.0	62.4	25.6	5.8	1.7
Std III	94.5	70.8	33.7	11.4	90.3	62.7	25.9	8.3
Std V	97.7	85.9	55.8	30.7	96.3	81.7	49.9	25.6
Change	Post-Pandemic: 2022-2024				During Pandemic: 2018 to 2022			
Std I	11.3	8.2	1.4	0.3	-1.9	-1.6	-0.1	-0.3
Std III	4.2	8.1	7.8	3.1	-2.2	-2.9	-2.2	-0.2
Std V	1.4	4.2	5.9	5.1	-0.3	-1.1	-2.4	-2.2

Source: ASER reports 2018, 2010 & 2006

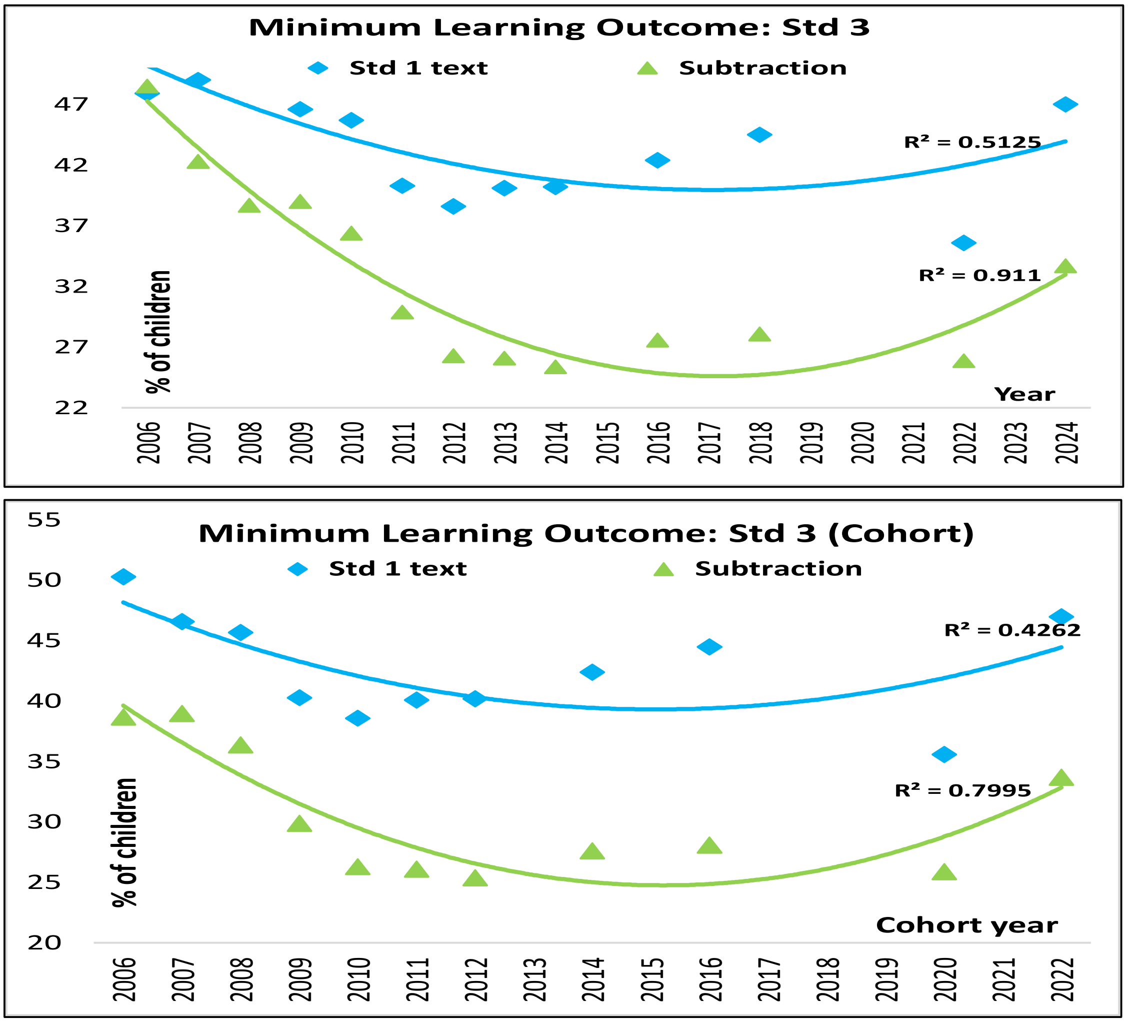
5.4.2.3 Long Term Trends in MLP

ASER is the only survey which can be used to compare national trends over two decades. Though ASER surveys started in 2005, there were major changes in 2006, which make the 2005 data non-comparable with later surveys. As 2006 survey was the first survey with improved methodology, it may have taken a year to stabilize, so we have to be somewhat cautious in using the 2006 data when its widely different from 2007. Figure 11 depict the trends in minimum learning proficiency among Indian Primary school children from 2006 to 2024. The first panel in Figure 11 & Figure 12 is the Minimum Learning Proficiency (MLP) in specific Std (III or V) over the years. This shows how the outcomes have changed over the years.

The second panel in Figure 11 & Figure 12 is based on the performance of identified cohorts. A cohort refers to a group of students who entered Std I in the same year and are tracked as they progress through grades. Thus the 2006 cohort is always show in cohort year 2006, which ever grade we are comparing. Thus, this cohort was in Std III in 2008 and in Std V in 2010, In the second panel of both Figure 11 & Figure 12 , its performance is the percentage shown for 2006. Similarly, the cohort which was in Std I in 2012 is always shown above 2012, though it was in Std III in 2014 and in Std V in 2016.

Std III is an appropriate level to check how many students have achieved functional literacy and numeracy (FLN) and identify the students who have not achieved FLN, so teachers and school administrators can pay special attention to them. Minimum reading proficiency, measured by ability to read and understand Std I level text. The share of children achieving minimum reading proficiency (Std I level text), shows three phases. A declining trend from 2006 to 2012 with a sharper decline in later years, a rising trend from 2012 to 2018, and then the sharp setback from the pandemic followed by recovery (blue diamonds & line, Figure 11 , top panel). Minimum arithmetic (subtraction) proficiency follows a similar pattern, but the decline in the first phase is more pronounced, and longer, with the trough reached in 2014. the recovery in the second phase is minimal (green triangles and line, Figure 11, top panel). The effect of the pandemic is however less, but recovery from pandemic good.

Figure 11: Minimum Learning Proficiency: Std III (% of children)

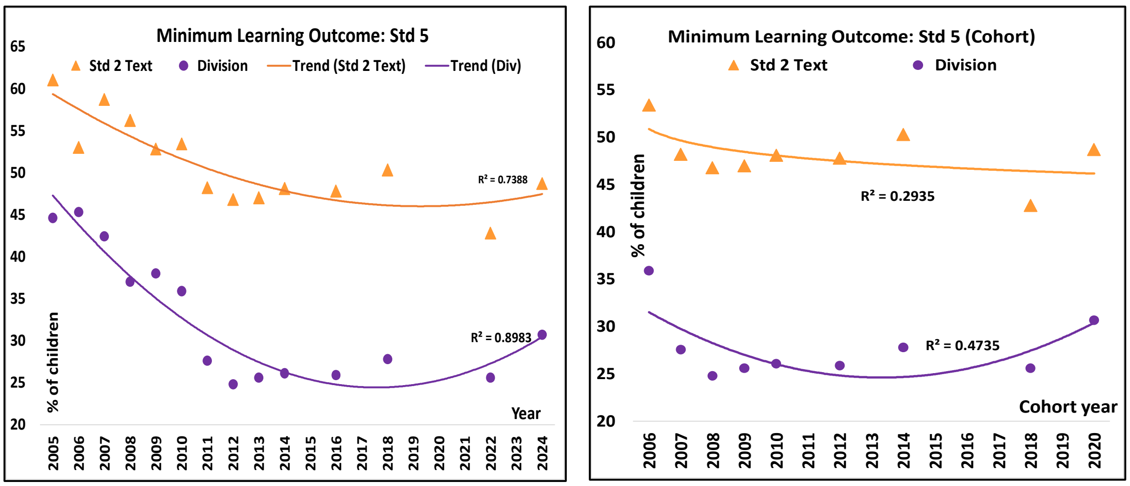


Data source: Annual Status of Education Reports 2006-2024

The results for cohorts, studying in Std III, are in lower panel in Figure 11. There was a decline in minimum reading proficiency (Std I level txt) from cohort 2006 to cohort 2010, while minimum arithmetic proficiency (subtraction) declined from cohort 2006 to cohort 2012. In both cases there was an uptrend thereafter, which peaked with cohort 2016. The Pandemic resulted a sharp decline in minimum reading proficiency of the 2020 cohort and a smaller decline in minimum arithmetic proficiency of this cohort. Both recovered sharply to put the cohorts back on the phase 2 uptrend in share of students meeting minimum learning standards. The gap between the minimum reading ability and minimum arithmetic ability is starkly illustrated by the blue and green trend lines. This gap was fairly narrow in 2006, expanded till around 2014 and then narrowed (Figure 11, top panel). When we look at the performance across cohorts (lower panel, Figure 11) the gap was fairly large even for the 2006 cohort, so its expansion for the middle cohort was less, before it narrowed again. It is therefore clear, that the foundation for numeracy is much weaker than for language, and bigger improvements are needed in pedagogy of teaching arithmetic.

Most countries define Std V as the completion of primary education. We use the share of students who can read Std level II text as a measure of minimum reading proficiency and the share of children who can do division as the measure of minimum arithmetic proficiency. Figure 12 shows the trends in minimum learning outcomes for Std V students during 2006-2024. We again find three phases in learning outcomes. A sharply declining trend from 2006/7-2012, a very slowly rising trend from 2012 to 2018, and then the pandemic disruption of a sharper fall and quick recovery (Figure 12, 2nd panel). The trend for the cohort based minimum learning outcomes is significantly different from the normal annual trends.

Figure 12: Minimum Learning Proficiency: Std V (% of children)



Data source: Annual Status of Education Reports 2006-2024

The cohort learning outcomes for Std V shows a decline in minimum reading (Std II level text) and arithmetic (division) performance from 2006 cohorts to 2007 cohort. Minimum learning outcomes then slowly improved from cohort 2007 to 2014. Because of the pandemic the performance was poor, while cohort 2020 reflects the post pandemic recovery. The gap between minimum arithmetic proficiency and minimum reading proficiency follows the same time pattern as in Std III, but are much wider, reinforcing the need for changes in pedagogy and related teacher training

Std I, foundational literacy and numeracy (LN) trends over time were similar to Std III foundational trends were similar. Share of children recognizing/understanding words, decline from 23.9% in 2007 to 19.1% in 2012. It then recovered to 24.7% by 2018. The pandemic shock reduced this to 20.8% in 2022 with an equally sharp recovery to 29.4% in 2024 a share higher than in 2007 (Table 16).

The same pattern was seen for minimum numeracy (10-99). Share of children recognizing/understanding numbers (10-99), declined from 25.5% in 2007 to 21.0% in 2012. It then recovered gradually to 27.2% by 2018. The pandemic shock reduced this to 25.6% in 2022 with an equally sharp recovery to 33.8% in 2024, higher than in 2007 (Table 16).[28]

[28] When compared with Std 3 student huge improvement can be seen in both reading and arithmetic. Improvement over grades could be partly due to dropouts, as students who are unable to acquire basic learning skills are more likely to drop the school.

Table 16: Minimum Learning Proficiency (% of children)

	Std	**Std 1**				**Std 3**				**Std 5**		PCGDP
	Year	**Word**	**Nos 10-99**	**Std 1 text**	**Subtract**	**Std 1 text**	**Subtract**	**Std 2 text**	**Divide**	**Std 2 text**	**Divide**	**(2011-12)**
		1	2	3	4	5	6	7	8	9	10	
1	**2006**	23.4		6.6	7.8	47.9	18.5	19.9	15.2	53.0	45.3	56964
2	**2007**	23.9	25.5	6.9	5.4	49.0	42.3	21.6	11.2	58.7	42.4	60466
3	**2008**	23.2	22.0	6.8	4.4	50.3	38.7	22.2	10.8	56.2	37.0	61468
4	**2009**	24.2	24.7	8.1	6.0	46.6	39.0	19.8	10.6	52.8	38.0	65394
5	**2010**	24.8	23.7	7.8	5.5	45.7	36.4	20.0	9.4	53.4	35.9	69994
6	**2011**	22.2	21.3	6.9	4.4	40.3	29.9	18.8	6.7	48.2	27.6	71609
7	**2012**	19.1	21.0	7.1	4.2	38.6	26.3	21.4	6.7	46.8	24.8	74599
8	**2013**	20.6	21.9	8.0	4.4	40.1	26.1	21.6	7.4	47.0	25.6	78348
9	**2014**	21.1	23.8	9.0	4.5	40.2	25.4	23.6	7.4	48.1	26.1	83091
10	**2016**	22.2	25.0	9.8	5.0	42.4	27.6	25.1	8.4	47.8	25.9	94751
11	**2018**	24.7	27.2	11.0	5.9	44.5	28.1	27.2	8.5	50.3	27.8	105448
12	**2022**	20.8	25.6	8.8	5.8	35.6	25.9	20.5	8.3	42.8	25.6	116892
13	**2024**	29.4	33.8	12.2	7.2	47.0	33.7	27.0	11.4	48.7	30.7	133501
14	Avg	23.0	24.6	8.4	5.4	43.7	30.6	22.2	9.4	50.3	31.7	
15	CorPcG	0.34	0.77	0.89	0.26	-0.36	-0.19	0.67	-0.22	-0.62	-0.57	1.00
16	CorAR	0.82	0.85	0.33	0.42	0.57	-0.04	-0.04	0.60	0.85		

Data source: ASER 2006-2024; RBI: Macro-Economic Aggregates (2011-12 At Constant Prices) (Amount in ₹ Crore)

The row 15 of Table 16 also shows the correlation between per capita GDP and learning proficiency of children in Std I, III and V. We find learning outcomes in Std I are highly corelated with per capita GDP, for both reading proficiency of Std I level text (0.89) and arithmetic proficiency in numbers 10-99 recognition (0.77). The correlation with word recognition is however moderate (0.34). Overall, however, the positive correlation suggests improvement during 2006-2024, as PCGDP increased. In Std III, the correlation between PCGDP and reading proficiency of Std II level text is reasonably high (0.67), but is negative for Std I level text, subtraction and division is negative. A similar negative correlation is found for Std V learning outcomes (Table 16). These suggest that learning outcomes in primary Std I, III & V, have not kept pace with the rising per capita GDP.

Row 16 shows the correlation across nearby columns of reading & arithmetic. The correlation between MRP & MAP is fairly high in primary school, for the levels we have chosen to reflect minimum learning proficiency for each std: 0.85 in Std I, moderately good 0.57 in Std III and 0.85 in Std V.

The difference in correlation between Arithmetic levels and language levels along with the fact that minimum arithmetic proficiency is generally lower than minimum language proficiency, suggests the following: Higher level learning in arithmetic (math) is much more dependent on learning in previous levels, than in reading (Language). Arithmetic involves abstractions and logical reasoning using these abstractions. Every level is therefore built on the foundation of the previous lower level. Those unable to understand the lower level have little chance of understanding the higher level. Language on the other hand is the instrument of everyday communication. As much is, or can be, learned from listening to family & third-party interactions as from formal schooling. So, language proficiency depends as much on the environment in which the child lives at home as from school. Therefore, many children can leapfrog reading levels, while some may even regress if their home environment is poor in communication skills.

Research by Evans and Popova (2016) confirm that *c*hanges in pedagogy, curriculum and testing are critical to better learning outcomes. Effective teaching in classrooms is essential for keeping students in school and helping them develop skills and learn effectively. A large body of evidence from school interventions in low- and middle-income countries clearly points to more effective teaching, through improved pedagogy*,* as the most impactful way to improve learning outcomes.

5.5 Learning Outcomes: Official Surveys

In this section we present some of the results of the National Achievement Survey (NAS 2017, 2021), The Foundational Learning Study (FLS 2022) and the Parakh Rashtriya Sarvekshan survey (PRS 2024). As noted in Section 5.2.1 NAS (2017) and NAS (2021) have the same design, but as the latter represents the outcome of a once in a century pandemic it is not possible to discern trends by comparing the two. Similarly, though PRS (2024) design and implementation is an update and improved version of the NAS, but comparable data on student performance in Class/Grade 3 is not available in the format used to classify students in by performance level in NAS 2021 & 2017. FLS (2022) study was conducted in 20 languages in 36 States and UTs. It aimed to establish a baseline for achieving NIPUN Bharat goals, by setting benchmarks in literacy and numeracy (*Kar, Kamat & Guria* (2024). It has been implemented only once.

NAS divides students into Below Basic, Basic, Proficient, and Advanced, based on different sets of question, percent of correct answers, average test scores, etc. The Foundational Learning Study (FLS) groups students into Below Partially Meets, Partially Meets, Meets, and Exceeds Minimum Proficiency based on global benchmarks. In these surveys, the distribution of students across categories is mutually exclusive, adding up to 100% within each subject and grade. It is understood that the students who are advanced in language (or arithmetic) are also proficient in language (or arithmetic, respectively) in this section we aim to benchmark these surveys against ASER, and to extract any other information which is not available in ASER surveys, such as performance differences across Urban-Rural and Gender.

5.5.1 Learning Outcomes: NAS and FLS

To make the surveys comparable, different methods were used. First, simple and weighted averages were created from state-level data available in each survey, and these were cross-checked with the total averages reported by the survey itself. Then, interstate correlations were run across categories, along with multiple regressions at the state level, to test the consistency of results. Some of these are reported in the section on Interstate comparisons. Here we report the National level analysis to map NAS results on minimum learning outcomes in Primary classes, with the results from ASER, recognizing that the latter covers only rural areas. Since these surveys are from different years, it is difficult to compare their results directly. Nevertheless, we use surveys from nearby years, such as ASER 2022 with NAS 2021, and NAS 2017 with ASER 2016 & ASER 2018. NAS results for percent of students reported as proficient & advanced in language or arithmetic are compared with ASER for per cent of children who can read Std I level text & Std II level text, and those able to do subtraction and division, respectively.

ASER reports, separately, the percentage of children able to read Words, Std I and Std II level text in language, and those able to recognize numbers (10-99), subtract, and divide in mathematics. We assume that a student who can read a Std 1 level text can also recognize words, and a student who can do subtraction can also recognize numbers 10-99. NAS reports separately the percentage of students at Proficient and Advanced performance levels. We assume that a student who is advanced is also proficient. In our use of the term "Proficient", therefore includes students who at a higher, "advanced" level.

Table 17 presents Grade 5 (end of primary) results. In Minimum Reading Proficiency (MRP) reasonably close match between the "proficient" level defined in NAS and the ability to read Std II level text, in ASER. Based on national averages (i.e., all India), as per ASER 2022, 42.8% of children can read standard II level text, and as per NAS 2021, 42.0% of student are proficient in language. Similarly based on national averages, in minimum arithmetic proficiency, 25.6% could do division as per ASER 2022, while 25.0% were Proficient in mathematics as per NAS 2021. This implies that NAS benchmark of Class 5, proficiency in language, is equivalent to ASER's (Std I-VIII) benchmark of ability to read Std II level text, and the NAS benchmark of proficiency in Class 5 mathematics is equivalent to ASER (Std I-VIII) benchmark of ability to division. The small differences in these measures between ASER 2022 and NAS2021, may be due to a combination rural-urban differences and different survey year.

The second closest ASER bench mark for language (Std I level text) at 62.7% is off by almost 50% from the NAS "proficient", i.e., it cannot be explained by rural-urban difference or the difference in year of survey. Similarly, the alternative benchmark for arithmetic from ASER (subtraction) at 49.9% is also off by almost 50%, from "proficient" in math as per NAS 2021, a difference too large to be due to rural-urban difference or difference in year of survey (Table 17)

Though NAS 2017 is an eight-year-old survey, it holds special significance, because it was the basis of the international comparison of Minimum Reading Proficiency presented in World Bank, World Development indicators. As there is no ASER survey for 2017, ASER 2018 and 2016 are used to compare with NAS 2017. As per NAS 2017, 46.3% of students were "Proficient" (Table 17). This was (-)4% points less than the 50.3 per cent of children who could read Std II level text (ASER 2018) and (-)1.5% point lower than the 47.8% of children who could read Std II level text (ASER 2016). Though the gaps are higher than for NAS2021-ASER2022 comparison, they are small enough to be accounted for by rural-urban differences (Table 17).

Table 17: Minimum Learning Proficiency (% of students): Grade 5/Standard 5

	Language		Mathematics	
Grade 5	Proficiency Levels	Students %	Level	Students %
ASER 2022	Can Read Std1 or higher text	62.7	Can do Substraction or higher	49.9
	Can Read Std 2 level text	42.8	Can do Division	25.6
NAS 2021	Proficient (incl Advanced)	42.0	Proficient (incl Advanced)	25.0
ASER 2018	Can Read Std1 or higher text	69.4	Can do Substraction or higher	52.3
	Can Read Std 2 level text	50.3	Can do Division	27.8
NAS 2017	Proficient (incl Advanced)	46.3	Proficient (incl Advanced)	43.7
ASER 2016	Can Read Std1 or higher text	66.4	Can do Substraction or higher	50.5
	Can Read Std 2 level text	47.8	Can do Division	25.9

Source: ASER Reports: 2022, 2018 and 2016; NAS survey 2021 and 2017

The picture is however very different for Minimum Math/Arithmetic proficiency. In mathematics, as per NAS 2017 43.7% of students are Proficient is 16% points higher than the 27.8% who can do Division in 2018, and 18% points higher than the 25.9% who can do Division in 2016 (ASER)). If we compare students proficient in Mathematics (43.7% NAS 2017) with children who can do Subtraction or higher (52.3% ASER, 2018, 52.3% ASER 2016), then the NAS is (-) 8.6 % (-)6.8% lower than ASER 2018 & 2016 respectively. This shows that the NAS 2017 result for math proficiency, lies between ASER's criteria Minimum Arithmetic Proficiency of children who can do Subtraction or higher, and children can do Division (Table 17).

To conclude, for Class 5 language, NAS "Proficient" level (including student at advance level) for language is close to ASER benchmark of children who can read Std II level text. For Mathematics, the comparable standard is expected to be Division, but the NAS results for 2021 is equivalent to this, but the NAS 2017 result is between MAP subtraction (including division) and MAP division. This suggests that, the weakness observed in NAS 2017 math assessment, were corrected in NAS 2021, and hopefully have been further improved in Parakh.

Table 18 presents Grade 3 results on minimum learning proficiency across FLS, ASER, and NAS. The categories differ by survey. FLS reports the percentage of students who Meet Global Minimum Proficiency (GMP), and those who Exceed GMP. We assume that those students who exceed GMP have already met the GMP standard. For 2022, FLS and ASER can be directly compared. As per FLS, 33.0% of students meet or exceed GMP in language, which is close to 35.6% of children who can read Std I level text or higher, as per ASER. There is a slightly higher difference of 4% points between the 54.0% students who meet or exceed GMP for language, as per FLS, and the 58.0% of children who can read words or higher text as per ASER. This implies that FLS benchmark of "exceeds Global Minimum Proficiency" in language is equivalent to the ASER benchmark of ability to read Std I (or higher-level) text (Table 18).

Table 18: Minimum Learning Proficiency (% of students): Grade 3 / Standard 3

	Language		Mathematics	
Grade 3	Proficiency Levels	Students %	Level	Students %
FLS 2022	Meets or Exceeds GMP (+)	54.0	Meets or Exceeds GMP(+)	52.0
	Exceeds Global Min Profeciency	33.0	Exceeds Global Min Profeciency	10.0
ASER 2022	Can read Words or higher text	58.0	Can recognize Nos 10-99 or do highr math	62.7
	Can Read Std1 or higher text	35.6	Can do Substraction or higher	25.9
NAS 2021	Proficient (incl Advanced)	39.0	Proficient (incl Advanced)	42.0
ASER 2018	Can read Words or higher text	65.3	Can recognize Nos 10-99 or do highr math	65.6
	Can Read Std1 or higher text	44.5	Can do Substraction or higher	28.1
NAS 2017	Proficient (incl Advanced)	47.0	Proficient (incl Advanced)	53.0
ASER 2016	Can read Words or higher text	62.3	Can recognize Nos 10-99 or do highr math	63.2
	Can Read Std1 or higher text	42.4	Can do Substraction or higher	27.6

Source: PARAKH 2024, FLS and ASER 2022

In mathematics, the standards used in FLS for Grade 3, does not match any specific ASER Std (one to one). As per FLS, 52.0% students meet or exceed GMP, but as per ASER this number lies between the 62.7% of children who can recognize numbers (10-99) or perform higher level mathematics, and the 25.9% of children who can do subtraction or higher. This implies that the FLS standard for mathematics lies in between the ASER standard of "recognize number 10-99 and can-do subtraction (right panel, Table 18).

Comparing NAS 2021 with ASER 2022, in language/reading proficiency, NAS estimates 39.0% of Class 3 students are Proficient, 3.4% point more than the 35.6% of students with minimum reading proficiency (Std I level text) as per ASER. This implies that NAS Class 3 benchmark of Proficient in language, is equivalent to the ASER benchmark of, "can read Std I level text." In mathematics, the standards are again very different, as we found for FLS. As per NAS 2021, 42.0% of students are Proficient, which is between the 62.7% of students who can recognize numbers (10-99), and 25.9% of children who can do subtraction as per ASER.

NAS 2017 can be compared with ASER 2018 and ASER 2016. In language, 47.0% of Class 3 students are Proficient, about +2.5% higher than the 44.5% who can read Std I level text as per ASER 2018, and +4.6% higher than the 42.4% show can read Std I level text as per ASER 2016. A fairly good match of Minimum learning outcomes in language. In mathematics, NAS 53.0% of students at Proficient, which lies between ASER Minimum Arithmetic proficiency (MAP) among Std III students who are proficient in two-digit numbers 10-99 (65.6% & 63.2% in ASER 2018 & 2016), and per cent of those who can do subtraction (28.1% & 27.1% in 2018 & 2016). This confirms that the NAS standards for minimum language proficiency is more or less equivalent to the ASER standard for minimum learning proficiency in language., while the NAS standards of proficiency in mathematics is weaker than ASERs.

To conclude, for Grade 3 language NAS "Proficient" and FLS's Minimum Global proficiency (GMP) students broadly match ASER's Std 1 level text reading standard, for mathematics, NAS proficient and FLS's GMP standards, lie in between ASER's arithmetic standard for recognition of two-digit numbers (10-99) and the standard for subtraction. This suggests that NAS & FLS math standard is either weaker than ASER's arithmetic standards, or is less stringently applied.

5.5.2 Change in Learning (NAS & FLS)

When comparing NAS 2021 with NAS 2017, the results show a clear decline in learning outcomes, largely reflecting the impact of the COVID-19 pandemic. In 2017 the percentage of students performing at the proficient level in Classes 3 and 5 was higher in Language and Mathematics. By 2021, these percentages had dropped sharply. The decline was more severe in mathematics than in language. For example, in Class 3 mathematics, the share of proficient students fell by (-)11.6 percentage points (Table 19). In Class 5 mathematics, the drop was (-)18.6 percentage points between 2017 and 2021. The Foundational Learning Study (FLS) 2022, though not directly comparable with NAS, suggests signs of recovery after the pandemic. For instance, in Class/Grade 3 language, while 39% of students reached proficient level in NAS 2021, the FLS 2022 recorded 54% (Table 19).

Table 19: Minimum Learning Proficiency (% of students): Grade 3 & 5

Grade/Subject	NAS 2017		NAS 2021		FLS 2022		Change:2022-2021	
Class III	**Proficient***	**Advanced**	**Proficient***	**Advanced**	**Meets***	**Exceeds**	**Proficient***	**Advanced**
Language	47.2	15.1	39.0	13.0	54.0	33.0	15.0	20.0
Mathematics	52.9	16.2	42.0	12.0	52.0	10.0	10.0	-2.0
Class V	**Proficient***	**Advanced**	**Proficient***	**Advanced**				
Language	46.3	11.8	42.0	10.0				
Mathematics	43.6	12.7	25.0	6.0				

Note* Proficient includes students at advance level; Meets (including exceeds).
Source: National Achievement Survey 2021 & 2017 and FLS 2022

5.5.3 Learning Difference across location & gender

This sub-section analyses the results of NAS, FLS and Parakh surveys to determine Rural-Urban and Male-Female differences in learning outcomes. This has a bearing on how indicative are ASER's rural surveys are for Urban students, and for students as a whole.

Table 20 shows that in Class 3, student learning proficiency in mathematics (42%) is far higher than in any ASER survey. As analyzed in the earlier sub-section, the standards for proficiency in math seem to be weaker or less stringently applied than in ASER surveys. The percent of students who are proficient in language (30%) are approximately the same as in ASER surveys, as benchmarks are equivalent.

This anomaly between NAS and other survey results with respect to Math proficiency, is not seen in Class 5 results. This indicates a better application of standards to testing/assessment of students. Geographical and gender differences in Class 3 student proficiency are generally quite small. Learning outcomes for rural students are better than those of urban students, in Class 5 Math (+13%) and Class 3 language (+5%), but worse in Class 5 language (-)5%. Language learning outcomes for girls are clearly better than for boys in both Class 5 (+16%) and Class 3 (+8%), and the same in Class 5 Math. As indicated earlier, Class 3 Math results are unreliable.

Table 20: Students (%) at different levels of proficiency: NAS 2021

Student(%) by performance levels	Class 5		Class 3	
Subject/Category	**Language**	**Maths**	**Language**	**Maths**
Total				
Proficient (including advance)	42.0	25.0	39.0	42.0
Urban				
Proficient (including advance)	43.0	23.0	38.0	39.0
Rural				
Proficient (including advance)	41.0	26.0	40.0	44.0
Boys				
Proficient (including advance)	39.0	25.0	37.0	42.0
Girls				
Proficient (including advance)	44.0	25.0	40.0	42.0

Source: National Achievement Survey (2021) Technical Report

Besides the distribution of students over learning levels**,** NAS 2021 also gives student performance in terms of average scores and per cent of correct answers averaged over all students in each grade. As already noted, Class 3 language scores are unreliable, so we will ignore them.

In Class 5, both average scores and per cent of correct answers are higher for Language than for Math (Table 21) for Class 3 and 5 from NAS survey. Across both Class, Language learning outperforms Mathematics in average scores and correct answers. This is consistent with earlier results on proficiency in language and Math (% of students who are proficient).

Table 21: NAS 2021: Average Scores & Correct Answers (%)- Primary

Class 5	**Total**	**Urban**	**Rural**	**Boys**	**Girls**
Average score (%)					
Language	61.8	62.6	60.8	60.6	61.0
Mathematics	56.8	56.2	56.0	56.0	56.2
Correct Answers (%)					
Language	55.0	56.0	55.0	54.0	56.0
Mathematics	44.0	43.0	44.0	44.0	44.0
Class 3	**Total**	**Urban**	**Rural**	**Boys**	**Girls**
Average score (%)					
Language	64.6	64.2	64.0	63.6	64.6
Mathematics	61.2	59.8	60.4	60.0	60.2
Correct Answers (%)					
Language	62.0	61.0	62.0	61.0	63.0
Mathematics	57.0	56.0	58.0	57.0	57.0

Source: National Achievement Survey 2021; Note: Scores are out of 500, converted to percent.

In Class 5, urban students outperform rural students on average scores and correct answers in Language, and average scores in Mathematics. Rural students are better only in correct answers. In Class 3, rural students outperform urban students in correct answers in language, while urban students have a small edge in average scores (0.2% points). In language, girls outperform boys in both Class 5 and 3, across average scores and correct answers. In mathematics, boys and girls achieved the same percentage of correct answers in Class 5. Overall, girls tend to perform better in language, while boys and girls have comparable performance in mathematics (Table 21).

The Foundational Learning Study (FLS) 2022, conducted under the NIPUN Bharat Mission, set national benchmarks for foundational skills at the end of Grade 3 to assess testing English reading with comprehension and Numeracy. Results are reported as the percentage of student who Meets or Exceeds the Global Minimum Proficiency (GMP) level, with the "meets" category including those who also exceed.

Table 22 shows that in English, results are uniform across total, boys, and girls, with 54% of students meeting or exceeding GMP. In contrast, Numeracy scores are slightly varying, with boys performing better (53%) than girls (51%). These FLS findings are not directly comparable with NAS 2021, yet they highlight a difference: 54% of students in Grade 3 meet or exceed GMP in English (FLS), against only 39% found proficient in Language in NAS 2021 (Table 22)

Table 22: Students (%) at different proficiency levels in grade 3

Grade 3	**English**			**Numeracy**		
Global Proficiency Levels	**Total**	**Girls**	**Boys**	**Total**	**Girls**	**Boys**
Meets or exceeds GMP	54.0	54.0	54.0	52.0	51.0	53.0
Exceeds GMP	33.0	33.0	33.0	10.0	10.0	10.0

Source: Foundational Learning Study (FLS) 2022.

PARAKH Rashtriya Sarvekshan (PRS 2024), reports average scores for foundational stages as Grade 3, it assesses Language and Mathematics, with results presented across gender and location. As PRS is based on a new, comprehensive design, its findings are not directly comparable with earlier NAS rounds. It is unclear whether the deficiency in assessment of Grade 3 math proficiency, noticed in NAS survey for Class 3, has been rectified, given that average scores in language are only 4% higher than in mathematics (Table 23).

In Grade 3, Language scores are higher than Mathematics across all groups, with an overall average of 64% in Language compared to 60% in Mathematics (Table 23). Rural students perform marginally better than urban students in both subjects. By gender, girls outperform boys, scoring 65% in Language compared to 63% for boys, while achieving the same score in Mathematics (60%).

Table 23: Average scores in grade 3 (PRS 2024)

Grade/Subjects	**Average Score(%)**				
Grade 3	**Total**	**Urban**	**Rural**	**Male**	**Female**
Language	64	63	64	63	65
Mathematics	60	59	60	60	60

Source: PARAKH Rashtriya Sarvekshan, 2024

In conclusion, the available data suggests that the geographical differences in learning outcome between Rural and Urban areas, vary in both directions, and are small enough to fall within the range of statistical errors in the survey. ***We can use the ASER rural survey to broadly represent national learning outcomes.***

5.6 Learning Outcomes in States

After looking at the overall national picture, the next step is to see how learning outcomes vary across states. For this, Std III results are used to reflect foundational learning, while Std V results are taken to assess primary learning. The interstate comparison helps to understand the differences and gaps in learning levels across states.

5.6.1 Learning Outcomes in States (ASER)

We start by examining learning outcomes across States for 2024 based on the ASER rural survey. There is virtually no correlation between per capita NSDP of a State and its primary education performance in terms of learning outcomes. For Std 5, the correlation of State PCNSDP with percent of children with Min reading proficiency (MRP) is only 0.16, and with percent of children with Minimum Arithmetic Proficiency (MAP) in negative (-)0.08. This means that there is no dependence of learning outcomes on how well off/developed or poor/underdeveloped the State or UT is. This is consistent with the results of Angrist et al. (2023) who found no significant improvement in learning outcomes resulting from increased expenditures on education. While enrolment expanded, being in school did not guarantee learning.

Next, we divide all 27 States and UTs into three categories (A, B, C), using Minimum learning levels among Std V students. We use the all India mean and the standard deviation of Minimum reading proficiency (Std II level text) to classify States & UTs by percent of children with MRP (Table 24, left panel), and we use Minimum Arithmetic proficiency (division) to classify States & UTs by per cent of students with MAP (Table 24, right panel). The numbers in brackets against each state show the change between 2014 and 2024, in the percent of children in the STATE with MRP & MAP respectively. The B level is created by taking a range of 0.67 times the standard division, on each side of the all-India average given by ASER for MRP and MAP respectively (Table 24).

In the case of MRP in Std V, there are nine States & UTs in A (above average) category, ten in B (average) and eight in C (below average). Surprisingly, UP and Odisha are in the A category having seen among the highest improvement since 2014, of 11.7% and 7.6% respectively. Three other States in A category improved learning outcomes between 2014 and 2024 (Mizoram, Maharashtra & Uttarakhand), while four States/UTs MRP deteriorated (Kerela, Haryana, Punjab, Himachal (column 1,Table 24).

Table 24: Min Learning outcomes in Std 5(%), across States-2024 (& change from 2014)

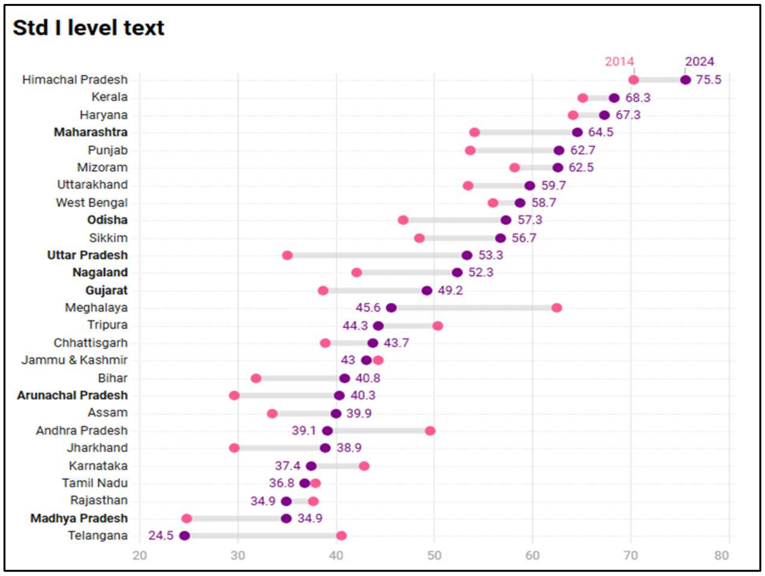
Minimum Reading Proficiency (MRP) in Standard 5				Minimum Arithmetic Proficiency (MAP)in Standard 5		
A: Above average	B: Average	C: Below average		A: Above average	B: Average	C: Below average
More than 56.1%	41.3% to 56.1%	Less than 41.3%		More than 56.1%	41.3% to 56.1%	Less than 41.3%
Mizoram (+15.6%)	Jharkhand (+10.9%)	Assam (+4.9%)		UP (+13.7%)	Odisha (+10.4%)	MP (+7.8%)
UP (+11.7%)	Sikkim (+10.2%)	J & K (-1.0%)		Uttarakhand (+9.6%)	Jharkhand (+9.1%)	Assam (+5.0%)
Odisha (+7.6%)	MP (+9.6%)	Arunachal (-3.4%)		Mizoram (+4.7%)	Maharashtra (+8.8%)	Meghalaya (+4.7%)
Maharashtra (+6.1%)	Nagaland (+7.6%)	Tripura (-4.6%)		Punjab (+4.4%)	Chhattisgarh (+7.7%)	Karnataka (+0.8%)
Uttarakhand (+3.3%)	Chhattisgarh (+2.0%)	Tamil Nadu (-11.3%)		Himachal (+0.2%)	West Bengal (+2.5%)	Tripura (-0.4%)
Kerala (-0.8%)	West Bengal (+1.4%)	Karnataka (-13.2%)		Haryana (-8.6%)	Bihar (+1.2%)	Rajasthan (-1.7%)
Haryana (-4.6%)	Rajasthan (+0.9%)	Andhra (-19.7%)			J & K (+0.2%)	Gujarat (-1.8%)
Punjab(-5.5%)	Gujarat (-0.3%)	Telangana (-22.9%)			Andhra (-1.4%)	Nagaland (-5.0%)
Himachal (-8.4%)	Bihar (-4.5%)				Arunachal (-5.0%)	Tamil Nadu (-5.0%)
	Meghalaya (-15.5%)				Telangana (-8.5%)	Sikkim (-14.4%)
						Kerala (-17.8%)

Source: Authors calc based on ASER report 2024 & 2014.Note: All India Std 5 MRP (std2 txt) is 48.7%, Standard deviation is 11.1%, and MAP (division) is 30.7% with SD =10.1%; Note: Cut-ffs are based on All India +/- 0.67* SD

In the case of Minimum Arithmetic proficiency (MAP) in Std V, there are six States/UTs in A (above average) category, nine States/UTs in B(average), and ten States in C (below average) category. Uttar Pradesh (UP), Uttarakhand and Mizoram, are in A category with an improvement of 13.7%, 9.6% and 4.7% respectively, between 2014 & 2024 (column 4, Table 24). Punjab, Himachal and Haryana are other States which are in A category for both MAP and MRP (columns 1 & 4). Eight States/UTs have below average outcomes in MRP and the 11 states have below average outcomes in MAP, with four state common (Assam, Karnataka, Tamil Nadu and Tripura (columns 3 & 6, Table 24). Lagging States need to improve their performance, with the help of NGOs such as Pratham, as UP and other States have done.

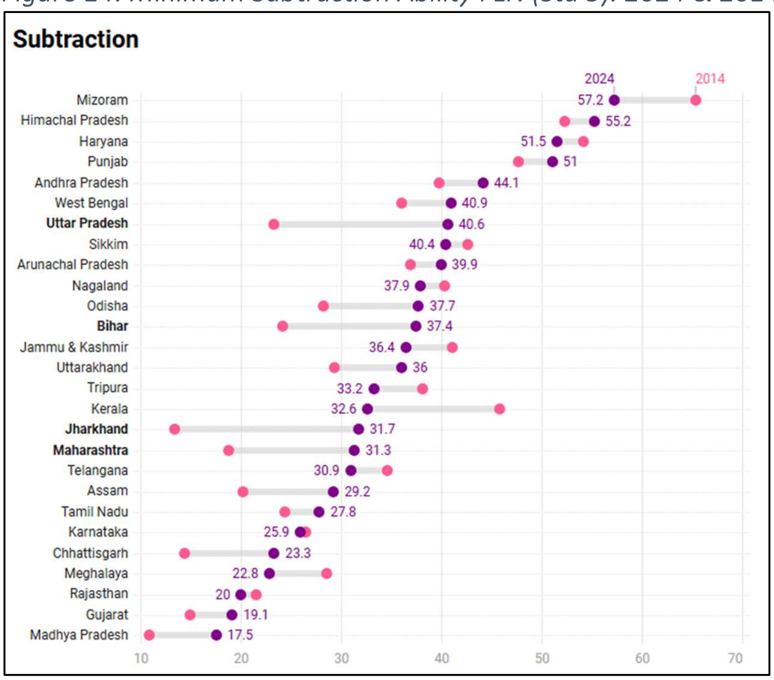
The comparative results for Minimum learning outcomes across States and UTs, for Std III are also depicted in Figure 13 & Figure 14 and those for Std V in Figure 15 & Figure 16. Minimum reading proficiency (MRP) is measured by the percentage of Std III children who can read a Std I level text (Figure 13), and the minimum arithmetic proficiency (MAP) is measured by the percent of Std III children who can do subtraction (Figure 14). The States are sorted by minimum learning outcomes in 2024 (purple dots), but the data for 2014 (pink dots) is also given so that the change between 2014 and 2024 is visible (line).

Figure 13: Minimum Reading Ability FLN (Std 3): 2024 & 2014



Data source: Annual Status of Education Reports 2014 & 2024

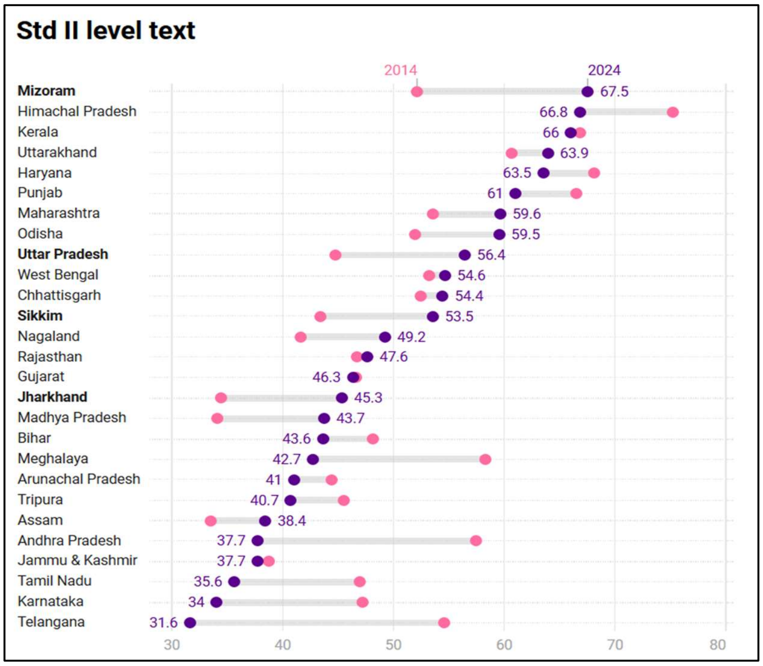
Figure 14: Minimum Subtraction Ability FLN (Std 3): 2024 & 2014



Data source: Annual Status of Education Reports 2014 & 2024

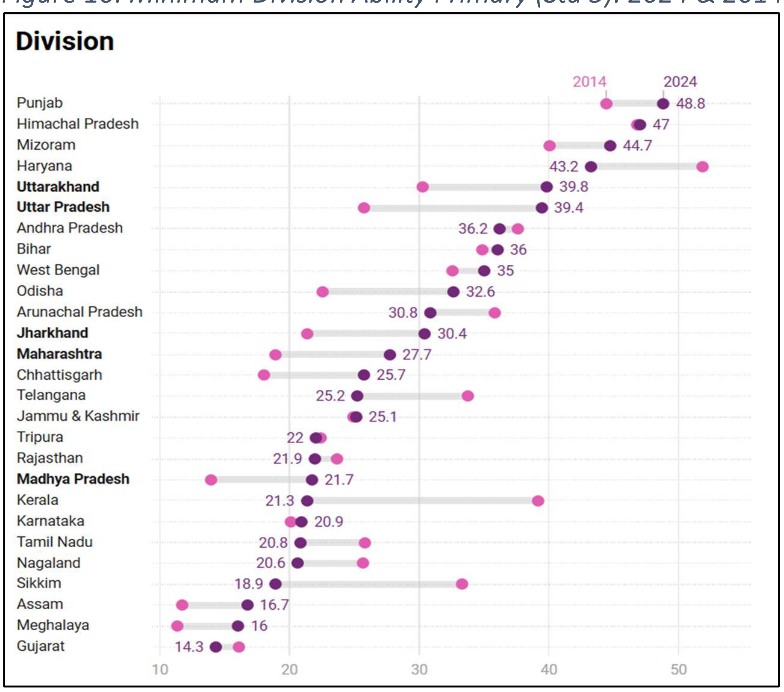
Minimum reading proficiency (MRP) is measured by the percentage of Std V students who can read a Std II level text (Figure 15), and the minimum arithmetic proficiency (MAP) is measured by the percent of Std V students who can do division (Figure 16). The States are sorted by minimum learning outcomes in 2024 (purple dots), but the data for 2014 (pink dots) is also given so that the change between 2014 and 2024 is visible (line).

Figure 15: Minimum Reading Ability Primary (Std 5): 2024 & 2014



Source: Author's calculation based on ASER 2014 & 2024 reports

Figure 16: Minimum Division Ability Primary (Std 5): 2024 & 2014



Source: Author's calculation based on ASER 2014 & 2024 reports.

Much greater attention needs to be paid by almost all States & UTs on Minimum learning outcomes, than has been the practice in the past. Excessive focus on completing set curriculum and pressure to move all students to the next class has led to credentialism, where a certificate completion is more important than actual learning, this can and must be changed.

Angrist et al. (2023) evaluated over 150 programs and identified two cost-effective interventions: Firstly, structured pedagogy, which includes textbooks, teacher guides, training, and coaching; and secondly Teaching at the Right Level (***TaRL***), which groups students by their actual learning level, not by age or grade, with or without a technology component. This highlights that small, targeted investments can generate large gains in learning outcomes and long-term economic benefits.

5.6.2 Minimum Reading Proficiency: NAS

As international comparisons of Indian learning were based on the National Achievement Survey of 2017, we start by looking at the Minimum Reading Proficiency across States as per NAS 2017 data. There is a negative correlation between per capita NSDP and Minimum Reading proficiency across States. In cross-country comparison, learning outcomes improve with per capita GDP in at PPP in constant international prices. There is no natural improvement in learning outcomes as their per capita NSDP at constant prices, increases.

States are therefore distributed into three categories, using the all-India results, along with the standard deviation of State results, following the methodology used for ASER results in Table 24. The Average category is sub-divided into two sub-categories- above and below the national average. The numbers in bracket are the changes in MRP between NAS 2017 and NAS 2022. There are thirteen States in the B category, four of which four were above the National average and nine below the national average (columns 3 & 4, Table 25),

Table 25: Min Reading Proficiency across States – % of students in Grade 5, NAS 2017

A: Above average	B: Average		C: Below average
More than 52.6%	46.3% to 52.6%	40% to 46.3%	Less than 40%
			Punjab (+27%)
Chandigarh (-9%)	Maharashtra (-1%)	Manipur (+7%)	Puducherry(+23%)
Rajasthan (-10%)	Assam (-8%)	West Bengal (+4%)	Sikkim (+16%)
Jharkhand (-15%)	Gujarat (-12%)	Goa (+2%)	Jammu&Kashmir (+14%)
Himachal Pradesh (-18%)	Tamil Nadu (-14%)	Haryana (+2%)	Arunachal (+13%)
Kerala (-20%)		Madhya Pradesh (0%)	A&N Island(+6%)
Uttarakhand (-23%)		Bihar (-4%)	Mizoram (+5%)
Karnataka (-27%)		Tripura (-8%)	Odisha (+4%)
Andhra Pradesh (-31%)		Chattisgarh (-12%)	Delhi (+3%)
Dadra &Nagar (-37%)		Telangana (-19%)	Meghalaya (+3%)
			UttarPradesh (+2%)
			Nagaland (+1%)
			Daman & Diu (-5%)
			Lakshadweep (-6%)

Source: Authors calculation based on NAS 2017 & 2021. Note 1: Cut-ffs are based on All India +/- 0.5*SD. Note 2: All India Std 5 MRP (Language) is 46.3% in 2017, Standard deviation (SD) is 12.7%.

Nine States were in category A and thirteen in category C. There was a positive change in learning outcomes between 2017 and 2022 in four States in category B and eleven of 13 States in category C (Table 25, 3rd & 4th column). The largest improvements were seen in Punjab (27%), Puducherry (23%), Sikkim (16%) Jammu & Kashmir (14%) and Arunachal Pradesh (13%).

The foundational learning study was also significant as to tried to bench park foundational literacy across the different language in which Foundational literacy and Numeracy is imparted to Primary students. As the New Education Policy (2020) stated: "The ability to read and write, and perform basic operations with numbers, is a necessary foundation and an indispensable prerequisite for all future schooling and lifelong learning". However, various governmental, as well as non-governmental surveys, indicate that we are currently in a learning crisis: a large proportion of students currently in elementary school - estimated to be over 5 crores in number - have not attained foundational literacy and numeracy, i.e., the ability to read and comprehend basic text and the ability to carry out basic addition and subtraction with Indian numerals. Attaining FLN for all children will thus become an urgent national mission, with immediate measures to be taken on many fronts and with clear goals that will be attained in the short term (including 100% foundational literacy and numeracy by Grade 3). The highest priority of the education system will be to achieve universal foundational literacy and numeracy in primary school by 2025."

In this background, the cross-State results on, "Oral reading fluency with reading comprehension", from the Foundational Learning study (2022) are important. Table 26 (like Table 25) uses the all India mean results (%), and the standard deviation of state results, to assign States & UTs to three categories A, B & C and subdivide B into two subcategories (Table 26). There are ten States & UTs in category A (>40%), fifteen in category B (26% to 40%) and ten in category C (<26%). Of the States and UTs in category B, seven are above the all-India average (33%) and eight below it. The best performing State was Odisha with 65% of Grade 3 students proficient in reading. In the worst performing State only 7% of Grade 3 students met minimum reading proficiency levels. Five states had only 13%-17% students meeting MRP levels (Table 26). It will be a big challenge for States to meet the NEP (2020) goal of 100% FLN.

Table 26: Min Reading Proficiency across States (% of students in Grade 3, FLS 2022)

Oral Reading Fluency with Reading Comprehension			
A: Above average	**B: Average**		**C: Below average**
More than 40%	**33% to 40%**	**26% to 33%**	**Less than 26%**
Ladakh	Goa	Rajasthan	Meghalaya
Mizoram	A&N Island	HimachalPradesh	Dadra&Nagar, Daman&Diu
Punjab	Sikkim	Assam	Puducherry
Tripura	Maharashtra	Chhattisgarh	Tamilnadu
West Bengal	Gujarat	Jammu & Kashmir	Andhra Pradesh
Bihar	Kerala	UttarPradesh	Nagaland
Uttarakhand	Jharkhand	Arunachal Pradesh	Manipur
Haryana		Karnataka	Chandigarh
Lakshadweep			Telangana
Odisha			Madhya Pradesh

Source: Authors calculations based on FLS State reports (2022). Note: All India Std 3 MRP(English) is 33.0%, Standard deviation is 14.0%.

This section also examines the degree to which ranking of States by share of students with Minimum Reading proficiency, in various surveys are consistent with each other. Table 17 identified the learning outcomes from ASER and NAS surveys, which appeared to be comparable to each other. A correlation matrix is constructed with these, Std/Grade 5, minimum reading proficiency outcome indicators for all States (Table 27).

Minimum Reading Proficiency, as measured by ability to read/understand a Std II level text is highly corelated across all ASER surveys, ranging from a high of 0.9 between ASER 2016 and ASER 2018, to a low of 0.78 between ASER 2022 and 2016 surveys. This indicates a fairly high degree of consistency, in which variations can reasonable attributed to States and UT improving their ranking or deteriorating. The correlation between NAS 2021 and NAS 2017 is only 0.18. The highest correlation across surveys, is 0.32 between NAS 2021 and ASER 2022, with the correlation between NAS17 and ASER 2016 marginally lower at 0.29. The correlation between NAS 2021 and NAS 2017 is surprisingly low at 0.18, probably because of the disruption caused by the pandemic in 2020 and 2021.[29] This suggests that even though national averages matched, state-level patterns of performance differ across surveys, reflecting variations in test design, proficiency standards, and learning assessments.

Table 27: Cross-correlation Matrix- Std/Grade 5 MRP across States

	ASER 2022	NAS 2021	ASER 2018	NAS 2017	ASER 2016
ASER 2022 (Std2 Text)	1.00	0.32	0.85	-0.02	0.78
NAS 2021 (Proficient)	0.32	1.00	0.18	0.18	0.23
ASER 2018 (Std2 Text)	0.85	0.18	1.00	0.18	0.90
NAS 2017 (Proficient)	-0.02	0.18	0.18	1.00	0.29
ASER 2016 (Std2 Text)	0.78	0.23	0.90	0.29	1.00

Source: ASER reports 2022, 2018 and 2016; NAS 2017 and 2021

Table 28 presents a similar correlation matrix for Minimum reading proficiency among Std/Grade 3 students, based on the indicators identified in Table 16. This includes inter-State data from FLS, ASER and NAS. Minimum Reading Proficiency, as measured by ability to read/understand a Std I level text is highly corelated across all ASER surveys, ranging from a high of 0.84 an 0.86. This indicates a fairly high degree of consistency, in which variations can reasonable attributed to States and UT improving their ranking or deteriorating. The correlation between NAS 2021 and NAS 2017 is 0.27, a little higher than the correlation for Grade 5 (Table 28).

Cross-survey correlations are less than half those between different ASER surveys higher than between the two NAS surveys (2021 & 2017). NAS 2021 and ASER 2022 have a correlation of 0.44 for Std/Grade 3 results, significantly higher than the corresponding for Std/Grade 5. FLS 2022 and ASER 2022 have also had a correlation of 0.39, but FLS correlation with NAS 2021 is half that at 0.18. This indicates significant differences in ranking of States for the same year (Table 28). Even though national averages matched reasonably well for ASER 2022 and FLS

[29] The relevant cross-correlations between NAS Maths proficiency and ASER MAP (division) and MAP (subtraction) are all negative, ranging from (-)0,13 to (-)0.40, suggesting conscious efforts to upgrade those students who are weak in maths to help them pass the grade and move on to higher grades.

2022 and NAS 2021, state rankings still differ significantly across surveys, reflecting variations in test design, proficiency standards, and learning assessments.[30]

Table 28: Correlation Matrix - Grade 3 MRP across States:

Grade 3	FLS 2022	ASER 2022	NAS 2021	ASER 2018	NAS 2017	ASER 2016
FLS 2022 (Exceeds)	1.00	0.39	0.18	0.22	-0.11	0.21
ASER 2022 (>Std1 Text)	0.39	1.00	0.44	0.84	0.05	0.84
NAS 2021 (Proficient)	0.18	0.44	1.00	0.38	0.27	0.32
ASER 2018 (>Std1 Text)	0.22	0.84	0.38	1.00	-0.01	0.86
NAS 2017 (Proficient)	-0.11	0.05	0.27	-0.01	1.00	0.19
ASER 2016 (>Std1 Text)	0.21	0.84	0.32	0.86	0.19	1.00

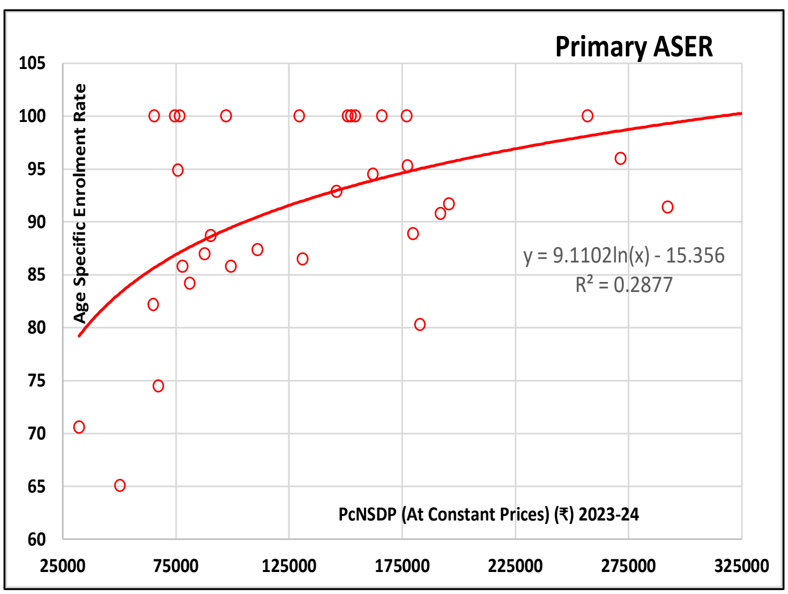
Source: FLS (2022), ASER reports 2022, 2018 and 2016; NAS 2017 and 2021

5.6.3 Enrolment Rates across States (2024-25)

As data on completion rates are not available for states, the paper uses enrollment ratio as a proxy for completion rates, to analyses inter-State performance. Two types of estimates are available for primary school enrolment (ages 6-10). Age-Specific Enrolment Ratio (ASER) and Adjusted Net Enrolment Ratio (ANER). ASER is the total number of pupils enrolled in primary school (Classes 1 to 5) who are of ages 6 to 10, expressed as a percentage of the population aged 6 to 10. ANER differs from ASER in primary, with ratio higher than 100%, rounded down to 100%.

Figure 17 plots Age-Specific Enrolment Ratio (ASER) for 2024-25 across all States and Union Territories, arranged according to their per capita Net State Domestic Product (PC NSDP) for 2023-24, since PCNSDP data for 2024-25 was not available for many States.

Figure 17: Inter State variation of Primary Enrolment Ratio with Per Capita NSDP



Source: UDISE 2024-25 & RBI, National Statistics Office (NSO), Latest Updated on: Aug 29, 2025

[30] The relevant cross-correlations between FLS numeracy and ASER are negative Nos 11-99, but positive for subtraction. The corresponding correlations for NAS 2021 are positive but low. suggesting less problems in testing an evaluation in grade 3 Math than in grade 5 Math results from NAS 2021. The results from FLS are also quite variable, and therefore non-comparable.

The regression trendline between ASER and PC NSDP is shown in Figure 17, with an R^2 of 0.29. Sixteen States & UTs are above the regression trendline equation, out of which twelve have already reached 100% enrolment at the primary level (Figure 17).[31]

Using the regression equation from Figure 17, an expected/benchmark primary ASER is calculated for each State based on its PCNSDP, and the gap is defined as the difference between actual and expected/benchmark enrolment. The States are then grouped by over performance (positive gap) and underperformance (negative gap), with States having a gap of +/- 2.6% [= (std.dev) 7.8%/3) points defined as having little or no gap (Table 29).

Table 29: Comparative Performance of States in Primary Enrolment

	Negative Gap	Little or No gap	Positive Gap
PcNsdp < ₹10,000	UP (-18.2%)	WB (-1.5%)	Assam (+7.9%)
	MP (-11.4%)	ChhattisG (-1.3%)	Tripura (+10.7%)
	Bihar (-8.6%)	Rajasthan (+0.1%)	J&K (+12.9%)
	Odisha (-3.7%)		Meghalaya (+13.2%)
	Jharkhand (-3.4%)		Manipur (+14.3%)
	Nagaland (-3.4%)		
PcNsdp > ₹10,000	Haryana (-14.7%)	Delhi (-2.6%)	Telangana (+5.3%)
	Sikkim (-7.9%)	Goa (0%)	MH (+5.9%)
	Tamil Nadu (-6.0%	Puducherry (-0.1%)	HP (+6.5%)
	AP (-5.5%)	Kerala (+0.6%)	Mizoram (+6.6%)
	Karnataka (-4.7%)	A&Nislands (+0.6%)	UttaraK (+6.7%)
	Gujarat (-3.9%)	Chandigarh (+1.9%)	Punjab (+8.1%)
	Arunachal (-3.1%)		

Source: Author Calculation based on UDISE+ 2024-25 & RBI, National Statistics Office (NSO), Latest Updated on: Aug 29, 2025.
Note: PC NSDP is for 2023-24. Gaps are in bracket.

Among States & UTs with Per capita NSDP less than Rs. 10,000/-, Assam (+7.9), Tripura (+10.7), Jammu & Kashmir (+12.9), Meghalaya (+13.2), and Manipur (+14.3) had higher enrolment than their expected or benchmark rates. (1st row, 3rd column of Table 29). Among States with per capita NSDP of more than Rs. 10,000/ Punjab (+8.1), Himachal Pradesh (+6.5), and Uttarakhand (+6.7) performed better than expected of their PC NSDP. Though major States above the national average of 83.2% include, Tamil Nadu (88.9%), Karnataka (90.8%), Gujarat (91.7%), Andhra Pradesh (86.5%) and Odisha (85.8%), their enrolment ratio is below the rate expected of States at their level of per capita NSDP.

The correlation between ASER and PCNSDP is a moderate 0.43, suggesting that better-off States have higher primary enrolment rates. This compares with a correlation of 0.16 between Minimum Reading Proficiency (MRP) and Per capita NSDP and of -0.08 between MAP and PCNSDP (section 5.6.1). This reinforces our earlier conclusion that minimum learning outcomes, depend on pedagogy, teaching at the right level, and regular assessment, not on income or expenditures.

[31] The log regression line goes above 100% at PCNSDP of ~32,000, so we truncate it at 100% to calculate gaps.

5.7 Programs and Platforms

Central Govt has made an effort over the past decade or so, to nudge states to improve their primary learning outcomes. These include Central Sector schemes, digital platforms and Public private partnerships (PPP) with industry and Non-Profit organizations (NPO/NGOs). Some States and Private non-profits have also initiated schemes and efforts on their own or in cooperation with States. This section presents some of these programs and platforms relevant to Primary education, along with available academic reviews.[32]

5.7.1 DIKSHA

Digital Infrastructure for Knowledge Sharing (**DIKSHA, 2017**) is a national digital platform which provides Open Educational Resources for teachers, teacher educators, and students across all stages of school education. It offers 7452 QR-linked energized textbooks, curriculum-aligned 3.78 lakh digital e-content, including interactive lessons, practice exercises, teacher training modules, and assessment tools, available in multiple Indian languages (36). To date it features 19,673 courses, records 14.58 Cr completion, and has issued 12.5 Cr certificate.[33] It reached 2.5 crore teachers, 25 crore students, and 50 lakh parents in all 36 states and union territories (UTs) as of 2023, with 10 million app downloads and 3 crore daily hits at the usage peak in 2020-21 (MoE, 2023). Offline access to the platform, in the form of QR-coded books and downloadable content on SD cards, widens the reach in low-connectivity locations, accounting for 60% of rural users (UNESCO, 2023). DIKSHA's implementation in state education systems (36), such as 90% primary and 78% secondary teacher adoption in Tamil Nadu, and 95 lakh learning sessions in Uttar Pradesh, indicates robust localized scale (Ramanujam, 2019; Times of India, 2024).

Banerjee and Biswas, (2025)] used mixed method study estimates, cost effectiveness and impact using quantitative evidence[34]. Their "findings offer DIKSHA's reach of 27.5 crore users and SWAYAM's 3 crore enrolments, at cost effectiveness of ₹545 and ₹3,333 per user, respectively. Both platforms enhance teacher competency (20-30% improvements) and students' pass percentages (10-15%), enabling economic inclusion for marginalized and rural teachers". They also confirmed that "SWAYAM's higher competency gains (27.5% vs. 22.5%), with a statistically significant difference, and that SWAYAM's mean gain exceeds DIKSHA's by 4.12-5.88%. This aligns with SWAYAM's quality focus and structured MOOCs"

Compared to global platforms like Coursera (₹5,000-10,000 per course) or Khan Academy (free but less localized), DIKSHA and SWAYAM offer cost-effective, context-specific solutions.

[32] Other schemes like NISHTHA and National Digital library of India cover all levels of education while Padna Likhna Abhiyan covers adult education and are detailed in section 5.6

[33] As of 7 Aug, 2025- https://diksha.gov.in/data/

[34] The authors use data such as Ministry of Education statistics, DIKSHA dashboards, SWAYAM course reports, Economic Surveys, and NITI Aayog documents, along with some inputs from CIET-NCERT.

However, reliance on government funding risks sustainability compared to private platforms' revenue models (*Mishra & Panda, 2022; World Bank, 2022*)[35].

Roul and Mohalik, (2025) surveyed 119 secondary school teachers to study the perceptions of quality of e-content on Diksha platform. They found, "positive perceptions regarding content alignment, engagement strategies, and accessibility, but highlighted challenges in inclusivity, assessment integration, and mobile compatibility. No significant differences were observed in teachers' perceptions based on gender or location". Some of their interesting results are summarized in Table 30.

Table 30: Survey of perception of secondary teachers on Diksha content & pedagogy

Statements	**Yes (%)**	**No(%)**	**Undecided(%)**
Contents are aligned with learning outcomes	94.1%	3.4%	2.5%
Contents depth are appropriate to learner needs	87.4%	8.4%	4.2%
Contents are carried activities for further learning	84.0%	7.6%	8.4%
Assessment is integrated with e-contents	67.2%	16.8%	16.0%
Promotes learner engagement	77.3%	16.0%	6.7%
Helps in retaining learner interest	79.8%	11.8%	8.6%
Contents encourages learners creativity	80.7%	13.4%	5.9%
The pedagogy and content are synchronised	77.3%	11.8%	10.9%
Content pedagogy appropriate to the student's level	85.7%	6.7%	8.6%

Source: Source: Mr. Rajkishore Roul, Prof. Ramakanta Mohalik, 2025

5.7.2 NIPUN Bharat

Several schemes to help implement NEP 2020 have been initiated by the central government, and some older schemes have been modified. Among these are,

National Initiative for Proficiency in Reading with Understanding and Numeracy (NIPUN Bharat 2021). The goal is to ensure every child attains foundational literacy and numeracy (FLN) skills by the end of Grade 3, preferably by age 9, by 2026-27[36]. NIPUN focuses on teacher training, development of quality learning materials (including digital content on DIKSHA), and regular tracking of each child's progress. NIPUN is implemented nationwide through a five-tier mechanism, with each state preparing its own action plan and actively monitoring progress.

5.7.3 PM eVidya

PM eVidya launched in 2020 integrates multiple components such as DIKSHA providing curriculum-aligned e-content and QR-coded textbooks, 200+ dedicated DTH TV channels for classes 1 to 12, SWAYAM MOOCs, and radio broadcasts to ensure education reaches students even without internet access. Special provisions are included for children with special needs, including content for visually and hearing-impaired learners.

[35] Banerjee, Anindita, and Rakheebrita Biswas. "Empowering Educators, Bridging Divides: Evaluating Diksha and Swayam for Digital Teacher Training and Economic Inclusion in India." International Journal for Creative Research and Thoughts (IJCRT) 13.7 (2025): 17.

[36] FLN means reading, writing & basic math. It also provides additional support to Classes 4 and 5 who need it to achieve foundational literacy.

Kumar et al. (2024) surveyed 681 students from classes 1-12, as well as teachers and parents across 13 states & 2 UT's using an online questionnaire. The study found "higher educational TV viewership in rural areas (55.4%) than urban areas (36.9%), with higher viewership among younger children (5-10 years), showing that visual media is more used by younger students". "Most teachers reported that the e-content was interesting (69.5%), provided comprehensive knowledge (67.9%), and supported teaching -learning (65.0%) and professional development (69.5%)". A high share of parents (73.3%) reported that e-content supported teaching learning. Students found the content interesting (67.7%) and useful for learning (77.7%). 61.7% of teachers and 37.9% of students reported that e-content reduced the need for tuition. The authors suggested improving reach through age-specific and pedagogically aligned, engaging content.[37]

5.7.4 E-Pathshala

E-Pathshala **(**2014) provides free digital access to NCERT textbooks, audio, video, e-books, and other multimedia resources for classes 1 to 12 in English, Hindi, and Urdu. *Bansal (2022)* findings suggested that the quality of content on ePathshala app is accurate and useful for the target audience. The design of the app is user-friendly with effective navigation and integration system. The search and filter options make the app easily accessible. However, author pointed out some weaknesses such as insufficient technical support (only email, no phone-in or real time chat), and no demonstrative tutorial.

5.7.5 Samagra Shiksha Scheme

Samagra Shiksha Scheme **(**2018) integrates Sarva Shiksha Abhiyan (SSA), Rashtriya Madhyamik Shiksha Abhiyan (RMSA), and the Teacher Education program, into a single scheme to improve pre-primary to senior secondary education. It proposes to improve learning outcomes through better school infrastructure, teacher training, digital tools, vocational training and sports. It will also strengthen digital initiatives such as Shala Kosh, Shagun, Shaala Saarthi and DTH channels.[38]

Sharma et al. (2018) surveyed 50 teachers from government secondary schools across five blocks of Pratapgarh district, Rajasthan[39]. It found, "90% of teachers agree that DTH channels and portal content are effective, and 86% observed improvement in students' performance, skills and knowledge". 56% of teachers reported that smart classrooms improve teaching quality and save time, and parents reported positive views based on students' performance. The authors suggested improvement in internet connectivity, provision of more teaching materials, and strengthening technical support for teachers.

[37] Kumar et al. (2024) reported that PM e-Vidya was effective in supporting students' learning during COVID-19.
[38] PIB report, 19 July 2018
[39] Total 50 sample were taken involving teachers and head masters of secondary and senior secondary government schools who are teaching under the scheme. The sample were taken across 5 blocks of Pratapgarh district - Chhotisadri, Arnod, Pipalkhunt, Dhariyawad and Pratapgarh (10 schools from each block).

5.7.6 PRATHAM: Teaching at the right level (TaRL)

Pratham's ASER was one of the first to identify the gap between the notional and actual learning levels in elementary schools (classes 1-8). To address this gap, Pratham developed the Teaching at the Right Level (TaRL) method in the early 2000s. TaRL begins instruction at the child's actual learning level, not grade. Children are grouped by ability, and teachers use simple, engaging activities to build foundational reading and arithmetic skills. Regular assessments track progress, and children are regrouped as they advance. This method helps children catch up quickly and lays the foundation for future learning.

TaRL is implemented in two ways, the direct model and the partnership model. In the direct model, Pratham instructors run "Learning Camps" lasting 30-50 days, with 3 hours of daily instruction. These camps focus on foundational skills and are conducted during school hours, vacations, or in community settings. In the partnership model, government teachers use TaRL approach over (4-6 months) with dedicated time for 2-2.5 hours a day. Continuous monitoring and support ensure effectiveness.

Pratham's TaRL program has been implemented at scale in Uttar Pradesh, Bihar, Haryana, Andhra Pradesh, Karnataka, Delhi, and a few districts of Maharashtra, Madhya Pradesh, Arunachal Pradesh and Daman and Diu Union Territory. The ALJ Poverty Action lab (J_PAL) at MIT has partnered with Pratham since 2001 to evaluated the TaRL approach, from the perspective of scalability. Six randomized evaluations across seven states in India showed that the TaRL is consistently effective when implemented systematically. It shows the largest effect sizes recorded in education research.

In *Uttar Pradesh*, high intensity, short duration, learning Camps for 40 days, during school hours, in 2013-14, with additional 10-day summer camp. improved learning outcomes in language and mathematics by 0.6 to 0.7 standard deviation. Further, the share of children unable to recognize letters declined from 34% to 8% in the intervention group, and the share of children who could read a paragraph or story increased from 15% to 49%, about double the rate compared to control schools. UP State later scaled up TaRL through the Graded Learning Program (GLP) across all primary schools in 2019, improving reading and numeracy skills in Grades 1-5. Within 3 months of implementation, over 1.7 million children in grades 4 and 5 were able to read basic grade 1 level Hindi text. J-Pal research shows that TaRL can deliver significant gains at less than $10 per child per year, making it affordable for large-scale adoption.

In Haryana, the Partnership model was applied in 2012-13. Government teachers implemented Read India TaRL during a dedicated school hour for Grade 3-5 across 400 schools, supported by trained Associate Block Resource Coordinators (ABRCs). This resulted in a 0.15 standard deviation gain in language scores (Banerjee et al., 2016). TaRL is recognized globally as a highly cost-effective intervention. The Global Education Evidence Advisory Panel (2023) listed TaRL among the "Great Buys" for improving learning outcomes.

*Duflo, Dupas, and Kremer (2011) found that e*ffective teaching practices such as *grouping students by ability and providing targeted support* have shown strong results in countries like Ghana and Kenya. In rural Kenya, separating primary students into groups based on their initial ability led to sizable gains in math and language for both high and low achievers, allowing teachers to teach at a level more appropriate to children's needs. Similarly, *Duflo and Kiessel (2012) found that, i*n Ghana, supplementing teachers with community assistants to help the weakest students led to sizable gains in literacy and numeracy, especially when done after school. Further, training teachers to teach students in small groups, targeted to their learning level, boosted their literacy skills.

Muammar et al. (2023) examined the effect of the combination of Indonesia's "Innovasi learning materials with Teaching at the Right Level (TaRL) approach, on initial reading skills of first-grade students in a public Islamic school in Mataram City, Indonesia. Initially, a large number of students struggled with basic reading. The researchers implemented the TaRL method in two phases (cycles), each including stages of planning, teaching, observation, and reflection. By adjusting teaching to match the students' actual reading levels, the number of students reaching the desired reading competency increased significantly from around *52% in the first cycle to nearly 87%* in the second phase. Teachers also became more effective, and student engagement improved. The study concluded that *TaRL, especially when supported with additional learning materials, is an effective way to improve foundational reading skills in early grades.*

5.7.7 Educate Girls (NGO)

Educate Girls (2007) is an NGO which works through a network of village-based volunteers and gender champions called "Team Balika", who ensure that girls are learning well, by offering supplemental classes. The program focuses on "child-centric learning and teaching techniques" that are "activity-based" and centered on "playful learning." These Creative Learning and Teaching (**CLT**) techniques include two main methods: "Catch Up" methodology that uses an activity-based learning approach to help children who are lagging behind, and a "Peer Group Learning" methodology that involves children working and learning together. It ensures that children find learning fun and thereby take interest and initiative in the process. Educate Girls also trains grade 3-5 teachers in CLT. The program uses pre-test and post-test assessments across five learning levels (A, B, C, D and E), in Hindi, English and Mathematics This structure is similar to ASER's reading and arithmetic levels.[40]

[40] (E) No response. (D) Alphabet reading in Hindi and English/ Single digit identification in Maths (C) Word reading in Hindi and English/ Two-digit identification in Maths (B) Sentence reading in Hindi and English/ Two-digit addition and subtraction in Maths A) Story reading in Hindi and English/ Two-digit division and multiplication in Math.
In 2014-15, Educate Girls has implemented CLT in 6 districts of Rajasthan. For measurement of CLT impact, pre and post tests have been conducted in 108 control schools. 1,47,281 students benefitted from the CLT program, including 68,435 boys and 78,846 girls in class 3rd, 4th and 5th and in Hindi, English and Mathematics.

5.7.8 SwiftPAL

Adaptive learning systems such as SwiftPAL (Personalized Adaptive Learning), developed by ConveGenius, help teachers identify learning gaps and plan differentiated instruction. SwiftPAL is rooted in the science of learning and evidence-based pedagogy and is built on mastery learning. Its Pedagogy is based on learning one micro-skill at a time, moving from Learn to Practice to Master to Advance. The Delivery System (Adaptive Tech) identifies the right learning gaps, guiding teachers with personalized Teaching Learning Materials (TLM) and insights. The Experience (Joyful Learning) uses game-like missions, badges, and streaks that feel like play but work like science. SwiftPAL has reached 22 states, 176 districts, 15,000+ schools, and over 2 million students, at an estimated cost of INR 1,700-2,100 per child per year.

Its impact has been evaluated through an RCT (by M Cramer) in government schools of Andhra Pradesh. The study found that after 17 months, the gain in test scores in the [PAL] schools corresponded to almost an additional 2 years of extra learning beyond what would have been expected over the period, with students learning 2.3x faster compared to peers Importantly, SwiftPAL integrates within regular school timetables, and even after replacing two weekly periods per subject, students performed just as well in school exams as their peers.
In Rajasthan (Mission Buniyaad PAL Program), ICT labs-based PAL program resulted in 2x higher learning gains; 6 months of extra schooling in 6 months. In Uttar Pradesh (Outcome-Linked PAL Program) resultant into 3x-8x higher learning gains with approximately 2.1 years of additional schooling in 22 months. It has also been implemented in states such as Gujarat, Maharashtra, and Telangana.

5.7.9 Other AI tools

Tools such as **PD 360** provide expert-led professional development resources that can be integrated into formal training programs and coaching cycles. Research-based systems like **FACET Multi-Agent AI** illustrate how AI can assist teachers in designing differentiated instruction while maintaining pedagogical control. General AI assistants such as **ChatGPT** for Teachers and **Google Gemini** for Education support lesson planning, assessment design, feedback generation, and content adaptation.

The Teacher App in India provides modular micro-learning courses on pedagogy, classroom strategies, and practical teaching techniques. Tools supporting early math thinking, such as **ST Math** and **QANDA,** provide step-by-step problem solving and adaptive feedback, which teachers can use to guide conceptual discussions in classrooms. **Eduaide.AI** help teachers to integrate real-world examples and prompts that encourage reasoning.

5.8 Summary and Conclusions

Basic education, especially literacy and numeracy, forms the foundation of the education and skill development system. Further education and skills are built on this foundation. Foundational literacy and numeracy (FLN) are essential for employment in today’s economy, as stated in NEP 2020. They are particularly important for casual labor which constitutes 1/5th of workers.

Comparison of India with international benchmarks which the paper has used, show that India's performance is reasonably good. The primary completion rate was 93.5% in 2023, 11.9% points above the benchmark for its Per capita GDP in 2023 (81.6%). Other available indicators are somewhat older but paint a similar picture. The Net Enrolment Rate was 92.3% in 2013, about 6.8% points above the benchmark (85.4%) for that year's per capita GDP. India's share of pupils achieving minimum reading proficiency was 46.3% in 2017, 5.3% points above the benchmark (41.0%), and reading proficiency, adjusted for out-of-school children, was 43.9%, 6.3% points above the benchmark (37.7%). India's pre-primary Gross Enrolment Rate was 62.8% in 2019, 8.3% points above the benchmark (54.8%).

Domestic surveys show small gaps between urban and rural outcomes. In 2021, rural students performed better than urban students by 12-13% in primary school. Rural students were also better in class 3 language (+5%), but worse in class 5 language (-5%) In 2024, rural students performed marginally better than urban students in Language and identical in Mathematics in Grade 3. We have therefore assumed that ASER Rural learning outcome surveys are broadly reflective of overall learning outcomes.

Based on ASER (2024), all India, primary learning outcomes are as follows. The number of children with Minimum Reading Proficiency, defined as the proportion of children who can read a Std II level text in Primary school (Std V), are 48.7%. Those with Minimum Arithmetic Proficiency (MAP), defined in terms of the proportion of children who can do division, are 30.7%. There is thus an 18 percent points difference between MRP and MAP (i.e., 36%). We also estimate that MRP in 2024 is still 2% above the international benchmark of 47.9% for India at the Per capita GDP of $9818 in 2024.[41]

NEP 2020 recognized the role of mathematics and mathematical thinking for India's future workforce, particularly in emerging fields such as artificial intelligence, machine learning, and data science. The NEP therefore says that mathematics and computational thinking should be given increased emphasis, with a variety of innovative methods, including use of puzzles and games, which make mathematical thinking more enjoyable and engaging (at the foundational stage). The broader the arithmetic proficiency at the primary level, the more likely is this to be achieved.

State level data (ASER 2024) shows that the following States have the highest number of children with Minimum Reading Proficiency in Primary school (Std V): Mizoram (67.5%), Himachal Pradesh (66.8%), Kerela (66%), Uttarakhand (63.9%), Haryana (63.5%), Punjab (61%) and Maharashtra (59.6%). The top ranked States for Minimum Arithmetic Proficiency (MAP) are, Punjab (48.8%), Himachal Pradesh (47%), Mizoram (44.7%), Haryana (43.2%), Uttarakhand (39.8%), Uttar Pradesh (39.4%) and Andhra Pradesh (36.2%).

[41] As a result of the pandemic MRP may have declined by 0.35% between 2017, the year of international comparison and 2024. Meanwhile he Benchmark has increased to 47.9% because of the increase in per capita GDP at PPP (2021 int dollars) to 9818

The potential challenge is to raise the MRP in primary school (Std V) by at least 2.6% points in the next 5 years to reach the UMIC benchmark of 54.2%, and by 27.6% points to reach the minimum HIC benchmark of 79.2%, in 25 years. This will require the efforts of all States. Given that about 14 (of 26) states and UTs were below the National estimate in 2024, increasing Minimum Reading proficiency remains a challenging task.

Experience from India and other countries shows that improving learning requires three main changes: revising curriculum to focus on measurable learning outcomes, retraining teachers in new approaches, and conducting regular tests to monitor student progress and give targeted support. To improve these outcomes, the quality of teaching and learning needs to improve, with the full backing and support of the school administration. Government programs like NEP 2020, NIPUN Bharat, and NISHTHA aim to address this by focusing on education quality. Digital platforms such as DIKSHA help support learning and teacher training.

Research and personal experience suggest, that the State primary education systems in India should pay more attention to the following elements of primary and pre-primary teaching to improve learning outcomes.

(1) Age-appropriate teaching material is critical for learning. This includes paper-based material like flash cards used in TaRL, but cannot be limited to it. It can include singing, music, radio and sound recordings, TV/DTH/DTS and video recording, educational toys, and even local materials (e.g., beads) for counting.

(2) Teachers have to be familiarized with these materials and taught how to use them for age-appropriate teaching. School administrations have to be sensitized to these non-conventional methods, so they support teachers in the use of these materials. Research shows that children who are subject to a lot of sound, music and conversation become more proficient in language.

(3) Testing and re-testing is very important for identifying lagging students and providing specific directed assistance to them., and measuring their progress.

(4) Social, Civic Sense and self-discipline is critical to learning and for future success. The Japanese method for enhancing these qualities should be adapted to Indian conditions, and adopted in pre-primary and primary school.

(5) Rote learning to thinking: Awareness of the world and the people around us is the foundation of self-learning. The next level is curiosity about the environment around us. Curiosity needs to be aroused by pointing to the puzzles in the world around her (nature, animal economic activities, people). The next stage is asking questions and finding answers. It’s a process, which can start by just looking closely at nature (trees, leaves, flowers, twigs).

(6) Physical sports, are key to developing hand eye coordination, mind body integration and learning how to socialize. The simplest least costly games like racing, marbles, “gulli-danda”, “pithu,” rope pulling, sack races and hop-skip & jump can be as effective for younger children, as “kabaddi”, football, cricket, basketball for older ones.

6. Secondary Education

A strong educational pyramid can only be built, if the foundation provided by Primary education is strong. Secondary education plays a crucial role in building upon the foundational skills acquired during primary schooling and acts as a gateway to higher education and employability. The latest position with respect to internationally comparable data on secondary enrolment and completion rates is summarized below.

The Gross enrolment ration in secondary school in 2024 was 78.1% of student in relevant age group (Table 31). The lower secondary completion rate (Class/Std 8) was 87.3%. Between 2014 and 2024, the secondary enrolment rate increased by 3.2% points, while the lower secondary completion rate increased by 1.4% points. While the improvement is modest, it reflects continued efforts by States.

Table 31: Improvement in Secondary enrollment & Completion (%)

Education Indicators	**Latest available year**		**Year for comparison**		***Change***
Secondary enrolment rate (% gross)	2024	78.1	2014	74.9	3.2
Lower sec completion rate	2024	87.3	2014	85.9	1.4

Source: World Development Indicators, July 2025

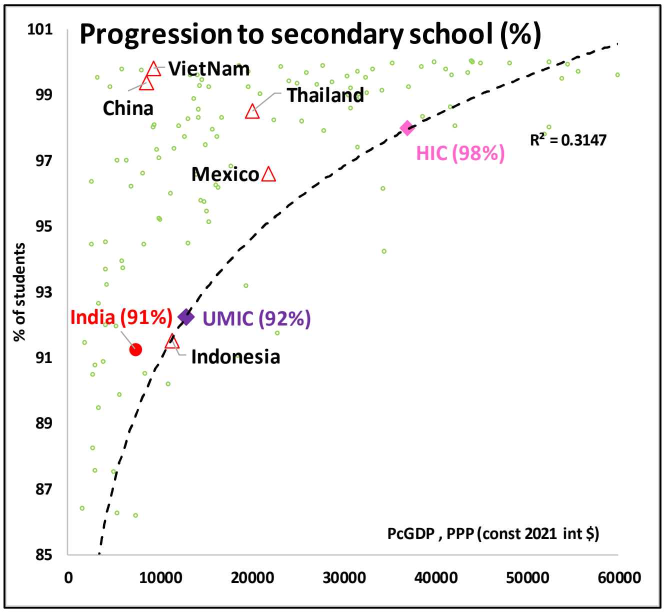
The first subsection examines the transition from primary to secondary school through the lens of progression rates. The second sub-section compare India's performance in secondary education across countries, using available data on secondary school enrollment and completion rates. The third sub-section analyses changes in minimum learning outcomes (MRP & MAP).

6.1 Transition from Primary to Secondary School

The "progression rates", from primary to secondary school, for the latest available year, is plotted for each country at its level of Per capita GDP at PPP (in constant 2021 international dollars), in the same year. A regression equation is then fitted to the international comparative data to represent the benchmark or expected rates at each level of per capita GDP (Figure 18).[42] India's progression rate from primary to secondary school was 91.3% in 2017, which is 2% points above the benchmark/expected level at the per capita GDP of India in 2017. China (+9.3), Vietnam (+9.3), Thailand (+3.8), and Mexico (+1.5) were also above their benchmark levels, while Indonesia was slightly below (-)0.1.

[42] Progression to secondary school refers to the number of new entrants to the first grade of secondary school in a given year as a percentage of the number of students enrolled in the final grade of primary school in the previous year (minus the number of repeaters from the last grade of primary education in the given year).

Figure 18: Progression to secondary school



Source: World Development Indicators, December 2024

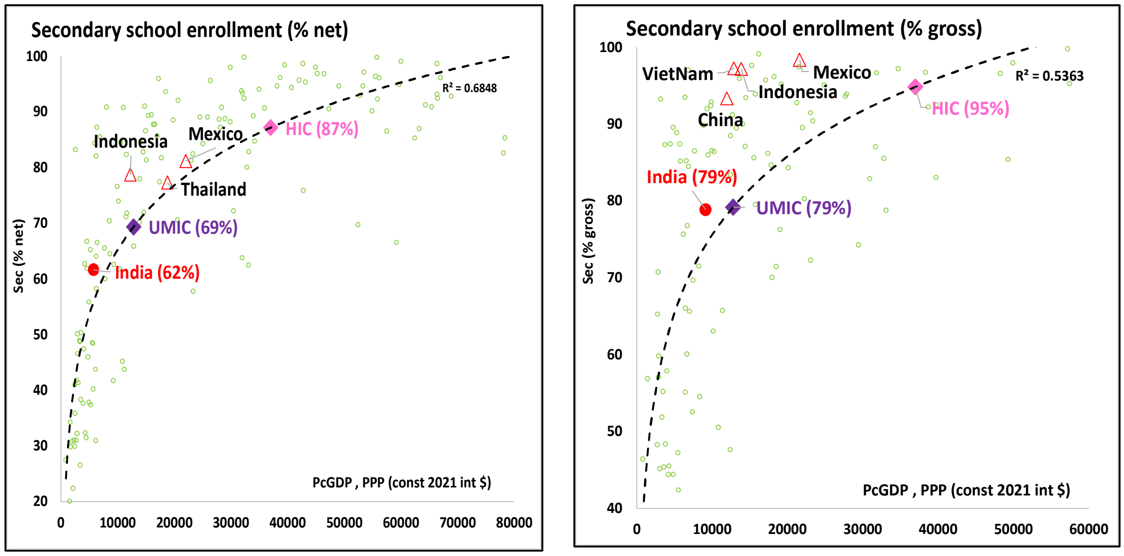
The base for India in Figure 18 is 2017, therefore we estimate the value for 2023 assuming that the gap remains the same (2.1% points). This gap is then added to the expected expected/benchmark (90.4%) for India at its 2023 per capita GDP to get an estimate for 2023 (92.5%). Based on this we estimate the improvement needed to reach UMIC & HIC benchmarks. As the estimated 2023 number is above the UMIC benchmark (purple diamond), we need an improvement of ~5.4% points to reach the HIC benchmark of 97.9% for HIC by 2050.[43]

6.2 Enrollment & Completion Rates

India's Net Enrolment rate in secondary school was 61.6% in 2013, which is 5.8% points above the level expected at its per capita GDP. Indonesia (+10.1), Thailand (+1.5) and Mexico (+2.7) are also above their expected levels (left panel in Figure 19). As the base for comparison in Figure 19 is 2013 for India, we estimate the value for 2023 (69.5%) assuming that the gap remains the same (5.8% points). This gap is then added to the expected/benchmark for India at its 2023 per capita GDP (63.7%). Based on the estimate for 2023 (69.5%), we are already above the UMIC benchmark. A 17.6%-point improvement is needed over the next 25 years to reach the HIC benchmark of 87.1% by 2050.

[43] The UMIC and HIC benchmarks are based on the Per capita GDP PP of Indonesia which became a UMIC in 2019, and Romania which became a HIC in 2019.

Figure 19: Secondary School enrollment: NER/GER

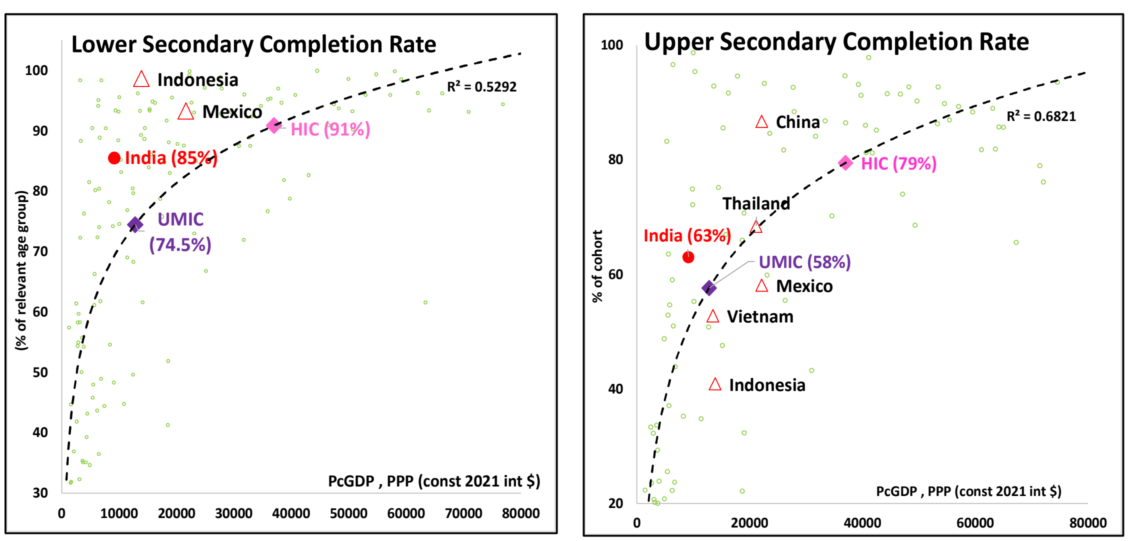


Source: World Development Indicators, December 2024

Since Gross secondary enrollment (GER) is available for the latest year (2023) for India, we also do an international comparison using GER. India's gross secondary school enrollment rate in 2023 was 78.9% (Figure 19, 2nd panel), 4.6 percentage points above the level expected at its per capita GDP. China (+15%), Vietnam (+18%), Indonesia (+17%), Thailand (+14%), and Mexico (+11%). India is already near the UMIC (2030) benchmark of 79.2%. To reach HIC (2050) benchmark of 94.8%, and will require only a 15.9% points improvement over 25 years.

India's lower secondary completion rate was 85.5% in 2023 (Figure 20), which is 16.2 percentage points above the expected/benchmark level at its per capita GDP of 2023. Indonesia (+23), Mexico (+11), China (+26), Vietnam (+24) and Thailand (+17) are also above their expected/benchmark levels.

Figure 20: Secondary completion rate, total (% of relevant age group)



Source: World Development Indicators, December 2024; UNESCO Global Education Monitoring Report (2023)

India already meets the UMIC (2030) benchmark of 74.5%, To reach the HIC (2050) benchmark of 90.9% we need a 5.4 percentage points rise over 25 years. This should happen in the normal course as quality of Primary education improves and learning outcomes improve.

India's upper secondary completion rate was 63.0% in 2023 (Figure 20, 2nd panel), was 12.3 percentage points above the expected/benchmark level at its per capita GDP in 2023. Thailand (+0.5) and China (+17.8) are also above their expected/benchmark levels, while Vietnam(-)5.9, Indonesia (-)18.4 and Mexico (-)10.8 are below their expected/benchmark levels. India is already above the UMIC (2030) benchmark of 57.6%. To reach the HIC benchmark of 79.4% by 2050 requires a 16.4 percentage points rise over 25 years.

6.2.1 India's schooling output relative to China

Even with India's school completion rates lower than higher income comparator countries, Vietnam, Indonesia, Thailand, China and Mexico, the absolute numbers are comparable to those of China and often exceed it. Table 31 presents the absolute numbers of children completing primary school, lower and upper secondary school, using population estimates/projections from the Technical Group on Population Projections (TGoPP) and the UN Population Division (UNpop). As UNpop population estimates are larger than TGoPP estimates, the estimated school completion numbers are also higher for the former

Estimated School Completers = Completion Rate (% of cohort) * Cohort Population (million).

In 2023, India had an estimated 131 million primary, 61 million lower secondary, and 94 million upper secondary completers, using TGoPP (Table 32).[44] The number of children completing primary school were 137 million, and those completing lower and upper secondary school were 65 million, and 98 million, respectively.

Table 32: Numbers of Youth completing different education levels

		Technical group on Pop		UN Population	
	Completion Rates (%)	Pop aged (Millions)	Completers (million)	Pop aged (Millions)	Completers (million)
Primary Education (population aged 6-11)					
2023	93.5	140	131	146	137
2030 (proj)	84.1	133	111	136	115
2050 (proj)	92.3	na	na	121	112
Lower secondary education (popuation aged 12 to 14)					
2023	85.5	71	61	76	65
2030 (proj)	74.5	69	51	71	53
2050 (proj)	90.9	na	na	62	56
Upper secondary education (population aged 18to 23)					
2023	63.0	150	94	156	98
2030 (proj)	57.6	141	81	150	86
2050 (proj)	79.4	na	na	131	104

Sources: WDI/UNESCO (completion rates), Technical Group on Pop projections (2020). na = not available.

[44] Age groups (In years) and Corresponding level of education- Age 6-10 as Primary (I-V), Age 11-13 as Upper Primary (VI-VIII), Age 14-15 as Secondary (IX-X), Age 16-17 as Senior Secondary (XI-XII) and Age 18-23 as Higher Education. Source: Educational Statistics at a glance, Ministry of Education (2018)

These numbers are compared with those of China and other comparator countries in Table 32**.** At the primary level, India had 1.25 times completers (137 million) than China (109 million) and more than 2.5 times the combined total of Vietnam, Indonesia, Thailand, and Mexico (MIC4). At the lower secondary level, India's 65 million completers were 1.2 times those of China 53 mil) and 2.4 times those of the MIC4.

These comparisons highlight that, despite lower completion percentages, India contributes a large share of the global pool of school completers due to its population size. At the upper secondary level, India's completion rate is higher than that of Vietnam, Indonesia, and Mexico. Number of children completing secondary school in India are 1.2 times China and 3.7 times those of the MIC4 (Table 33).

Table 33: Youth Completing different levels - India, China, MIC4

	India	Vietnam	Indonesia	Thailand	China	Mexico
Primary Education						
Completers (million)	137	10	24	5	109	13
Completion Rates(%)	93.5	100	100	100	100	100
Pop aged 6-11 (mil)	146	10	24	5	109	13
Lower secondary						
Completers (million)	65	5	14	2	53	7
Completion Rates(%)	85.5	100	98.6	100	100	93.3
Pop aged 12-14 (mil)	76	5	14	2	53	7
Upper secondary						
Completers (million)	98	4	11	4	83	8
Completion Rates(%)	63.0	52.8	40.9	68.4	86.7	58.1
Pop aged 18-23 (mi)	156	8	26	6	96	13

Sources: WDI/UNESCO (completion rates), Technical Group on Pop projections (2020).

6.2.2 Secondary Enrolment Rates across States

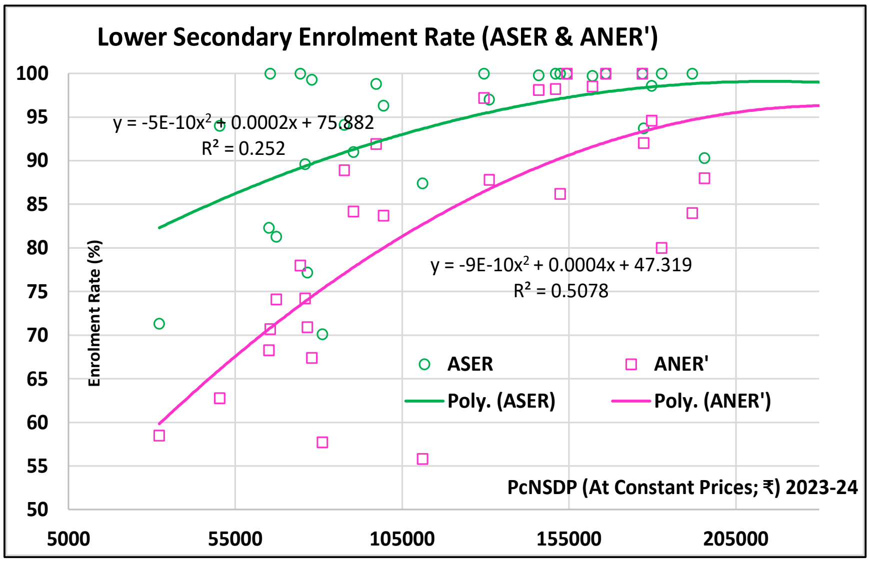
As data on completion rates for secondary schools are not available for states, the paper uses enrolment ratio as a proxy for completion rates, to analyses inter-State performance. Secondary school enrolment is divided into two levels: Lower Secondary and Upper Secondary. Two types of estimates are available for lower secondary school enrolment: Adjusted Net Enrolment Ratio (ANER) for Classes 6-8 and Age-Specific Enrolment Ratio (ASER) for age 11-13. ASER is the total number of pupils enrolled in lower secondary (Classes 6 to 8) of ages 11-13, expressed as a percentage of the population aged 11 to 13. ANER is total number of pupils enrolled in the Class 6-8 or a higher level of school education corresponding official age group, expressed as a percentage of the population of that age group in a given school year. We truncate ANER ratio above 100% to 100% to obtain an ANER'.

Figure 21, plots ANER' and ASER for 2024-25 across all States and Union Territories, arranged according to their per capita Net State Domestic Product (PC NSDP) for 2023-24, since PCNSDP data for 2024-25 was not available for many States. The regression trendline between ASER and per capita Net State Domestic Product (PC NSDP) is shown in Figure 21 (green), with an

R^2 of 0.25. The regression trendline between ANER’ and PCNSDP is also shown in Figure 21 (pink), with a stronger fit and an R^2 of 0.51.

Using the regression equation from Figure 21, an expected or benchmark lower secondary ANER’ and ASER is calculated for each State based on its Pc NSDP, and the gap is defined as the difference between actual and expected enrolment. States are then grouped by over-performance (positive gap) and under-performance (negative gap), with States having a gap of +/- 3.4% [= (std.dev) 10.1%/3) points defined as having little or no gap (Table 34)[45]. The interstate comparison of enrolment ratio using ANER’ are different from those using ASER.

Figure 21: Inter State variation of Lower Secondary Enrolment Ratio with PCNSDP



Source: UDISE 2024-25 & RBI, National Statistics Office (NSO), Latest Updated on: Aug 29, 2025.

Table 34: Comparative Performance of States in Lower secondary Enrolment (ANER’)

	Negative Gap	**Little or No gap**	**Positive Gap**
PcNsdp < ₹10,000	Nagaland (-16.2%)	UP (-2.4%)	MP (+3.9%)
	WB (-5.6%)	J&K (-1.8%)	Odisha (+5.5%)
		Jharkhand (-1.2%)	Meghalaya (+5.9%)
		Bihar (-0.8%)	Rajasthan (+8.1%)
		Manipur (+1.1%)	ChhattisG (+13.4%)
		Assam (+1.7%)	Tripura (+14.2%)
PcNsdp > ₹10,000	Arunachal (-24.9%)	Gujarat (-3.1%)	AP (+3.5%)
	Sikkim (-18.5%)	Mizoram (-1.2%)	Tamil Nadu (+4.5%)
	Haryana (-10.4%)	A&Nislands (+2.0%)	Chandigarh (+9.3%)
	Karnataka (-6.9%)		Kerala (+10%)
			Telangana (10.1%)
			Delhi (+10.4%)
			UttaraK (+11.0%)
			MH (+11.1%)
			Puducherry (+11.6%)
			HP (+12.4%)
			Punjab (+13.2%)

Source: Author’s Calc based on UDISE 2024-25 & RBI, National Statistics Office (NSO), Latest Updated on: Aug 29, 2025 Note: PC NSDP is for 2023-24. Gaps are in bracket.

[45] Both ANER’ and ASER are given, as the consistency of the data was not clear. Their correlation with PCNSD is 0.55 and 0.31 respectively.

Using ANER', Odisha (+5.5%), Rajasthan (+8.1), Chhattisgarh (+13.4), and Tripura (+14.2) were above the enrollment rate (ANER') expected of their PCNSD (among States with per capita NSDP less than ₹10,000). Among States with per capita NSDP of more than Rs. 10,000/ Kerala (+10), Uttarakhand (+11), Maharashtra (+11.1), Punjab (+13.2) and Himachal Pradesh (+12.4) performed better than expected at their PCNSDP (Table 34, 1st 3 columns). Though major States above the national average of 77.9% include, Karnataka (84%), Gujarat (88%) and Haryana (80%) their enrolment rate is below the rate expected of States at their level of per capita NSDP'.

Table 35 presents the inter-State comparison of lower secondary age-specific enrolment Rate, ASER. States are grouped based on the gap between actual and expected enrolment levels. States with a gap within +/-2.6% [= (std.dev) 7.8/3] are considered to have little or no gap. Tripura (+3.5), West Bengal (+7.8), Uttar Pradesh (+8.0), Meghalaya (+9.2), and Manipur (+11) had an enrollment rate (ASER) above that expected of their PCNSDP. Haryana, Karnataka, Maharashtra, Punjab, Himachal Pradesh show little or no gap (0.0), enrolment levels in line with expectations. Only Tripura and Meghalaya have a positive gap under both ANER' and ASER.

Table 35: Comparative Performance of States in Lower secondary Enrolment (ASER')

Negative Gap	**Little or No gap**	**Positive Gap**
Sikkim (-25.4%)	Assam (-1.5%)	Tripura (+3.5%)
Nagaland (-22%)	Tamil Nadu (-1.4%)	WB (+7.8%)
J&K (-14%)	Kerala (-0.3%)	UP (8.0%)
Bihar (-11%)	Puducherry (-0.2%)	Meghalaya (+9.2%)
Arunachal (-10.7%)	Haryana (0.0)	Manipur (+11%)
Gujarat (-9.7%)	Karnataka (0.0)	
MP (-8%)	Mizoram (0.0)	
Jharkhand (-6.6%)	Chandigarh (0.0)	
A&Nislands (-6.3%)	Telangana (0.0)	
AP (-3%)	Delhi (0.0)	
Rajasthan (-3%)	UttaraK (0.0)	
	MH (0.0)	
	HP (0.0)	
	Punjab (0.0)	
	Goa (0.0)	
	Odisha (0.5)	
	ChhattisG (0.7)	

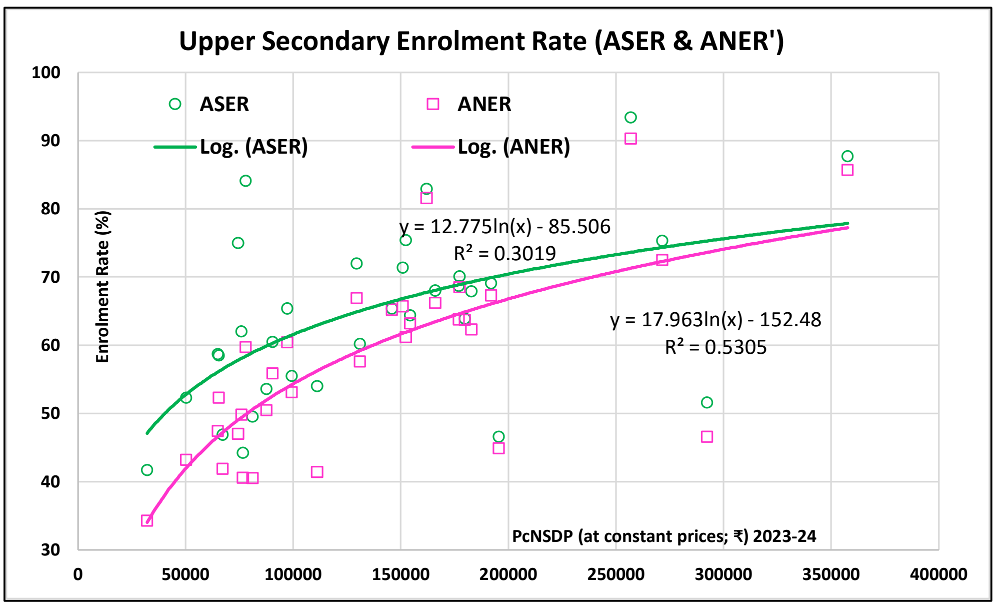
Source: Author's Calculation based on UDISE 2024-25, Note: Gaps are in bracket.

Upper Secondary

The Age-Specific Enrolment Rate (ASER) is the total number of pupils enrolled in Upper secondary (Classes 9 to 12) of ages 14-17, expressed as a percentage of the population aged 14 to 17. The Adjusted Net Enrolment Rate (ANER) is the total number of pupils enrolled in the Class 9 to 12 or a higher level of school education, corresponding to ages 14 to 17, expressed as a percentage of the population of 14 to 17-year-olds in a given school year.

Figure 22, plots both ANER and the ASER for 2024-25 across all States and Union Territories, arranged in order of per capita NSDP for 2023-24, since PCNSDP data for 2024-25 was not available for many States. The regression trendline between ASER and PCNSDP is shown in Figure 22 (green), with an R^2 of 0.30. The regression trendline between ANER and Pc NSDP is also shown in Figure 22 (pink), with a stronger fit and an R^2 of 0.53.[46] On this basis, ANER is taken as the more appropriate measure. As per ANER, nineteen States and Union Territories lie above the regression trendline equation, i.e., are performing better than expected at its respective level of PCNSDP.

Figure 22: Inter State variation of Lower Secondary Enrolment Ratio with PCNSDP



Source: UDISE 2024-25 & RBI, National Statistics Office (NSO), Latest Updated on: Aug 29, 2025

Using regression equation from Figure 22, an expected or benchmark ANER is calculated for each State based on its Pc NSDP, and the gap is defined as the difference between actual and expected upper secondary enrolment. States & UTs are then grouped by over-performance (positive gap) and under-performance (negative gap), with a gap of +/- 3.1% [= (std.dev) 9.2%/3] defined as having little or no gap.

Among States with PCNSDP less than Rs. 10,000, West Bengal (+9.9), Tripura (+6.6), Manipur (5.6), Rajasthan (+3.4%) had lower secondary enrolment rates higher than expected/benchmark at their PCNSDP. Among States with per capita NSDP of more than Rs. 10,000/ Uttarakhand (+4), Punjab (+7.9), Kerala (+18.6%) performed better than expected of their PCNSDP. Though Telangana (63.8%) and Mizoram (61.2%) had enrolment rates above the national average of 52.2%, it was less than expected at their level of PCNSDP (Table 36).

[46] The interstate correlation between PCNSDP and ANER' is 0.69 and between PCNSDP and ASER is 0.52

Table 36: Comparative Performance of States in Upper Secondary Enrolment

	Negative Gap	Little or No gap	Positive Gap
PcNsdp < ₹10,000	Nagaland (-10.1%)	Meghalaya (-2.0%)	Rajasthan (+3.4%)
	J&K (-9.0%)	ChhattisG (-1.5%)	Manipur (+5.6%)
	MP (-5.3%)	Odisha (-1.1%)	Tripura (+6.6%)
		Bihar (+0.3%)	WB (+9.9%)
		Assam (+0.4%)	
		Jharkhand (+0.8%)	
		UP (+1.2%)	
PcNsdp > ₹10,000	Sikkim (-27.0%)	Haryana (-2.9%)	A&Nislands (+3.9%)
	Gujarat (-21.5%)	AP (-1.6%)	UttaraK (+4.0%)
	Arunachal (-14.8%)	Tamil Nadu (-1.2%)	Puducherry (+4.1%)
		Telangana (-0.8%)	Punjab (+7.9%)
		Mizoram (-0.7%)	Goa (+8.5%)
		Delhi (+0.2%)	Kerala (+18.6%)
		HP (+1.1%)	Chandigarh (19.0%)
		Karnataka (+1.3%)	
		MH (+2.8%)	

Source: UDISE 2024-25 & RBI, National Statistics Office (NSO), Latest Updated on: Aug 29, 2025

6.3 Learning Outcomes and Traditional Results

As shown in Table 7, Surveys which measure learning outcomes in secondary school cover different grades. ASER surveys (2006-2024) cover Standards 6, 7 and 8, while NAS (2021 & 2017) surveys cover Class 8 and 10 only. The PRS (2024) survey covers Grade 6 and 9, but does not give us data on minimum learning outcomes. As indicated earlier, ASER, presents the percentage of students who can read a Std II level text in language and those who can solve division problems in mathematics. ASER uses the same test level (Std II) for all grades, so it is the most useful for getting the current picture as well as changes over time. The next sub-section therefore covers the learning outcome from ASER surveys. Thereafter, learning outcomes for grade 8 are compared for NAS and ASER surveys.

6.3.1 Learning Outcomes: Lower secondary school

Das and Zajonc (2010), who used data from a 2005 World Bank-led survey of students, in secondary school, in two Indian states where students were tested using a selection of 36 questions from the TIMSS 1999 math test. They found that a large number of students failed to meet even basic international benchmarks.

Table 37 tracks changes in student ability to read a Std II text (MRP) and perform basic division (MAP), across secondary grades, with the available data for 2006 to 2024. In 2024, Minimum reading proficiency (MRP) as measured by the percent of children in who can read Std II level text, is 57.7% in Std VI, 64.4% on Std VII and 71.1 in Std VIII. This means that in rural areas, 42% of std V, 36% of Std VII and 39% of Std VIII students cannot read a Std 2 text. Similarly Minimum Arithmetic proficiency (MAP) as measured by the percent of children who can divide is 36% in Std VI, 41.5% in Std VII and 45.7% in Std VIII. MAP is therefore significantly lower than MRP across Std, with the MAP in Std VIII 25.7% points lower than MRP in the same grade, a gap which needs to be reduced.

Between 2006 and 2014, there is a sharp decline in both MRP and MAP across all lower secondary grades. For Std VIII, reading fell by 9.1% and division by 31.7%, while similar declines are evident in Std VII and Std VI. Between 2014 and 2024 was a recovery in Arithmetic (MAP) by 1.6% points to 3.4% points in stds6 to 8. In contrast, the declining trend in MRP, seen from 2006 to 2014, was slowed, but not reversed. This likely due to reduced verbal interactions and connectedness which is more important for language learning.

Table 37: Learning outcomes in 2024 & change 2006 to 2024 (% of students)

	2024		2014	
Std	**StdIIText**	**Divide**	**StdIIText**	**Divide**
VI	57.7	36.0	58.8	32.2
VII	64.4	41.5	67.7	37.8
VIII	71.1	45.7	74.6	44.1
Change	**2014 to 2024**		**2006 to 2014**	
VI	-1.1	3.8	-7.8	-26.3
VII	-3.3	3.7	-8.4	-29.6
VIII	-3.5	1.6	-9.1	-31.7

Source: ASER reports 2024, 2014 and 2006

The effect of Right to Education Act (2009) is analyzed by comparing changes in the pre-RTE period (2006-2010) with the post-RTE period (2010-18). The immediate period after the introduction of RTE (2009) shows declines in both reading and arithmetic competencies (Table 38). Between 2006 and 2010, MRP increased in Std VI and Std VII, but declined during 2010 to 2018. MAP declined in both pre-RTE and post-RTE period, but the decline was less in the post-RTE period. Similar pattern was observed for MRP in Std VIII.

Table 38: Effect of RTE on Learning outcomes (% of students)

	2018		2010	
Std	**StdIIText**	**Divide**	**StdIIText**	**Divide**
VI	59.8	34.7	67.5	49.3
VII	67.7	39.0	76.2	57.8
VIII	72.8	43.9	82.9	67.4
Change	**Post RTEA(2010 to 2018)**		**Pre- RTEA (2006 to 2010)**	
VI	-7.7	-14.6	0.9	-9.2
VII	-8.5	-18.8	0.1	-9.6
VIII	-10.1	-23.5	-0.8	-8.4

Source: ASER reports 2018, 2010 & 2006

As in the case of primary schooling, Pandemic also disrupted secondary schooling. We measure the effect of this disruption by comparing the change in learning out comes in the post-pandemic period 2022-2024 with the change during the pandemic period. As there was no ASER survey during the Pandemic, we use the change from 2018 to 2022 for the latter.

From 2018 to 2022, MAP declined in all three standards, but increased in Std VIII, while declining less in Std VI and Std VII (Table 39). There is a clear recovery after the pandemic, in both MRP and MAP, across all lower secondary grades. The recovery is stronger in MAP with the per cent of children who can divide, larger in 2024 than in 2018.[47]

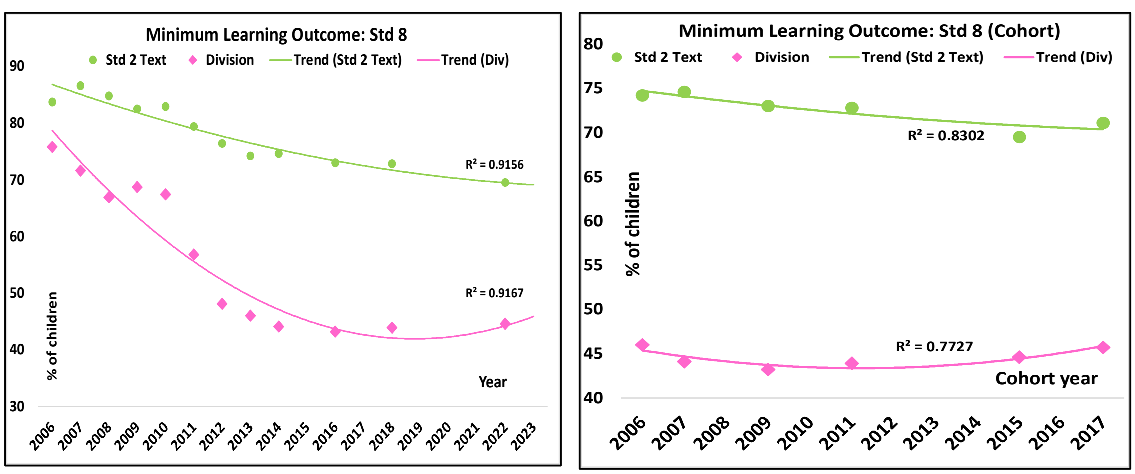
Table 39: Effect of Pandemic on learning outcomes (% of students)

	Post Pandemic 2022-2024		Pre-Pandcemic 2018-2022	
Std	StdIIText	Divide	StdIIText	Divide
VI	4.9	4.3	-7.0	-3.0
VII	2.3	3.7	-5.6	-1.2
VIII	1.6	1.1	-3.3	0.7

Source: ASER reports 2024, 2022 & 2018

Figure 23, shows trends in Minimum Learning Proficiency in Std VIII during 2006 to 2024. The percentage of students with minimum reading proficiency (Std II level text) was high in 2006-2007, but has been on a declining trend since then. The steepest decline was from 2006-2007 to 2014, with the rate of decline less during the past decade (green line). Part of the decline in the last decades is due to weaker foundational learning outcome in primary school, in previous decade. The declining trend in the percent of Std VIII students who can divide (MAP) is even sharper from 2006 to 2014. There has been a gradual but modest improvement from 2014 to 2024. As foundational learning is even more important for Arithmetic than for reading, the sharper fall in ability to divide, more likely reflects poor MAP in primary school with respect to ability to subtract & two-digit number recognition.

Figure 23: Minimum Learning Proficiency: Std 8 (% of children)



Data source: Annual Status of Education Reports 2006-2024

We use the learning outcome data from ASER, by grade to construct synthetic cohorts. We then follow each cohort through different grades. Thus, the cohort marked 2006 (is the cohort which entered Std I in 2006, while 2017 is the cohort which entered Std I in 2017 (X axis in

[47] This can be seen by adding the columns headed divide (3 & 5) in table 31.

right panel, Figure 23). Comparing the right panel with the left panel of Figure 23 , shows that MAP outcomes in Std VIII do not change much across cohorts (pink lines) during 2006-2024.

The MAP results across cohorts also lower than the raw data across years, though the percentage difference may not be as significant, as the former are on average, lower than the latter. The trends in MRP across cohorts are also flatter than the trends over time difference between the trends in MRP (red lines in right & left panel), and are much less significant in percentage terms, as the average is lower for the cohorts.

Overall, the declining trend, suggests that as access improved for previously excluded children, pedagogy and teaching has not changed sufficiently to address the weaker self-learning ability of new entrants. Move to universal school education of such a large and diverse population, requires changes in the conventional curricula and teaching methods.

Inter-State Comparison

ASER data can also be used to compare Learning outcomes across States and UTs, with respect to both Minimum Reading Proficiency (MRP) and Minimum Arithmetic Proficiency (MAP). The 27 States and UTs are put into three categories (A, B, C), using the all India mean outcomes in Std VIII, and the standard deviation of Minimum reading proficiency (Std II level text) to classify States & UTs by per cent of students with MRP (Table 40, columns 1 to 3). Similarly Minimum Arithmetic proficiency (Division) is used to classify States & UTs by per cent of students with MAP (Table 40, columns 4 to 6). The numbers in brackets against each state show the change between 2014 and 2024, in the percent of students in the State with MRP & MAP respectively. The B level is created by taking a range of 0.5 times the standard division, on each side of the all-India average given by ASER for MRP and MAP respectively (Table 40).

Table 40: Min learning outcomes across Stats-2024 and change 2014-24 in bracket)

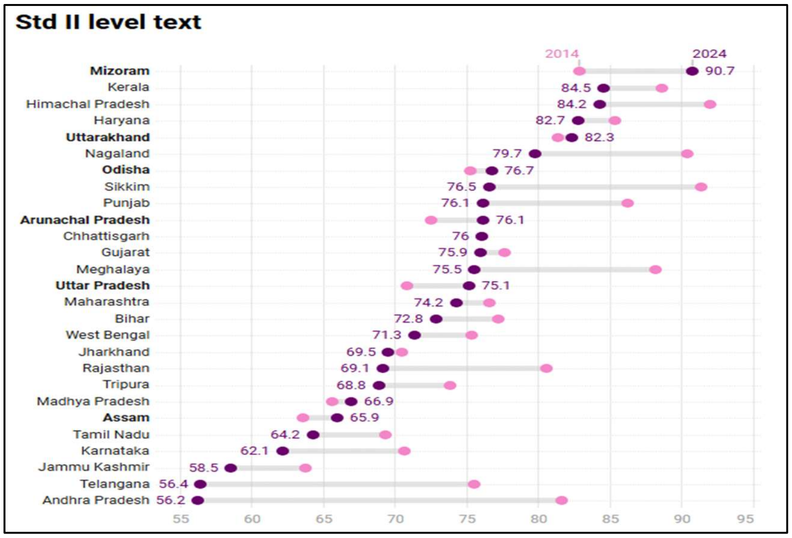
Minimum Reading Proficiency (MRP) in Standard 8			Minimum Arithmetic Proficiency (MAP) in Standard 8		
A: Above average	**B: Average**	**C: Below average**	**A: Above average**	**B: Average**	**C: Below average**
More than 75.5%	**66.7% to 75.5%**	**Less than 66.7%**	**More than 51.3%**	**40.1% to 51.3%**	**Less than 40.1%**
Mizoram (+7.9%)	Uttar Pradesh (+4.3%)	Assam (+2.4%)	Uttar Pradesh (+11.5%)	Odisha (+10.7%)	Madhya Pradesh (+7.7%)
Arunachal (+3.6%)	Madhya Pradesh(+1.3%)	Tamil Nadu (-5.1%)	Uttarakhand (+4.8%)	Jharkhand (-0.1%)	Chhattisgarh (+7.0%)
Odisha (+1.5%)	Jharkhand (-0.9%)	J&K (-5.2%)	Bihar (+2.5%)	Telangana (-2.8%)	Assam (+4.6%)
Uttarakhand (+1.0%)	Maharashtra (-2.3%)	Karnataka (-8.5%)	Punjab (-1.9%)	Andhra (-8.0%)	Maharashtra (+3.4%)
Chhattisgarh (0.0%)	Bihar (-4.4%)	Telangana (-19.1%)	Himachal (-10.0%)	Arunachal (-12.3%)	Karnataka (+0.9%)
Gujarat (-1.7%)	Tripura (-5.0%)	Andhra (-25.4%)	Haryana (-10.2%)	Nagaland (-30%)	Tamil Nadu (-2.0%)
Haryana (-2.6%)	Rajasthan (-11.4%)		Mizoram (-24.6%)		Gujarat (-2.1%)
Kerala (-4.1%)	Meghalaya (-12.6%)				J&K (-3.4%)
Himachal (-7.7%)	West Bengal (-27.6%)				Tripura (-6.3%)
Punjab (-10.1%)					West Bengal (-6.6%)
Nagaland (-10.6%)					Rajasthan (-15.0%)
Sikkim (-14.8%)					Kerala (-21.3%)
					Meghalaya (-29.4%)
					Sikkim (-35.5%)

Source: Authors calculations based on ASER report 2024 & 2014. Note 1: Cut-offs are based on All India +/- 0.5*Stdev.
Note All India Std 8 MRP (std2 txt) is 71.1%, Stdev is 8.7%, and MAP (divide) is 45.7% with Stdev =11.2%. stdev=standard deviation.

In the case of MRP in Std VIII, there are 12 States & UTs in A (above average) category, 9 in B (average) and 6 in C (below average) category, in 2024. Four States/UTs have improved their MAP since 2014 in A category, two in B category and only one in C category. In the case of

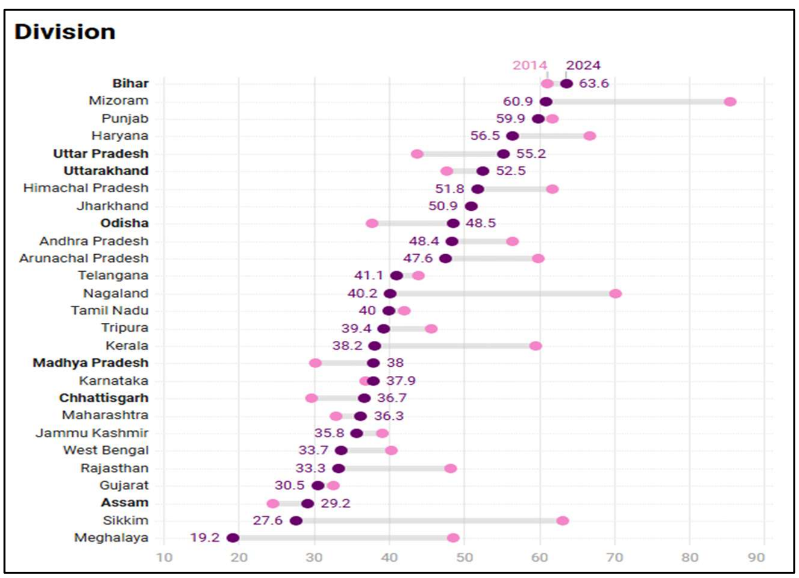
MAP, the skew is in the lower direction, with 7 States & UTs in A, 6 in B and 14 in C category, in 2024. Four States have improved their MAP since 2014 in category A, one in category B and five in category C. The largest improvement between 2014 and 2024 are seen in UP (+11.5%), and Odisha (+10.7%).

Figure 24: Minimum Reading proficiency (% of std 8) in 2024 & 2021



Data source: Annual Status of Education Reports 2014 & 2024

Figure 25: Minimum Arithmetic proficiency (% of std 8 students) in 2024 & 2014



Data source: Annual Status of Education Reports 2014 & 2024

The ranking of states and UTs by Minimum Reading proficiency (MRP), measured as per cent of children in Std VIII who can read Std II level text in 2024, is shown in Figure 24. This figure also contains the 2014 MRP. The ranking of states and UTs by Minimum Arithmetic proficiency (MAP), measured as per cent of children in Std VIII in 2024, who can divide, is shown in Figure 25.

6.3.2 Comparison of Grade 8 learning outcomes (NAS viz ASER)

This section analyses, to what extent the results NAS surveys for lower secondary school, match those from ASER, given the limitations arising from different years of the surveys and the different criteria and testing procedures used. Table 41 presents Std/Class 8 results on minimum learning proficiency based on ASER and NAS data. Since these surveys were conducted in different years and follow different assessment frameworks, direct comparison is challenging. However, approximate comparisons can be drawn between nearby years, such as ASER 2022 with NAS 2021, and ASER 2016 and 2018 with NAS 2017. NAS shows the share of students achieving Basic and Proficient levels. This paper uses Basic and Proficient levels to include all those above the specific level. Thus, Basic level includes Proficient and Advanced. As NAS questions become more difficult for higher grades, the percentage of students in each grade is expected to be lower than those for preceding grade.

Table 41: Minimum Learning Proficiency (% of students): Grade/Standard 8

Grade 8	Reading/Language	Students %	Arithmetic/Math	Students %
ASER 2022	Can Read Std 2 level text	69.5	Can do Division	44.6
NAS 2021	Basic (incl prof + advance)	79.0	Basic (incl prof + advance)	73.0
	Proficient (incl Advanced)	34.0	Proficient (incl Advanced)	27.0
ASER 2018	Can Read Std 2 level text	72.8	Can do Division	43.9
NAS 2017	Basic (incl prof + advance)	85.2	Basic (incl prof + advance)	82.1
	Proficient (incl Advanced)	38.3	Proficient (incl Advanced)	39.5
ASER 2016	Can Read Std 2 level text	73.0	Can do Division	43.2

Source: ASER 2022, 2018, 2016 and NAS 2021 & 2017

ASER presents the percentage of children who can read a Std II level text in language and those who can divide in arithmetic. ASER uses the same test questions & marking system for Std II text and division for all grades, so the percentage of students achieving this level is expected to be higher in the upper grades.

For Std/Class, ASER 2022 and NAS 2021 comparability is lower than we found for Std/Class 8. In language, 69.5% of children could read a Std II-level text as per ASER 2022, but this share differs by (-)9.5% points for Basic level and (-)35.5% points from proficient level in NAS 2021. Similarly in mathematics, 44.6% of children could do division (ASER 2022), but this share differs by points (-)17.6% from those who were proficient and by (-)28.4% points who achieved basic levels. Thus, in both language and Math, the match between NAS and ASER is inferior in Std/Class 8 than we found in Std/Class 5. Similar mis-matches are found between NAS 2017 and ASER 2016 or ASER 2018 in language. with NAS 2017 percentage for Basic language skills higher than ASER 2016 Std II level text by +12.2% points (17%) and Proficient level lower by (-)34.7% points (-48%). However, there is almost a perfect match between NAS 2017 student who are proficient in math (39.2%), with those who can do division as per ASER 2016 (43.2%) [Table 41].

The cross-State correlation coefficient for Std/Class 8 results in language and Math/Arithmetic confirms the high variance in grade results from ASER 2022 and NAS 2021. The cross-survey correlation between the per cent of Std VIII children able to read Std II level text as per ASER and State results for per cent of Class 8 students who can meet the basics is 0.25 (Table 42). The cross correlation for Class 8 math is even lower (0.15), between the percent of students who are proficient in Math across States (NAS 2021) and those who can divide ASER 2022). This is consistent with the all-India analysis in Table 27.

Table 42: Learning Outcomes in Grade 8 [NAS (2021) & ASER (2022)]

Subject	Reading/Language		Arithmetic/Math	
	ASER 2022	NAS 2021	ASER 2022	NAS 2021
Profeciency	Std II Text	Basic+	Division	Proficient+
All India (%)	69.5	79.0	44.6	27.0
States Avg(%)	72.9	81.1	44.3	24.1
Cross survey correl		0.25		0.16

Source: National Achievement Survey (2021), ASER (2022)

6.3.3 Learning Outcomes & Scores: Grades 8 and 10 (NAS)

The National Achievement Survey (NAS) evaluates learning outcomes of students across grades and subjects at the national level. The definition of "Basic" and "proficient" performance level for each subject changes with Class. The test of performance becomes more complex as students move to a higher grade. In the previous section, we have shown that the basic performance is best indicator of minimum language proficiency and the proficient level is the best indicator of minimum math proficiency, in Class 8. This section begins with Class 8 to understand the pandemic's impact on basic learning levels, followed by Class 10 outcomes and the shift between the two stages. Then looks at conventional results of secondary school performance such as average scores, and the percentage of correct answers across subjects and categories.

Table 43 shows the percentage of Class 8 students who achieved at least the basic level of learning (including proficient and advanced) in NAS 2017 and 2021. It also shows the proficient level for Math as this was found to be more comparable to other surveys.

Table 43: Grade 8 students (%) meeting Basic performance level: NAS

Grade 8	2021					2017				
Subject	Total	Urban	Rural	Boys	Girls	Total	Urban	Rural	Boys	Girls
Language	79.0	85.0	75.0	76.0	81.0	85.2	88.0	84.0	85.0	86.0
Maths	73.0	75.0	70.0	73.0	72.0	82.1	80.0	83.0	82.0	82.0
Math: Proficient	27.0	26.0	26.0	27.0	27.0	39.5	32.0	42.0	39.0	40.0
Science	62.0	69.0	60.0	64.0	62.0	81.4	80.0	83.0	82.0	80.0
Social Science	61.0	65.0	59.0	59.0	62.0	80.2	80.0	80.0	80.0	80.0

Source: National Achievement Survey, 2021 & 2017

In 2017, overall performance was high across subjects, with over 80% of students meeting the basic level in all areas: 85% in Language, 82% in Math, 81% in science, and 80% in Social Science. The high scores were also seen in both urban and rural areas and across gender. The percent of students who were proficient in math was 39.5%

In 2021, student performance dropped, because of the Pandemic. The largest declines were seen in science (-)19.4 points and Social Science (-)19.2 points, showing a stronger pandemic effect on these subjects. The fall in performance was visible across all categories: urban and rural, boys and girls, but the rural urban gap widened more than the gender gap in language, The geographical and gender gaps in Math were less affected by the pandemic.

As NAS 2021 is the latest available survey with data on Class 10, it gives a picture of the learning outcomes in Upper secondary school. States are therefore distributed into three categories (A, B, C), using the all-India results along with the standard deviation of State results, following the methodology used for NAS 2017 in Table 25. NAS 2021 gives separate results for English and for Modern Indian languages (MIL). The States & UTs are therefore distributed in three categories for each, and presented in the two panels in Table 44 with English on the left and MIL on the right. For English, there are 21 States/UTs in category A, 9 in B category, and 5 in category C. For MIL there are only 6 States & UTs in category A, 17 in category B and 14 in category C. This is partly because the national average for English is 76.0% and for MIL is 47%, half of that for English (Table 44). All the States in A category for MIL are also in the A category for English. In contrast only two of the 5 States & UTs which are in the C category of English are in the C category of MIL.

Table 44: Class 10 Basic Language ability in States/UTs in 2021

Minimum Reading Proficiency (MRP) in grade 10						
English				**Modern Indian Language (MIL)**		
A: Above avg		**B: Average**	**C: Below Avg**	**A: Above avg**	**B: Average**	**C: Below Avg**
More than 80.3%		**71.7% to 80.3%**	**< 71.7%**	**> 56.1%**	**37.9% to 56.1%**	**< 37.9%**
J&K	Haryana	Assam	Karnataka	Rajasthan	Bihar	Mizoram
Maharashtra	Manipur	Uttarakhand	Uttar Pradesh	Delhi	Assam	Nagaland
Andhra	Sikkim	Jharkhand	Bihar	Kerala	Tripura	Meghalaya
Daman & Diu	Delhi	Tripura	Chattisgarh	Haryana	A&N Islands	Manipur
Himachal	Nagaland	West Bengal	Dadra & NH	Chandigarh	Uttar Pradesh	Puducherry
Lakshadweep	Chandigarh	Gujarat		Punjab	Andhra	Goa
Rajasthan	Goa	MP			Jharkhand	Sikkim
Telangana	Puducherry	Meghalaya			Odisha	Lakshadweep
Kerala	Punjab	Mizoram			Tamilnadu	Arunachal
Arunachal		Odisha			Chattisgarh	Ladakh
Ladakh		Tamilnadu			Uttarakhand	Telangana
A&N Islands					Daman & Diu	Karnataka
					West Bengal	Dadra &NH
					Gujarat	J & K
					MP	
					Maharashtra	
					Himachal	

Source: Authors calculation based on NAS 2021. Note 1: Cut-offs are based on All India +/- 0.5*Stdev
Note 2: All India Std 10 MRP(English) is 76.0%, Stdev is 8.6%, and MRP (Modern Indian Language) is 47%, Stdev is 18.2%.

Table 45 shows the States similarly categorized into three groups, based on State Math proficiency in Class 10, 2021. This is because the math "proficiency" level in NAS 2021 is more comparable with minimum arithmetic proficiency (MAP) than the "basic" level. There are 7 States and UTs in the A category (above average), 12 in B (average) and 18 in C category, below the national average. This is two more than in the C category of MIL (Table 44). The All-India average of 47% for basic ability in MIL is much higher than the 23% of students who are "proficient" in Math in class 10, but much lower than the 70% who had "basic" math ability.

Table 45: Proficiency in Class 10 Math in 2021

Minimum Math Proficiency (MAP) in class 10				
A: Above average	**B: Average**		**C: Below average**	
More than 28.7%	**17.3% to 28.7%**		**Less than 17.3%**	
A&N Islands	**UttarPradesh**	**Puducherry**	**Sikkim**	**Daman & Diu**
Bihar	**Manipur**	**Madhya Pradesh**	**Lakshadweep**	**Kerala**
Delhi	**WestBengal**	**Odisha**	**Mizoram**	**Gujarat**
Haryana	**Andhra Pradesh**		**Nagaland**	**Himachal Pradesh**
Rajasthan	**Jammu & Kashmir**		**Meghalaya**	**Ladakh**
Chandigarh	**Jharkhand**		**Tamilnadu**	**Telangana**
Punjab	**Karnataka**		**Chattisgarh**	**Goa**
	Uttarakhand		**Dadra &Nagar**	**Maharashtra**
	Assam		**Arunachal**	**Tripura**

Notes: Authors calc based on NAS 2021. Cutoffs based on India avg +/- 0.5*Stdev India Avg MAP (proficient) is 23.0%, its Stdev is 11.3%

Table 46 presents the sub-categories within students meeting the Basic (+) performance levels: classified as Basic, Proficient, and Advanced. While earlier tables discussed the overall Basic (+) category, this table breaks it down further to show variation across subjects in Class 8 and 10.

Table 46: Distribution of Grade 8 & 10 students by performance level (%)

Grade	**Grade 10**				**Grade 8**			
Levels	**<Basic**	**Basic**	**Proficient**	**Advanced**	**<Basic**	**Basic**	**Proficient**	**Advanced**
Language	-	-	-	-	21.0	45.0	22.0	12.0
Language (MIL)	53.0	37.0	10.0	0.0	-	-	-	-
English	23.0	17.0	41.0	18.0	-	-	-	-
Maths	30.0	47.0	17.0	6.0	27.0	46.0	19.0	8.0
Science	74.0	17.0	8.0	1.0	37.0	35.0	19.0	8.0
Social Science	62.0	23.0	13.0	2.0	39.0	41.0	12.0	8.0

Source: National Achievement Survey, 2021

As students move from Class 8 to Class 10, the share of those performing below basic rises sharply in all subjects, showing a clear decline in overall learning levels. The fall is most visible in science, where students at below basic level increased from 37% to 74%, and in Social Science, from 39% to 62%. Students at the advanced and proficient levels declined in all subjects, reflecting weak conceptual learning. Only a slight increase is seen in Mathematics (basic level +1%) and Social Science (proficient +1%). Overall, the distribution highlights widening learning gaps as students advance to higher grades, especially in Science and Social Science.

Table 47 presents the percentage of students in Class 10 meeting the basic performance level in NAS 2021, along with the change from Class 8 to Class 10. Overall, performance tends to decline as student progress to higher grades, with the lowest achievement recorded in science (26%), followed by Social Science (38%). Across all subjects, urban students performed better than rural. By gender, girls showed stronger outcomes in Language (MIL) and English, while boys performed slightly better in Mathematics, Science, and Social Science.

Table 47: NAS (2021): Students (%) meeting basic performance level in Grade 10

Grade 10	**Total**	**Urban**	**Rural**	**Boys**	**Girls**
Language	-	-	-	-	-
Language (MIL)	47.0	54.0	43.0	45.0	47.0
English	76.0	84.0	73.0	76.0	77.0
Maths	70.0	72.0	68.0	72.0	68.0
Math: Proficient	23.0	24.0	21.0	24.0	21.0
Science	26.0	33.0	23.0	27.0	25.0
Social Science	38.0	46.0	34.0	39.0	38.0
Change from Grade 8 to Grade 10					
Maths	-3.0	-3.0	-2.0	-1.0	-4.0
Science	-36.0	-36.0	-37.0	-37.0	-37.0
Social Science	-23.0	-19.0	-25.0	-20.0	-24.0

Source: National Achievement Survey, 2021

When comparing across grades, it is important to note that Class 8 assessed "Language", whereas Class 10 included "Language (MIL)" and "English", making direct comparison difficult. A performance gap is visible, with an overall 38% decline in Language scores from Class 8 to Class 10. This is likely the result of a shift from the local language/mother tongue in Class 8 to Modern Indian Language (MIL) in Class 10, making it necessary for students to relearn in MIL the basics they had already learned in language. The decline seems more pronounced in rural areas (-)41% vs (-)34% in urban, suggesting a possible difficulty in getting teachers who can teach MIL. This would be a fit case for using digital & e-learning aids for language teachers, so they can smooth the transition.

Further a clear decline in Basic performance, is visible, with performance is weaker in Class 10 Science (-)36% and Social Science (-)23% than in Class 8. The former deterioration is significantly larger than the latter. This suggests that science teachers (in both urban & rural areas) are unable to improve their pedagogy to match subject complexity. In contrast, basic learning in social science, which is more connected to general knowledge seems to deteriorate less in urban areas than in rural, less for boys than girls and less overall than Science.
This reinforces the case for using digital and e-learning aids to improve the quality of science (& other subjects) teaching in rural schools.

Table 48 presents percentage of correct answers and average scores for Class 8 and Class 10. Between 2017 and 2021, the overall performance of students declined across both Class 8 and Class 10. The average scores fell more sharply in science (-)4.8 and Social Science (-)4.6 for Class 8, showing a noticeable learning loss during the pandemic period. In Class 10, the drop was even greater in Mathematics (-)6.8 and Science (-)9.4. While average scores in English (+4.8) and Language (MIL) (+1.2) improved, most other subjects saw declines. The pattern was consistent for correct answers, which also showed clear deterioration from 2017 to 2021.

Table 48: NAS 2021: Average Scores & Correct Answers (%)

	Year 2021				
Grade 8	**Total**	**Urban**	**Rural**	**Boys**	**Girls**
Average score (%)					
Language	60.4	64.0	59.8	60.4	62.4
Mathematics	51.0	51.2	50.2	50.6	50.6
Science	50.0	52.0	49.4	50.4	50.4
Social Science	51.0	51.8	50.4	50.6	51.2
Correct Answers (%)					
Language	53.0	58.0	50.0	52.0	54.0
Mathematics	36.0	37.0	36.0	36.0	36.0
Science	39.0	42.0	38.0	40.0	39.0
Social Science	39.0	36.0	34.0	39.0	39.0
Grade 10					
Average score (%)					
Language (MIL)	52.0	51.4	49.6	49.4	51.0
English	55.4	61.0	56.0	57.6	58.8
Mathematics	44.0	44.0	42.8	43.8	43.2
Science	41.2	43.6	40.8	42.0	42.2
Social Science	46.2	49.0	59.8	47.0	47.4
Correct Answers (%)					
Language (MIL)	41.0	44.0	40.0	41.0	42.0
English	43.0	50.0	39.0	43.0	43.0
Mathematics	32.0	33.0	32.0	33.0	32.0
Science	35.0	37.0	34.0	35.0	35.0
Social Science	37.0	40.0	36.0	38.0	37.0

Source: NAS (national) 2021 (All India-Class 8 &10)

Note: Scores are out of 500, converted to percent; MIL: Modern Indian Language.

In 2021, the Class 8 average scores remained around 50-60%, correct answer at 35-55%. In Class 10, the Language (MIL) at 52% and English at 55.4% recorded higher average scores Mathematics and Science were the lowest.

Across both grades, urban students consistently scored higher than rural students in almost all subjects, across both average scores and correct answers. Among gender, girls performed slightly better in Language-related subjects, while boys scored marginally higher in Mathematics and Science.

To improve outcomes in rural areas, focused efforts are needed to ensure the availability of subject-specialized teachers and to expand e-learning access for both students and teachers. These measures can help bridge the urban-rural performance gap and strengthen learning continuity across grades.

6.3.4 PRS (2024) results for Grades 6 and 9

PRS 2024 reports average scores for Grades 6 and 9 across subjects, by gender and location. Table 49 shows a decline in learning outcomes as students move from Grade 6 to Grade 9. In Grade 6, average scores were 57 in Language and 46 in Mathematics, while Grade 9 students scored 54 in Language and only 37 in Mathematics. Science and Social Science at the secondary level recorded similar averages around 40.

Urban students consistently outperformed than rural across both grades and subjects. Girls performed slightly better in Language, whereas boys showed a marginal advantage in Mathematics.

When compared with NAS 2021, PRS 2024 shows relatively lower average scores, particularly in Mathematics and Social Science, where the gap ranges between 4-6 points. This difference possibly reflect variation in testing design and grades, since PRS assesses Grades 6 and 9 while NAS covers Class 8 and 10. Despite these structural differences, the overall trend remains consistent: Language continues to record the highest performance, while Mathematics remains the weakest area across all grades. Urban-rural differences remain modest. However, girls performing better in Language and boys showing slight advantage in Mathematics, a pattern visible in both assessments.

Table 49: PRS 2024: Average scores (2024)- Secondary

Grade/Subjects	Grade 6 (PRS 2024)					Grade 8 (NAS 2021)				
Category	Total	Urban	Rural	Boys	Girls	Total	Urban	Rural	Boys	Girls
Language	57	59	55	55	59	60	64	60	60	62
Mathematics	46	47	45	47	46	51	51	50	51	51
The World Around Us	49	51	48	49	50					
Grade/Subjects	Grade 9 (PRS 2024)					Grade 10 (NAS 2021)				
Language	54	58	51	52	56					
Mathematics	37	38	36	37	36	44	44	43	44	43
Science	40	42	39	41	40	41	44	41	42	42
Social Science	40	41	39	39	41	46	49	60	47	47

Source: PARAKH Rashtriya Sarvekshan (PRS), 2024

6.4 Programs & Platforms

A number of programs and platforms have been launched by the central government to improve the teaching and learning at the secondary and higher level. Schemes like **Samagra Shiksha Scheme, E-Pathshala, PM eVidya**, **DIKSHA,** also extend to secondary and senior secondary education; discussed earlier in section 5.7. **Padhna Likhna Abhiyan** (PLA) was launched in 2020 to eliminate adult illiteracy in India by providing basic functional literacy to adults aged 15 years and above. The target was to make 57 lakhs adult illiterates' literate within a year.[48] A few schemes which have been reviewed by independent researchers are highlighted in this sub-section.

6.4.1 SWAYAM

Study Webs of Active-Learning for Young Aspiring Minds (SWAYAM, 2017) is a massive open online course (MOOC), providing free education to learners from *Class 9 up to post-graduation*. SWAYAM offers 16530 courses with video lectures, downloadable reading material, quizzes, and discussion forums for clearing doubts. As of 2025, SWAYAM had more than 5.4 crore enrolments and had issued over 45.2 lakh total certificates[49].

Raj et al. (2025) examined SWAYAM platform data across nine national coordinators and found that "student enrolment, exam registration, and successful course completion are strongly and positively correlated".[50] Their analysis further shows that a substantial share of learners progressed from enrolment to certification, indicating "70.6% of learners have used SWAYAM courses effectively". The study also notes that "the majority of students have enrolled in technical courses rather than other," suggesting that "the learning population in India is largely demanding technical-based educational programs."

Learner-level evidence from *Singh and Bhandari (2025)*, based on a survey of 154 higher-education students using SWAYAM-NPTEL (National Program on Technology Enhanced Learning) courses[51]. The authors report that "71% of enrolled and eligible learners successfully completed courses and received certification," and that "a majority of learners perceived improved comprehension of subjects and usefulness of certification." Students also rated course relevance and content quality positively, with "over 80% finding courses relevant and 77% reporting that learning outcomes were fully or mostly achieved." The authors also note that "Out of 93 respondents, 65.6% found the platform user friendly" & operational. Also, of 69 respondents "62.3% of respondents believe that companies value SWAYAM-NPTEL certifications," suggesting confidence in the platform's credibility and applicability to employability. The study emphasizes that "improved digital infrastructure, and curriculum integration are necessary to maximize the benefits of the platform."

Beyond participation and completion, *Mehra and Kant (2024)*, using survey data from over 500 students and faculty across engineering and science institutions, found that MOOC under the SWAYAM "fails to provide avenues for face-to-face discussion, hands-on skill development, and real-life learning experiences." However, students and faculty agree that "MOOCs provide flexibility, and provide knowledge beyond classroom curriculum".

[48] The scheme especially focused on women, Scheduled Castes (SCs), Scheduled Tribes (STs), minorities, and other disadvantaged groups.
[49] https://swayam.gov.in/
[50] with coefficient of determination of about 98% and p value is about 0.001.
[51] Postgraduate and undergraduate students across all courses using Stratified random sampling used to achieve representation by institution type, academic subject, and education level of 154 students based on structured questionnaires.

Gunjan's (2025) study of teacher education students (B.Ed. and M.Ed.) found that "76.7% of B.Ed. students and 66.7% of M.Ed. students" agreed that *SWAYAM MOOCs are beneficial*, and that "80% of B.Ed. students and 66.7% of M.Ed. students" were motivated to enroll in courses to improve their knowledge and skills. In terms of quality, "73.3% of B.Ed. students and 80% of M.Ed. students" SWAYAM MOOCs provide quality instruction and content. The study suggests that improvements in internet connectivity, increased awareness of the platform, and sufficient training to use SWAYAM platform can strengthen the effective use of SWAYAM MOOCs.

6.4.2 NISHTHA

National Initiative for School Heads' and Teachers' Holistic Advancement launched in (NISHTHA**,** 2019) to train 42 lakh elementary teachers, school heads, SCERTs, DIETs faculty, and resource coordinators. NISHTHA-Online was launched on the DIKSHA platform in 2020. The program was extended to secondary and senior secondary teachers in July 2021, and to Pre-primary to Class V teachers and school heads, for FLN (Sep,2021).[52]

Shrivastava (2024) did an opinion survey 400 teachers from Gujarati-medium schools in Anand district about NISHTA. Author found that 43% of teachers felt the content's quality was suitable for their professional and academic growth, 52.5% of teachers found assignments to be need-based and 59.2% rated the evaluation process for teacher certification as suitable. The study further notes that 58.1% of teachers found the ICT platform and tools attractive and useful. Darji & Sondagar (2025) highlighted that 69.5%" highlighted flexibility in pursuing courses, indicating positives of the program design and delivery[53].

Using course-wise participation data, *Aayushi and Mittal (2025)* surveyed teachers from Muzaffarpur, Bihar from 2021 to 2024 and found that teacher completion rates among the 13 courses in the NISHTHA 2.0 program "peaked in 2021 (45.7%)" but declined sharply to "22.0% in 2022, 21.8% in 2023, and 4.1% in 2024." The authors attribute this decline to factors such as "prior completion of courses, reduced post-pandemic urgency and professional responsibilities. The study highlights courses such as "***Toy-Based Pedagogy***" were viewed as more relevant for elementary or primary teachers than secondary school teachers. However, for older students, "Activity-Based Pedagogy for Engaging Adolescents" or "Interactive and Experiential Learning Approaches" would make the course relevant.[54]

6.4.3 National Digital Library of India

National Digital Library of India (NDLI 2018) acts as a single-window platform that aggregates metadata and provides full-text indexing of resources collected from various national and

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[52] Training programmes for teachers, PIB report 2022

[53] Darji & Sondagar (2025) selected school teachers from various talukas of Anand district and prepared opinionnaire with 50 statements having 10 components. Provides mostly similar results as Shrivastava (2024).

[54] NISTHA 2.0: The study involved teachers from the Muzaffarpur district in Bihar, eight blocks were randomly selected from a total of sixteen using the lottery method, and teachers from these blocks were chosen through cluster sampling. Percentage analysis and the t-test were used as primary statistical tools for analyzing quantitative data, while qualitative data from interviews were analyzed using thematic analysis.

international digital libraries, academic institutions, and repositories. It offers learning materials across subjects and grade levels in multiple Indian languages, making quality content accessible to students, teachers, researchers, and lifelong learners across the country.

Newar and Borah (2022) examined awareness and utilization of NDLI through a survey of 384 respondents comprising students, teachers, and research scholars across India. The authors found that "the overall level of awareness of NDLI was low (39.3%)", with students have comparatively low level of awareness on NDLI, compared to research scholars". In terms of utilization: "54% of respondents were able to access the required content using the app", and "71% rated the performance of the NDLI app as good." The authors indicate that increasing improved connectivity and targeted outreach could strengthen utilization of the platform.

User satisfaction and quality of engagement of NDLI are explored by *Bharti and Prabha (2024)* surveyed 150 users and report that "62% of users rated NDLI as satisfactory," citing appreciation for its "vast content base and centralization of resources." The authors note that strengthening navigation and content discoverability, expanding regional-language access, and improving interface design, content organization and tutorials would enhance utilization.[55]

The digital library needs to add a completely new section containing the best videos for skilling of Master trainers, for semi-skilled workers in engineering skills for Industry, and repair & maintenance, and self-employed workers in a range of old and potential new services.

6.5 Summary & Conclusion

6.5.1 Summary

Secondary education in India does well on international comparisons, based on the per capita GDP linked bench marks we have constructed; All available indicators are above the levels expected at India's per capita GDP. The progression rate from primary to secondary education at 91.3% is 2 per cent points above its benchmark (89.3%), Net Enrolment Rate of 61.6% is 5.8% points above the benchmark (55.8%), and a Gross Enrolment Rate of 78.9% is higher than benchmark by 4.6% points. Both the Lower secondary completion rate at 85.5%, and the upper secondary completion rate at 63.0%, are above benchmark levels by 16.2% and 12.3% points respectively.

India's progression rate from primary to secondary school is estimated at 92.5% in 2023. This is above the benchmark for the PCGDP we are projected to attain in five years. However, our comparator countries (China, Vietnam, Thailand and Mexico) also overperformed on this indicator, relative to the benchmark for their PCGDP, while Indonesia was just on track. The 5.4% points increase needed in the progression rate for India, to meet the minimum HIC benchmark of 97.9%, is well within reach.

[55] Primary data includes interviews and open-ended surveys involving 150 users, primarily students, educators, and researchers from urban and semi-urban academic institutions asked to rate various features of NDLI on a satisfaction scale and provide feedback on their overall user experience.

India's Net Enrolment Rate (NER) in secondary school was 61.6% in 2013, 5.8% points above the level expected at its per capita GDP level in 2013. The NER is estimated at 69.5% in 2023, which is also above the UMIC benchmark, expected to be reached in five years. Indonesia, Thailand and Mexico are also above the NER levels expected for their per capita GDP, while China & Vietnam's NER data was not available.

Within India, the Net secondary school enrolment rate (NER) is one of the few education indicators which is positively corelated to pe capita NSDP. The good NER performance of India is the result of some States and UTs doing better with respect to adjusted NER, than is expected at their level of Per capita NSDP. These are, (a) At Lower Secondary: Odisha, Rajasthan, Chhattisgarh, & Tripura among the lower income States & UTs, and Kerala, Uttarakhand, Maharashtra, Punjab, and Himachal Pradesh among the higher income States & UTs. (b) At Upper Secondary: West Bengal, Tripura, Manipur, and Rajasthan among lower income and Uttarakhand, Punjab, and Kerala among higher-income states.

India's lower Secondary completion rate was 85.5% in 2023, which is 16.2% above its benchmark. Competitor countries such as China, Vietnam, and Thailand are at 100%. Upper Secondary completion rate was 63.0% in 2023, 12.3% points above its benchmark. Thailand (+0.5) and China (+17.8) are also above their expected levels, while Vietnam (-)5.9, Indonesia (-)18.4 and Mexico (-)10.8 are below the level expected at their PCGDP.

The number of Indians completing school education are comparable to those of China, despite lower completion rates (%) in 2023. In India 137 million students completed primary school, 65 million completed lower secondary school and 98 million students completed upper secondary school. India therefore had 1.25 times the students completing primary school than China (109 million) and more than 2.5 times the combined total of Vietnam, Indonesia, Thailand, and Mexico (MIC4). In India 65 million students completed lower secondary school, 1.2 times those of China (53 mil) and 2.4 times those of the MIC4. Similarly, the number of Indian children completing upper secondary school were 1.2 times China and 3.7 times those in the MIC4.

The challenge is to raise secondary enrolment and completion rates to the international benchmarks for a high-income country in 25 years or less. This requires an increase of 5.4 % points in progression from primary to secondary, an increase of 17.6% points in Net Enrolment Rate, 15.9% points in Gross Enrolment Rate, 5.4% points in lower secondary completion, and 16.4% points in upper secondary completion rates.

As schooling comes within the purview of the State and local Governments, a disaggregated view and action plan will be critical to success. The adjusted NER in lower secondary schools of major states like Karnataka, Gujarat, and Haryana, are above the national average of 77.9%, but were below the level expected at their Per capita NSDP. Much stronger efforts are also required in Nagaland, West Bengal, Arunachal Pradesh, Sikkim, Haryana, and Karnataka. Similarly, adjusted NER at the upper secondary level shows that, Telangana and Mizoram, though above the national average of 52.2%, were below the level expected at their Per capita

NSDP. Greater efforts are also needed in Nagaland, Jammu & Kashmir, Madhya Pradesh, West Bengal, Arunachal Pradesh, Sikkim, and Gujarat.

Minimum learning outcomes are critical to the evaluation of the quality of teaching and learning. Minimum Reading Proficiency (MRP) is measured by the per cent of children who can read a Std II level text. 57.7% of Std VI children and 71.1% in Std VIII are found to satisfy this criterion in 2024. States such as Mizoram, Arunachal Pradesh, Odisha, and Uttarakhand performed above the average in 2024 and also showed improvements since 2014 (Std VIII). Minimum Arithmetic Proficiency (MAP) is measured by the percent of children who can do division. In 2024, MAP is found to be only 36.0% in Std VI and 45.7% in Std VIII. The MAP of children in Std VIII, was above the all-India average in Uttar Pradesh, Himachal Pradesh, Uttarakhand, Bihar, and Punjab. As the all-India average MAP is 25.7 per cent points less than MAP in Std VIII, urgent attention needs to be given to close this a gap between MRP and MAP.

Learning outcomes improve from primary to lower secondary education, though it is unclear how much of this is due to dropout of students who have fallen behind, and how much to actual learning by those who could not read or do division in earlier classes. The share of children with Minimum Reading Proficiency increases from 48.7% at the end of primary (Std V) to 71.1% by the end of lower secondary (Std VIII). Share of children with Minimum Arithmetic Proficiency increases from 30.7% in Std V to 45.7% in Std VIII. Improvements in MRP are observed in Mizoram (+7.9%), Arunachal (+3.6%), Odisha (+1.5%), Uttarakhand (+1.0%), Uttar Pradesh (+4.3%), Madhya Pradesh (+1.3%) and Assam (+2.4%) during the ten years from 2014 to 2024. Improvements in MAP are observed in Uttar Pradesh (+11.5%), Himachal Pradesh (+10.0%), Uttarakhand (+4.8%), Bihar (+2.5%), Odisha (+10.7%), MP (+7.7%), Chhattisgarh (+7%), Assam (+4.6%), Maharashtra (+3.4%) and Karnataka (+0.9%) from 2014 to 2024. It is encouraging that States like UP and Odisha were able to improve minimum learning outcomes so significantly over a decade.

Data availability for minimum learning outcomes at upper secondary levels (Classes 9-12) is lower. From the available data, paper selects the metrics which align best with international metrics. These metrics are somewhat different from those for Std I to Std VIII (used above). According to NAS (2021), basic performance of Class 10 students was relatively high in English and Mathematics, but lower in Modern Indian language, Science and Social Science. The per cent of Class 10 students meeting basic performance level, was 76% in English, 47% in modern Indian language (MIL), 70% in Mathematics, 26% in science, and 38% in Social Science. At the upper secondary level (Class 10) top 20% states in learning outcomes were, (a) Jammu & Kashmir, Maharashtra, Andhra Pradesh, Himachal Pradesh, Rajasthan, Telangana, and Kerala in English, (b) Rajasthan, Delhi, Kerala, Haryana, Chandigarh, and Punjab (above all-India average) and Bihar & Uttar Pradesh (average), in Modern Indian Languages. (c) Bihar, Delhi, Haryana, Rajasthan, Chandigarh, Punjab, Uttar Pradesh, and West Bengal, in mathematics. Surprisingly the performance in Modern Indian language was 47%, which was 29% points lower than in English.

Urban students performed better than rural students across secondary education. The share of rural Class 8 students meeting the basic performance level was lower than urban students by about 11.8% in Language and 6.7% in Mathematics. In Class 10, the gap increased to about 13.1% in English, and 5.6% in Mathematics (2021). The gap was 20.4% in modern Indian language (only available in Class 10).

Average scores and percent of correct answers are other metrics available in India, which do not have international counterparts. These show that, in Class 8, average rural scores were 6.6% lower in Language and 2.0% in Mathematics than urban scores. Correct answers in rural areas were 13.8% lower in Language and 2.7% lower in Mathematics, than in urban areas. In Class 10, rural students had 3.5% lower scores in Language, 8.2% in English and 2.7% in Mathematics. On average correct answers in rural areas were 9.1% lower in Language, 22% lower in English, and 3.0% lower in Mathematics (2021). Similar results were found in 2024 in Grade 6 and 9. Rural students scored about 6.8% lower in Language and 4.3% lower in Mathematics in Grade 6 than urban students. Rural Grade 6 results were about 12.1% lower in Language and 5.3% lower in Mathematics than urban.

In primary school Girls perform better than boys in Language. In 2021, girls had higher proficiency in Language in both Class 3 (+8%) and Class 5 (+16%), and also performed better in average scores and correct answers. In Mathematics, performance of boys and girls is largely similar in NAS (2021), though boys perform slightly better in Numeracy in 2022. In 2024, girls in class 3 scored higher in Language and identical scores in Mathematics. In secondary school girls perform better in Language and boys in Mathematics. In 2021, a greater share of girls in Class 8, met basic performance levels in language than boys (+6.6%). However, in Class 8 mathematics the share of girls meeting basic performance levels were (-)1.4% less than boys. The position in Class 10 was similar, with girls' basic performance higher in Language (4.4%) and English (1.3%), while it was lower by (-)5.6% in Mathematics.

In Class 8, average scores and correct answers in Language, for girls were 3.3% and 3.8% higher (respectively) than for boys. In Mathematics both were identical for boys and girls. In Class 10, average scores and correct answers in Language for girls were 3.2% and 2.4% higher, respectively, than for boys, whereas in Mathematics they were lower by (-)1.4% and (-)3.0%. In English, average scores for girls were 2.1% higher than for boys, while correct answers were identical for both. By 2024, in Grade 6 girls scored higher in Language by 7.3% and lower in Mathematics (-) 2.1%; in Grade 9 girls scored also higher in Language (7.7%) and lower in Mathematics (-) 2.7%.

The biggest challenge will be to raise the minimum learning outcomes in reading (MRP) and Arithmetic (MAP). As per the last available survey on learning proficiency, 28.9% of rural Std VIII children do not have minimum reading proficiency, and 54.3% do not have Minimum Math proficiency (MAP). For Urban students, the number may be ~10% less for MRP and ~5% less for MAP. Raising MRP and MAP is important, both for obtaining higher completion rates at lower secondary level, and for successful transition to upper secondary level. Assam, Tamil

Nadu, Karnataka, Telangana, Andhra Pradesh, West Bengal, Nagaland, and Sikkim are below the all-India average in minimum reading proficiency. A majority of states, require stronger efforts to raise arithmetic proficiency including Madhya Pradesh, Chhattisgarh, Assam, Maharashtra, Karnataka, Gujarat, Jammu & Kashmir, Tripura, West Bengal, Rajasthan, Kerala, Meghalaya, Tamil Nadu, Sikkim, Nagaland, Mizoram, and Haryana. This can be achieved by improving subject-specific pedagogy, especially in mathematics and science, ensuring availability of teachers who are trained in teaching these subjects, and expanding digital and e-learning resources to support both teachers and students.

To address these challenges, several programs and schemes have been launched: SWAYAM provides large number of free, online courses for learners from Classes 9 to 12. Research studies show that 70.6% of learners have used these courses, and 71% of those who signed up completed their courses and received certification. The courses seem to fill the gap in technical education. NISHTHA is a national initiative to train elementary school teachers (Classes 1-8), school heads SCERTs, DIETs and resource coordinators. a teacher training initiative to strengthen pedagogy; Surveys by scholars show that 58% of teachers found the ICT platform and tools attractive and useful. The National Digital Library of India (NDLI), is a single window providing full text indexing of resources, national and international digital libraries, academic institutions and repositories. The NLDI offers digital learning resources to support students and teachers. A scholarly survey has found that 62% of users rated NLDI as satisfactory. The study suggested that there is considerable room for improvement. These and other initiatives by the Central Government are aiming to improve raise completion rates, and strengthen learning outcomes across the secondary education system, but more needs to be done at the State and UT level.

6.5.2 Conclusion

Knowledge is global, but application of knowledge is local. NEP (2022) rightly emphasizes holistic learning, technical courses and extracurricular activities. Much remains to be done to provide standard operating procedures for teachers and administrators, teaching and learning material for teachers and students, and re-training the teachers to focus on learning outcomes. The challenge for India at its level of per capita GDP, given its constitutional structure, is how to effectively apply International, National and inter-State research to education & skilling at the local level.

Research shows the importance of four aspects of learning at the secondary level. Namely Learning by playing, learning by socializing, learning by doing and learning to think. There are many overlaps between them. These have to be adapted to reach the large, dispersed and diverse, non-urban population of India. In our view, these are best imparted by maximizing the use of traditional games, local materials, living things & animals, and the environment, in pedagogy, curriculum and teaching.

(1) Learning by Playing (Sports, physical and board games)

Sports are the means for students to learn self-discipline (to follow rules of the game) and self-motivation to better their performance. Well known games like cricket and soccer are undoubtedly important for older children, but simple, old games using local materials can be equally effect for lower secondary children. These include marbles, pitthu, gulli-danda, kabaddi, rope skipping and hop-skip and jump. These can even help bystanders learn counting and how to accept and interact with children who are better than oneself in games.

(2) Learning by Socializing (Multiplayer games, play acting, singing, discussion, debate)

Students can also organize periodic drives to collect donations of old toys, games, sports material, educational music, videos etc., particularly in Urban areas for use in their own and other schools. Schools can have donation boxes for these things along with books & comic books and tools and material for arts & crafts, and making simple electric and mechanical equipment

(3) Learning by Doing (Arts, Crafts, hobbies)

Students can make the simple items needed for traditional games. This is an educational project in itself. Older students can also try and make simpler toys for younger students based on known designs and local materials. They could also list local craftsman as temporary teachers to help students how to make toys and games with wood and other materials.

(4) Learning by Thinking (Awareness, Curiosity, Questioning, study/ research for answers).

Ability to think, is preceded by awareness, curiosity and questioning. The conventional method of doing this is through story books, discussion and debate on issues. The simplest way, especially in rural India, is by investigating the world around the school and home, and becoming aware of its varied details. This includes, Nature (Leaves, trees, bushes, seeds/beads, crops; worms, insects, birds' animals) & Geology (Rocks, soils, clay, building material, fields, hillocks).

Awareness can be followed by simple measurement, comparison and experimentation (research) an invaluable aid to learning how to think. Curiosity about natural phenomenon can also be aroused by experiments captured on audio visual material. Curiosity about things and events which are foreign to local society can be aroused by comics and audio-visual material.

The question and answers that follow are the tool for teaching secondary school students how to think and do simple research to find the answers to their questions. These things will not happen spontaneously, Pedagogy and Standard operating procedures (SOP) need to developed for teachers and administrators, and discussed among them.

6.5.3 Suggestions

There must be weekly periods assigned in secondary school for sports and games, arts & crafts and learning outings. Teachers must be trained how to do these things, and how to teach their students. Besides written materials like comic books, songs, recorded stories, short illustrative videos are excellent for teaching both teachers.

Children drop out at every level of secondary school. They must be provided an outlet for acquiring job skills. State Governments should identify hub schools where job skills are provided, these can include crafts and vocations with actual or potential demand in the locality. Particular attention to localities with poor attendance and/or high drop-out rates.

Companies should be allowed and encouraged to adopt schools near their factories, to provide vocational education and training appropriate to secondary school.

7. Institutional Issues

This section examines Institutional factors and educational infrastructure.

7.1 Pupil Teacher Ratio (PTR)

Teachers play a key role in improving the quality of education. The number of students per teacher and the share of trained teachers are conventional indicators of institutional quality. Table 50 shows the Pupil-Teacher Ratio (PTR) and Trained Teachers. Between 2018 and 2024, the PTR has declined across all levels of schooling, indicating smaller class sizes and better teacher availability, and the potential for more focused attention on students requiring greater attention. The sharpest improvement is seen at the primary level (27 to 20), followed by secondary (19 to 15) and higher secondary (27 to 23). The improvement in PTR is reflected in an increase in the percent of children meeting Minimum Arithmetic Proficiency (MAP), but Minimum Reading Proficiency (MRP) deteriorated in Std IV to Std VIII (Table 51). We also estimate the cross correlation between minimum learning ability (MRP & MAP) and Pupil Teacher Ratio (PTR) across States. There is zero correlation between PTR and MAP in Primary education (Std V) and Upper Primary/Lower secondary (Std VIII). The correlation between PTR and MRP is very low in both Std V (-0.09) and Std VIII (-0.15) (Table 51).

Table 50: Pupil-teacher ratios & per cent of Trained Teachers

	Pupil-teacher ratio			**Trained teachers (%)**		
	2018	**2024**	**Change**	**2021**	**2024**	**Change**
Preprimary				67.6	53.3	-14.3
Primary (1-5)	27.0	20.0	-7.0	88.7	91.4	2.7
Upper Primary (6-8)	19.0	17.0	-2.0	88.6	91.7	3.1
Secondary (9-10)	19.0	15.0	-4.0	92.2	92.7	0.5
Higher Secondary (11-12)	27.0	23.0	-4.0	91.8	92.6	0.8

Data Source: UDISE+ 2018,2021 and 2024 Reports.

Table 51: Interstate correlation of MRP & MAP with PTR & TT

	2024		Change (2024-18)		Cross State Correlations			
	MRP	MAP	MRP	MAP	PTR-MRP	TT-MRP	PTR-MAP	TT-MAP
Primary (Std V)	48.7	30.7	-1.6	2.9	-0.09	0.18	0.03	0.22
Lower Secondary (Std VIII)	71.7	45.7	-1.7	1.8	-0.15	0.05	0.01	0.18

Source: UDISE+ Reports, 2018-2025 and ASER 2024, 2018

Glewwe and Muralidharan (2016) found that improving teacher accountability through pedagogy, monitoring attendance, performance-linked pay, contract teachers, and better school management is more effective than increasing inputs like salaries, based on global evidence in low-income countries, *De Ree et al. (2018)* found no improvement in student learning outcomes in mathematics, language, or science, three years after a large salary increase for teachers, despite increased teacher satisfaction, reduced financial stress, and fewer second jobs among teachers (in Indonesia). They argued that in public-sector systems with high job security and weak accountability, unconditional pay hikes are unlikely to raise productivity. *Mbiti et al. (2019)* conducted a randomized experiment in public schools in Tanzania, testing teacher incentives, unconditional grants, and showed that teacher incentives had some positive effects, unconditional grants had no effect, and the combined intervention produced the most significant gains in student learning.

According to UDISE+ **(**Table 50**)** the share of trained teachers, has improved at all levels, except the preprimary level, which shows a major decline (from 67.6% to 53.3%). This could possibly be due to the implementation phase of NEP 2020, which introduced new norms and qualification requirements for early childhood educators. While other small improvements: Primary (+2.7), Upper Primary (+3.1), Secondary (+0.5), and Higher Secondary (+0.8). In Primary school (Std V), the interstate correlation between percent of trained teachers and learning outcomes is higher than the correlation between PTR and learning outcomes but still low; 0.18 and 0.22 for MAP and MRP respectively but still low (Table 51). In Lower Secondary/Upper Primary the correlation between trained teachers and MRP is close to zero (0.05), but higher than with PTR for MAP (0.18). Simple interstate regressions, with either MRP or MAP as dependent variable and Pupil Teacher ratio (PTR) and Trained Teachers (TT) as independent variables, shows that the coefficients are not significant. This confirms that these variables have little or no effect on minimum learning outcomes.

The UDISE+ definitions do not match the ones used in WDI, and the years for which data is available are also different. According to WDI, the share of trained teachers has shown a clear improvement across all levels of education. The largest increase is at the primary level, from 69.8% in 2017 to 91.7% in 2024 a gain of 21.9% points (Table 52). At the secondary and upper secondary levels, the increase of trained teachers was by 16% points each, over seven years to 2024. Even in preprimary education, trained teachers have increased from 83.8% of total in 2020 to 92.3% in 2024.

Table 52: Improvement in Percent of Trained Teachers (%)

	Latest available year		Year for comparison		***Change***
Trained teachers (% of total teachers)		Rates		Rates	
In preprimary education	2024	92.3	2020	83.8	8.5
In Primary education	2024	91.7	2017	69.8	21.9
In secondary education	2024	92.3	2017	76.5	15.8
In lower secondary education	2024	92.0	2017	76.6	15.4
In upper secondary education	2024	92.7	2017	76.4	16.3

Data Source: World Development Indicators, December 2025.

7.2 Gender parity

India has largely achieved gender parity in school education, with female-to-male ratios at or above 1.00 across most indicators, including Primary and Lower Secondary completion, School Enrollment, and Progression to Secondary education (Table 53). Despite this overall parity in access and completion, a minor gender gap persists in youth literacy, with the rate for young females (96%) slightly lower than that for young males (98%) in 2023. Net enrollment rates at both primary and secondary levels favor females over males (ratio of 1.02), while a small disparity remains in gross enrollment at the primary (0.99) and tertiary (0.98) levels.

Table 53: Female-to-Male Ratio in Education of Indian children

Female-to-Male Ratio in Education of Indian children		**Rate for**		
	Year	**Males**	**Females**	**Ratio**
Literacy rate, youth (% of ages 15-24)	2023	98.0	96.0	0.98
Primary School enrollment rate, (%)- gross	2023	112.6	111.4	0.99
Primary School enrollment rate, (%)- net	2013	91.6	93.0	1.02
Primary completion rate,(% of relevant age group)	2023	93.3	93.7	1.00
Progression to secondary school (%)	2017	91.0	91.6	1.01
School enrollment, secondary, (% gross)	2023	79.0	78.8	1.00
School enrollment, secondary, (% net)	2013	60.9	62.4	1.02
Lower secondary completion rate, (% of relevant age group)	2023	84.5	86.5	1.02
School enrollment, tertiary, (% gross)	2023	33.4	32.8	0.98

Data Source: World Development Indicators, December 2024

7.3 Public vs Private Schools

Many studies of Indian education (Section Error! Reference source not found.) have pointed to the difference in learning outcomes between Private and Public schools. This section examines the latest available data, to determine the current situation and changes if any. Due to differences in grading levels, learning levels, and categorization of school types, results cannot be directly compared across surveys. Each survey is assessed separately to understand the differences between public and private schooling.

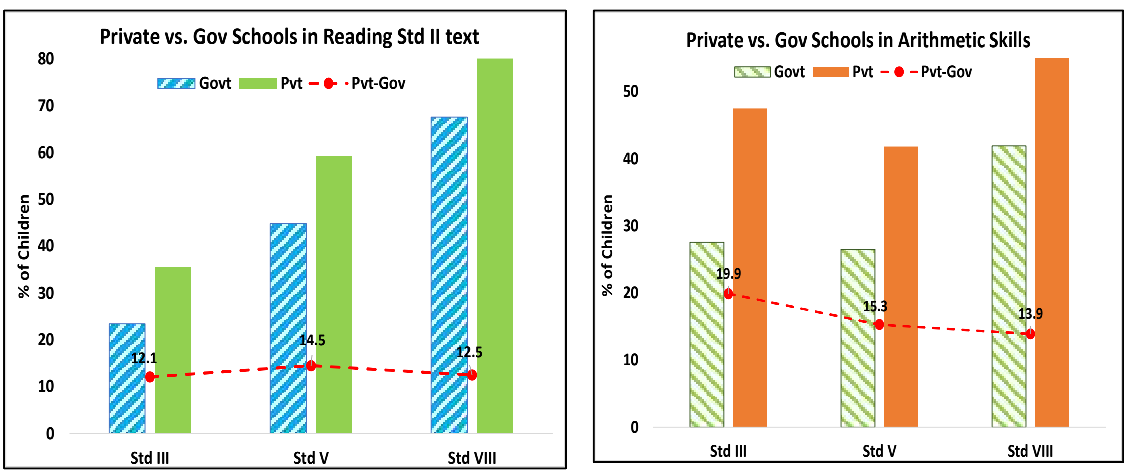
ASER (Rural) reports results for alternate years from 2010 to 2024, for government and private schools across Std III, V and VIII, assessing MRP using Std II level text and MAP using Subtraction (Std III) and Division (Std V & VIII). NAS 2017, provides data for Government and Government Aided schools for Class 3, 5, and 8. NAS 2021, contains data for State Government, Government Aided, Private, and Central Government schools. Similarly, PRS 2024 covers the same four categories but for Grades 3, 6, and 9.

Our results are consistent with earlier research that highlighted long-term gaps in quality and efficiency across school types. *Kingdon (1996)* found that private unaided schools deliver better learning outcomes at lower cost compared to government or private aided schools, due to stronger teacher accountability.

7.3.1 Annual Status of Education Report

In 2024, ASER data show that private school students performed better than their government school in both reading and arithmetic at all grade levels. The gap between the two school types is 12-15% in reading and slightly higher in arithmetic, especially at the lower grades (Figure 26). Std V is generally considered the end of primary school, while Std VIII is classified in India as the end of either upper primary or lower secondary. Std III of interest because it is the goal post for measuring foundational literacy and numeracy (FLN). While Minimum Learning Proficiency (MLP) improves as children move to higher grades, the difference between private and public schools continues, with private schools' minimum learning outcomes consistently better than those in public schools (Figure 26).

Figure 26: Performance of Students (%) by School Type



Source: Annual Status of Education Report, 2024

Inter-temporal data on reading and arithmetic proficiency in Std III, V & VIII, for government and private schools confirms that the private public performance gap has persisted from 2010 to 2024 (Table 54). The per cent of children with Minimum Reading Proficiency (MRP) and Minimum Arithmetic Proficiency (MAP) in private schools is consistently higher than that in government schools. The performance gap is wider in arithmetic than in reading, suggesting a relative greater deficiency in pedagogy and teachers' ability to teach arithmetic in government schools.

Table 54: Trend by School Type: 2010 - 2024

		Read Std2 text						Subtraction		Division				Sub	Division	
		Std 5		Std 8		Std 5	Std 8	Std 3		Std 5		Std 8		Std3	Std5	Std8
	Year	Govt	Pvt	Govt	Pvt	Diff Gov-Pvt		Gov	Pvt	Govt	Pvt	Govt	Pvt	Diff Gov-Pvt		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	**2010**	50.7	64.2	82.0	87.5	-13.5	-5.5	33.2	47.8	33.9	44.2	67.0	72.0	-14.6	-10.3	-5.0
2	**2012**	41.7	61.2	73.4	84.2	-19.5	-10.8	19.8	43.4	20.3	37.8	44.5	57.1	-23.6	-17.5	-12.6
3	**2014**	42.2	62.6	71.5	82.4	-20.4	-10.9	17.2	43.4	20.7	39.3	40.0	54.2	-26.2	-18.6	-14.2
4	**2016**	41.7	63.0	70.0	81.0	-21.3	-11.0	20.3	44.1	21.1	38.0	40.2	51.2	-23.8	-16.9	-11.0
5	**2018**	44.2	65.1	69.0	82.9	-20.9	-13.9	20.9	43.5	22.7	39.8	40.0	54.2	-22.6	-17.1	-14.2
6	**2022**	38.5	56.8	66.2	80.0	-18.3	-13.8	20.2	43.1	21.6	38.7	41.8	53.8	-22.9	-17.1	-12.0
7	**2024**	44.8	59.3	67.5	80.0	-14.5	-12.5	27.6	47.5	26.5	41.8	41.9	55.8	-19.9	-15.3	-13.9

Source: Annual Status of Education Reports, 2010-2024

Kingdon (2007) observed that India's educational progress, though remarkable in enrolment, still suffered from weak attendance and low learning levels. She warned that while private schools deliver better outcomes, this led to inequality, as access to private schooling is concentrated among better-off families. The learning gap in ASER 2024 confirms this challenge for Government schools. *Singh (2014)* finds that the public-private gap varies across locations: in rural areas, private schools have large positive effects on English and moderate effects on Math and Telugu for younger children, while in urban areas private schools do not outperform government schools.

Kingdon (2017) reviews the growth and role of private schools in India using DISE, NSS and ASER data, showing that more students are moving from government to private schools because private schools are more affordable and offer better value; most charge low fees and get slightly better learning results. They paid lower teacher salaries to sustain lower fee structures. Many small schools were struggling with strict RTE Act rules. Data collated from public domain by National Independent schools' alliance (NISA) on school closures due to RTE Act showed that as of October 2016, 9382 private schools had received closure threat. Another 7898 Private school actual closure notices, and further, 3332 private schools had actually closed down, based on data from only a few states.[56]

It is useful to view the inter-temporal trends in learning outcomes in private schools, as a benchmark of exogenous factors which may have affected the quality of teaching and learning. Consider first the outcomes in Minimum Reading Proficiency (MRP) as measured by the percent of children in private school who can read Std II text. The patten of change in both Std V and Std VIII is nonlinear (Table 54, columns 3 & 5). In primary school Std V), the sharp drop in performance till 2012, was steadily reversed from 2014 to 2018. It suffered a temporary

[56] Actual school closure from govt documents is available from only three States.

setback during the pandemic, but recovery followed as soon as pandemic was over. Govt. schools broadly follow this pattern with some hiccups. In Lower Secondary school (Std VIII), there is a decline between 2010 and 2016, an upward bump in 2018, and further decline in 2022. It is clear that a potential improvement in outcomes starting in 2017 was disturbed by the pandemic.

Consider next the outcomes in Minimum Arithmetic Ability (MAP) as measured by the percent of children in private school who can do Division. In both Primary (Std V) and Lower Secondary/Upper Primary, there is trend decline in MAP from 2010 to 2016 and then the same cycle of recovery from 2016 to 2018, pandemic setback till 2022 a then a recovery in 2024. FLN in private schools, as measured by the MAP (Subtract) in Std III, has a completely different pattern, falling sharply from 47.8% in 2010 to 2012, remaining between 43.1% -44.1% level till 2022, and then recovering sharply to 47.5%.

Some of these wobbles are likely the effect of the right to education Act (RTE) as learning outcomes declined across the board in both private and govt schools for Std III, V and VIII in both MRP and MAP (Table 55). After 2014 there was a recovery (except in Std VIII, MRP in Govt schools), but there was another setback during the pandemic in 2020 and 2021.

Table 55: Effect of RTE on Minimum Learning Proficiency (% of students)

Minimum Learning	Std 2 text						Subtraction			Division					
Standard	Std 5			Std 8			Std 3			Std 5			Std 8		
Year	Govt	Pvt	Diff	Govt	Pvt	Diff	Gov	Pvt	Diff	Govt	Pvt	Diff	Govt	Pvt	Diff
Year 2010	50.7	64.2	-13.5	82.0	87.5	-5.5	33.2	47.8	-14.6	33.9	44.2	-10.3	67.0	72.0	-5.0
Change 2014-2010	-8.5	-1.6	-6.9	-10.5	-5.1	-5.4	-16.0	-4.4	-11.6	-13.2	-4.9	-8.3	-27.0	-17.8	-9.2
Year 2014	42.2	62.6	-20.4	71.5	82.4	-10.9	17.2	43.4	-26.2	20.7	39.3	-18.6	40.0	54.2	-14.2
Change 2024-2014	2.6	-3.3	5.9	-4.0	-2.4	-1.6	10.4	4.1	6.3	5.8	2.5	3.3	1.9	1.6	0.3
Year 2024	44.8	59.3	-14.5	67.5	80.0	-12.5	27.6	47.5	-19.9	26.5	41.8	-15.3	41.9	55.8	-13.9

Source: Annual Status of Education Reports, 2016, 2014 & 2024; Note: Diff = Public - Private

These findings align with the evidence presented by *Kingdon and French (2010),* who analyzed ASER 2005-2007 data and found that private school children consistently performed better than those in government schools, even after controlling for family background. They noted that the difference was not just due to student characteristics but also due to school-level factors, such as better teaching practices, lower teacher absence, stronger management, and more effective accountability systems.

State governments need to pay much greater attention to improving the quality of education in Govt. schools by improving pedagogy, training teachers to teach at the right level and administrators to identify, student; earning levels and improvements through repeated testing, and back teachers to improve minimum learning outcomes.

7.3.2 National Achievement Surveys (NAS) 2021

National Achievement Survey (NAS) evaluates students learning outcomes across different classes, subjects, and school management types. Table 56, presents the percentage of students performing at or above the Proficient level for Classes 3 and 5, and at or above the Basic level for Classes 8 and 10, by school type. This 2021 survey contradicts the generally accepted results for the Class 3 level relevant for FLN, but is broadly in agreement with results from other surveys for Primary and Lower Secondary.

The last column of Table 56 shows the differences in share of students meeting Minimum Learning Proficiency in selected Classes. This shows that Public Schools marginally outperformed private schools in Class 3 in both Reading proficiency and Math proficiency in 2021. Equally surprising, the State Govt. schools also outperform Central Govt. schools by 1/3rd. They continued to do so in Math proficiency even Class 5, with State govts schools again beating Central Govt. schools. The results for Class 8 (Lower Secondary) and Class 10 (Upper Secondary) are similar to those of other surveys, with Private schools outperforming State Govt. schools. This is accompanied by a reversal of the relative performance of State Govt. and Central Govt. schools, with the latter now performing better. Because the 2021 results are strongly affected by the Pandemic, it is possible that Private Schools and Central Govt. schools were more generous in allowing teachers and students of Primary and Lower Secondary school, to absent themselves from school during the Pandemic, than State Govt schools.

Table 56: Students (%) by performance levels, 2021

Performance Level	**Proficient (incl advanced)**					
Class 3	**Total**	**State Gov.**	**Central Govt**	**Gov. aided**	**Private**	**StateGovt-Pvt**
Language	39	40	31	39	39	1
Mathematics	42	44	31	43	42	2
Class 5						
Language	42	41	43	39	44	-3
Mathematics	25	28	24	22	23	5
Class 8	**Basic (inc Proficient & Advanced)**					
Language	69	72	86	73	87	-15
Mathematics	73	70	80	65	78	-8
Class 10						
English	76	72	87	72	82	-10
Language (MIL)	47	42	55	41	53	-11
Mathematics	70	68	78	64	73	-5

Source: National Achievement Survey, 2021

The position with respect to average number of correct answers is very similar to that about minimum learning outcomes, with State govt. schools having higher levels of correct answers on average than private schools (last column of Table 57). Average scores were consistent with other surveys, with only one exception; Average scores in Math in Class 3 (Table 57) for State Govt schools were higher than in Private schools, with Central Govt schools performing worse than State Govt schools.

Table 57: Overall Performance of Students: Average Scores & Correct Answers

Class/Subjects	State Gov.	Central Govt	Gov. aided	Private	State-Pvt	State Gov.	Central Govt	Gov. aided	Private	State-Pvt
Class 3	*Average Scores*					*Correct Answers*				
Language	64.6	61.8	63.0	64.8	-0.2	63.0	56.0	62.0	62.0	1.0
Mathematics	61.0	57.8	58.8	60.6	0.4	58.0	52.0	57.0	57.0	1.0
Class 5										
Language	60.4	62.6	60.6	63.8	-3.4	55.0	56.0	53.0	57.0	-2.0
Mathematics	56.0	57.0	55.0	56.8	-0.8	45.0	44.0	42.0	43.0	2.0
Class 8										
Language	57.0	64.6	59.8	66.2	-9.2	48.0	59.0	48.0	60.0	-12.0
Mathematics	49.6	51.8	48.6	52.4	-2.8	36.0	39.0	31.0	38.0	-2.0
Class10										
Modern Indian Language	48.8	53.4	50.0	51.6	-2.8	39.0	45.0	40.0	43.0	-4.0
Mathematics	42.0	47.0	41.8	45.6	-3.6	32.0	36.0	29.0	34.0	-2.0
English	53.4	64.4	56.2	64.2	-10.8	39.0	54.0	37.0	50.0	-11.0

Source: National Achievement Survey, 2021; Note: Scores are out of 500, converted to percent.

7.3.3 PARAKH Rashtriya Sarvekshan (PRS) (2024)

PRS (2024) survey did not estimate the students meeting Minimum Learning Levels. It presented only the average scores in Grades 3, 6 and 9 by type of school. The difference in State Govt school performance relative to Private schools is very similar to that in the NAS survey of 2021, in FLN (Grade 3), Lower Secondary (Grade 6) and Upper Secondary (Grade 9), with private schools out-performing States in the latter two (last column, Table 58). As before Central schools perform worse than State Govt schools in primary, but better in secondary school in both subjects.

Table 58: Overall performance of students: Average scores (2024)

Grade/Subjects	State Gov	Central Gov	Gov. aided	Private	State-Pvt
Grade 3	*Average across Subjects*				
Language	64	60	63	64	0
Mathematics	61	57	58	60	1
Grade 6	*Average across Subjects*				
Language	52	69	52	60	-8
Mathematics	43	61	40	49	-6
Grade 9	*Average across Subjects*				
Language	48	69	49	59	-11
Mathematics	33	48	33	39	-6

Source: PARAKH Rashtriya Sarvekshan, 2024

7.4 Digital Access in Schools

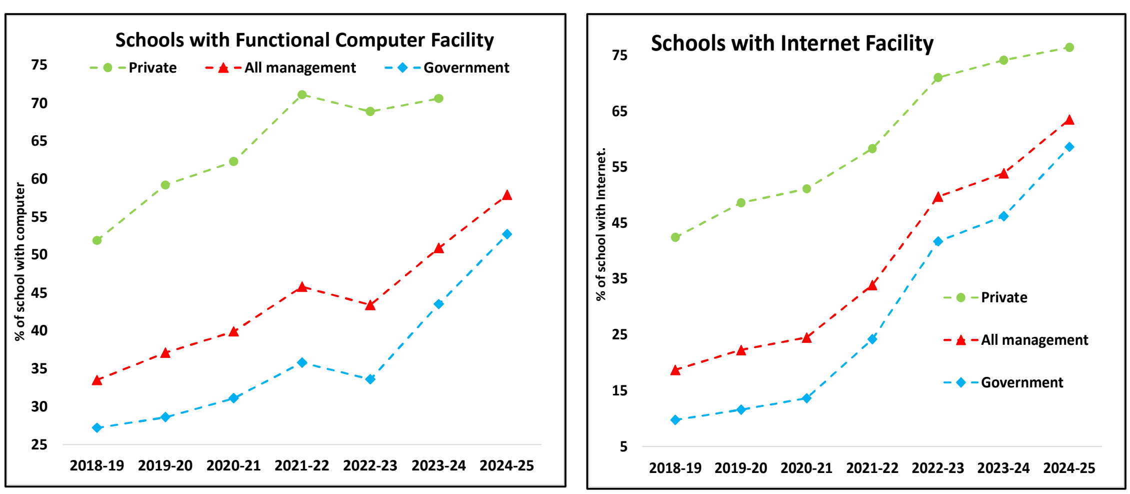
Virmani (2006) reviewed the social services provided by the Indian Govt, including education and health service, in the erstwhile Planning Commission, and highlighted the poor quality of basic education (1-8) and public health services (preventive & curative) in rural areas where 2/3rd of the population lived. He concluded that raising the quality of teaching and learning to US & EU levels would take decades using conventional methods of expanding the training & recruitment of high-quality teachers (doctors) and raise the teacher-pupil (doctor-patient) ratio. This was due to the fact that the rural population of India itself was larger than the population of the USA & the EU combined. He proposed the universal use of online (internet) resources, online teaching (diagnosis & prescription) and expert systems, to rapidly close the gap in teaching (medical treatment) quality.

Banerjee et al. (2007) evaluated two interventions in urban India: remedial education and computer-assisted learning. The remedial program hired young women (Bal-sakhis) to work separately with the low-performing students. This produced clear learning gains, showing that grouping students by ability and targeting instruction was more effective than reducing class size and was also cost-effective. The computer-based math program provided fourth graders with two hours of shared weekly computer time using educational games. This significantly improved scores, indicating that even limited, curriculum-linked technology can enhance learning outcomes.

Digital access in schools is gradually becoming a part of how students learn and teachers teach, though progress is patchy, because many teachers and administrators are new to the effective & appropriate use of digital tools in teaching and learning. Internet connection, computers, laptops, tablets, projectors, and smart classrooms indicate how much technology is used for learning. The presence of these tools also differs between government, aided, and private schools. Looking at changes over the years helps to understand where schools have improved and where digital gaps still remain.

Figure 27, presents the availability of functional computer facilities for pedagogical purpose has improved overall between 2018-19 and 2024-25.

Figure 27: Computer and Internet facility in Schools (% of Schools)



Source: Unified District Information System for Education Plus Note: Values for Private schools have been derived using the absolute scores of Government-aided and Private unaided schools.

Government schools nearly doubled their access from 27.2 % to 52.7%, showing steady expansion in computer facility. Private schools continued to lead with higher levels, rising from 51.9% to 72.3%. A dip around 2022-23 in both categories suggests some temporary decline, possibly due to pandemic, before recovery in later years.

Across all management types, the share increased from 33.5% to 57.9%, reflecting integration of computers in classroom learning.

From 2018-19 to 2024-25, the share of schools with non-functional computers increased from 1.0% to 5.6% overall. The share of schools with internet access (Figure 27, 2nd panel) has improved across all types between 2018-19 and 2024-25. Government schools saw a sharp rise from 9.8% to 58.6%, especially after 2020-21, indicating strong digital expansion in the post-pandemic years. Private schools consistently performed better, increasing from 42.4% to 76.4 % during the same period and maintaining a clear lead across the board. Overall, schools under all management types grows from 18.7% to 63.5%. The biggest hike occurred between 2020-21 and 2022-23, suggesting greater focus on digital infrastructure despite the pandemic.

Between 2021-22 and 2024-25 (Table 59), access to computer and digital initiatives in schools improved across all categories. The data show progress in both the number of functional digital devices and the percentage of schools equipped with ICT facilities.

Table 59: Computer and Digital Initiatives

School Type	**All**			**Government**			**Private**		
Percentage of schools,	**2024-25**	**2021-22**	**Change**	**2024-25**	**2021-22**	**Change**	**2024-25**	**2021-22**	**Change**
Desktops/ PC's	34.9	25.9	9.0	24.0	16.5	7.5	61.5	49.3	12.2
Laptop/Notebook	19.8	12.9	6.9	11.2	5.5	5.7	40.5	30.6	9.9
Tablets available	26.0	9.0	17.0	32.3	9.4	22.9	12.7	8.5	4.2
PC's: Teaching Learning	9.4	6.7	2.7	5.7	3.6	2.1	18.7	14.4	4.3
Projector Available	21.5	16.7	4.8	16.1	11.8	4.3	35.6	29.7	5.9
Smart Classroom	30.6	14.7	15.9	28.6	14.4	14.2	37.3	16.9	20.4
Mobile Phones for teaching	25.6	17.7	7.9	23.2	16.6	6.6	32.0	21.1	10.9
Digital Library	6.9	2.2	4.7	5.4	1.2	4.2	10.9	4.6	6.3

Source: Unified District Information System for Education Plus; Note: Values for Private schools have been derived using the absolute scores of Government-aided and Private unaided schools.

Overall, the share of schools with desktops or PCs rose by 9%, reaching about 35% in 2024-25. The increase was stronger in private schools (up by 12.2%) than in government schools (7.5%). Laptop and notebook availability also improved, rising by 6.9% overall, with private schools again showing larger growth. Tablet availability recorded one of the most significant increases, up 17%, driven mainly by government schools where access rose by nearly 23%. Smart classrooms also expanded rapidly across all school types up 15.9% overall, with private schools showing a large gain of more than 20%. This marks a strong shift toward technology-based teaching environments.

There are many ways to display audio-visual material, including TVs, computers and films/ projectors. Projector availability increased modestly by around 5% across all schools, while the proportion of schools using PCs for teaching and learning grew slightly by 2-4%. Access to mobile phones for teaching improved as well, rising by about 8%, showing wider use of simple digital tools at the classroom level. Digital library access, though still limited, from 2.2% to 6.9% overall with both government and private schools reporting steady growth.

To see how effectively these digital facilities have been used, we corelate learning outcome across States, with the availability of the digital facilities in States. There are three categories of facilities. (1) Facilities with a correlation of about 1/3rd, (2) Facilities with a correlation of around 0.2-0.25, and (3) facilities with low or negative correlation. The most promising seem to be computers and desktops for reading proficiency & lesser extent in arithmetic, in primary school, and Internet access for arithmetic proficiency in lower secondary school (Table 60). Interstate regressions however show an insignificant effect of these digital facilities on differences in learning outcomes (MRP & MAP) across States in std V.[57] One of the results from other studies is that teachers who cannot use digital facilities are not in a position to use them to teach their students. Teacher training must include training on how to use digital facilities to improve learning outcomes of their students.

Table 60: Effect of Computer and Digital Facilities on Learning: Cross-State correlation

India/State/ UT	Computer	Internet	Desktop/PCs	Smart Classroom	Laptop	Tablet	Mobile
India	57.9	63.5	34.9	30.6	19.8	26.0	25.6
Minimum Reading Proficiency (MRP)							
Correlation (ASER: Std V)	0.32	0.16	0.32	0.26	0.08	-0.05	0.03
Correlation (ASER: Std VIII)	0.22	0.04	0.29	0.13	0.11	-0.06	-0.15
Minimum Arithmetic Proficiency (MAP)							
Correlation (ASER: Std V)	0.08	0.12	0.07	0.09	-0.36	-0.06	-0.04
Correlation (ASER: Std VIII)	0.14	0.30	0.08	0.09	-0.24	0.03	0.01

Source: Unified District Information System for Education Plus, 2024-25

Muralidharan, Singh, and Ganimian (2019) evaluated *Mindspark*, a technology-aided instruction program delivered through after-school centers in Delhi for low-income public-school students. These centers ran six days a week for 90 minutes, combining self-paced software use with small-group support from teaching assistant. The study included 619 students from public middle schools, half of whom were randomly given vouchers for free access. The program was evaluated over 4.5 months using standardized paper-based tests, made comparable across grades using Item Response Theory (IRT). The students with access to Mindspark scored 0.37 SD higher in math and 0.23 SD higher in Hindi. Longer-term projections showing gains of 0.6 SD in math and 0.39 SD in Hindi with 90 days of attendance. The program benefited all students, with academically weaker students gaining the most, and improved competencies across arithmetic, word problems, fractions, geometry, pattern recognition, and Hindi comprehension skills.

Sailer et al. (2021) study of teachers in Bavaria, Germany, found that while a minimum level of technology is needed, the key factors for effective digital learning are actually *teachers' own digital skills* and their ability to teach with technology. In fact, teachers' skills were much more important than the amount of equipment available. He concludes that to unlock the benefits of digital learning especially more constructive, interactive, and problem-solving activities for

[57] The exception is, MAP (std 5) = 20.54 + 0.8 Internet - 0.66 Desktop/PC, with both coefficients significant at the 5% level. The negative coefficient on computers is hard to explain!

students' schools and education systems should focus on improving *teachers' training* and ongoing education, specifically on how to use digital tools in teaching.[58]

After the Central Govt introduced Atal Tinkering labs on an experimental basis, such labs have been set up in many high schools since 2021-22. The share of schools with tinkering labs rose sharply from 1.8% in 2021-22 to 11.1% in 2024-5. The increase was 10.2% in private schools, compared with a 7.1% rise in government schools (Table 61).

Table 61: Schools with Tinkering Labs (%)

School Type	2024-25	2021-22	Change
All Management	11.1	1.8	9.3
Government	7.8	0.7	7.1
Government Aided	9.2	4.1	5.1
Private Unaided	15.0	4.8	10.2
Others	5.6	0.4	5.2

Source: Unified District Information System for Education Plus

ICT lab facilities at the higher secondary level have also increased. The share of schools with ICT labs increased from 17.5% to 25.6%, while functional ICT labs rose from 14.0% to 21.2%, showing a positive change of more than 7%. Number of government schools with Upper Primary, Secondary, and Higher Secondary sections now have working ICT labs, reflecting ongoing efforts to expand digital infrastructure and promote hands-on learning environments through initiatives like Atal Tinkering Labs and ICT in Schools (Table 62).

Table 62: Schools having ICT Labs (%)

School Type	2024-25	2021-22	Change
ICT Labs			
Government	25.6	17.5	8.1
Government Aided	26.0	27.8	-1.8
ICT Labs (Functional)			
Government	21.2	14.0	7.2
Government Aided	21.2	21.0	0.2

Source: Unified District Information System for Education Plus

8. School Dropouts need Job Skills

Paradoxically the focus on secondary school access and retention has detracted attention from the need to provide basic job skills to our vast casual labor force. Primary and secondary school retention and dropout rates therefore are important for estimating the skilling requirement of children at different levels from primary, through lower secondary to upper secondary. Retention rates measure movement from a given level to the next higher level,

[58] This applies to all new materials, media and methods (3M).

while dropout rates measure those who have dropped out before completing a given level. Our analysis of minimum learning ability suggests, that the returns to further schooling may be zero or even negative, for those who do not meet minimum reading proficiency and/or minimum arithmetic proficiency in the class they are in. We must not only raise MRP and MAP, but also provide basic skills to those who have not acquired such proficiency.[59]

Table 63 shows retention rates from 2018-19 to 2024-25 across key school stages under both the earlier structure and the new NEP 2020 structure. Overall, retention has improved over time, particularly primary grades. In 2024-25, retention rates in Primary classes average 98.9% in Class 2 and 92.4 % in Class 5. In Secondary school the retention rate is 82.8% in Class 8 (Lower Secondary), 62.9% in Class 10 and 47.2% in Class 12 (Higher Secondary). These rates are at their peak for the past seven years for classes 5, 8 and 12 (Table 63).

Table 63: Retention Rate by level of education (%)

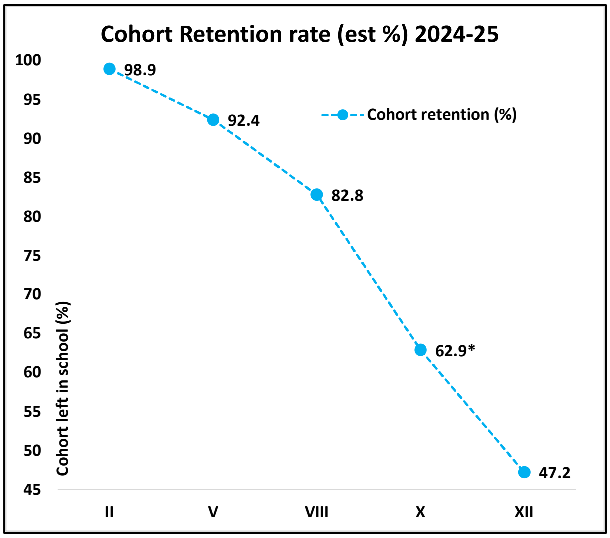
Retention rate relative to class 1 entrants					
	Class 2	Class 5	Class 8	Class 10	Class 12
2018-19		86.3	71.2	58.2	
2019-20		87.0	74.6	59.5	40.2
2020-21		95.3	80.9	61.5	42.8
2021-22		95.4	81.2	64.7	43.6
2022-23	92.1	90.9	75.8	65.5	44.1
2023-24	98.0	85.4	78.0	63.8	45.6
2024-25	98.9	92.4	82.8	62.9	47.2
Avg (3yr)	96.3	89.6	78.9	64.1	45.6

Source: Unified District Information System for Education (UDISE+ Reports 2018-2025)

The pattern of retention rates across classes for 2024-25 is depicted in Figure 28. The retention rate decreases slowly in Primary school (Classes 1-5), accelerates in Lower Secondary (Classes 6-8) and then declined sharply in Upper Secondary (Classes 9-12). The decline increases from 2.2% per year to 3.2% per year to 10.0% & 7.9% per year, respectively. These students must be given basic job skills in school itself, or in nearby skilling centers, related to local agriculture, industry, and services. NGOs can play an important role in supporting these students and connecting them with skilling opportunities.

[59] Primary-level retention rate increased from 53.4% in 2003-04 to 58.1% in 2004-05, and further to 71.0% in 2005-06. It dropped to 70.3% in 2006-07, before rising to 73.7% in 2007-08(DISE analytical Report 2007-08). Data is not available till 2017 after which UDISE+ started UDISE 2012-13 could not be found.

Figure 28: Retention Rate Across Grades (% cohort)



Source: UDISE+ 2024-25, based on NEP structure; Note* Class X – 62.9% estimated based on different data set.

Dropout rates have declined in primary and secondary school (Table 64)[60]. In Primary school (Classes 1-5), dropout rates declined sharply from 4.5% in 2018-19 to 0.3% in 2024-25, despite a temporary rise to 7.8% after two years of pandemic. The data for Classes 3-5 is only available for 3 years but follows the same intertemporal pattern as for Classes 1-3, with a post pandemic rise to 8.7% followed by decline to 2.3% in 2024-25.

In Lower Secondary/Upper Primary (Classes 6-8), dropout rates follow the same pattern as in Primary, declining from 4.7% in 2018-19 to 3.5% in 2024-25. The latter are however significantly more than the 0.3% in primary school. Dropout rates also declined in upper secondary school (Classes 9-10), from 17.9% in 2018-19 to 11.5% in 2024-25. For secondary school as a whole (Classes 9-12) the dropout rates are now 8.2% (Table 64). Dropout rates have therefore dropped significantly in Primary and Secondary school.

Table 64: Dropout Rate in Primary and Secondary school (%)

Level	Primary			Secondary	
Class	(1 to 5)	(3 to 5)	(6 to 8)	(9 to 10)	(9 to 12)
2018-19	4.5		4.7	17.9	
2019-20	1.5		2.6	16.1	
2020-21	0.8		1.9	14.6	
2021-22	1.5		3.0	12.6	
2022-23	7.8	8.7	8.1	16.4	13.8
2023-24	1.9	3.7	5.2	14.1	10.9
2024-25	0.3	2.3	3.5	11.5	8.2

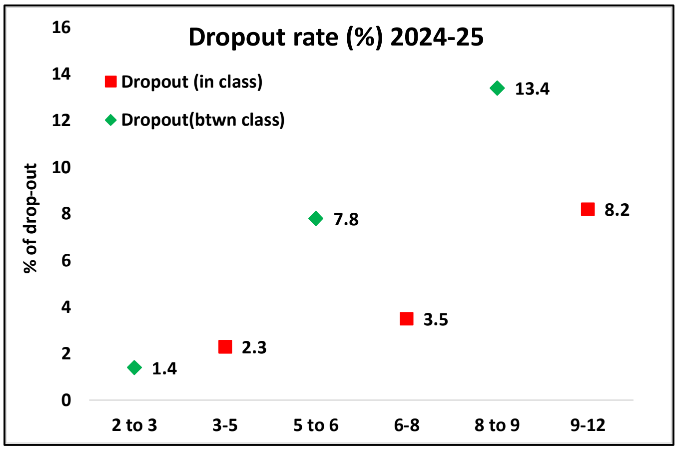
Source: UDISE+ Reports 2018-2025

[60] Dropout rate is defined as proportion of pupil 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. Promotion Rate + Repetition Rate + Dropout Rate = 100

Figure 29 shows the drop rates between classes calculated from the retention rates and the within school dropout rates. Broadly, the drop-out rates between Primary and Lower Secondary school and between the latter and Upper Secondary are higher than the drop-out rates within the Lower and Upper secondary schools.

The school and skilling system must both take account to these dropout rates. Providing basic job skills to the drop outs is as if not more important than efforts to keep them in school. Efforts to improve the percent of children with minimum learning proficiency, must go hand in hand with provision of job skill to children who drop out before completing Class 10.

Figure 29: Class-wise Dropout Rates: In-Class & Between-Class



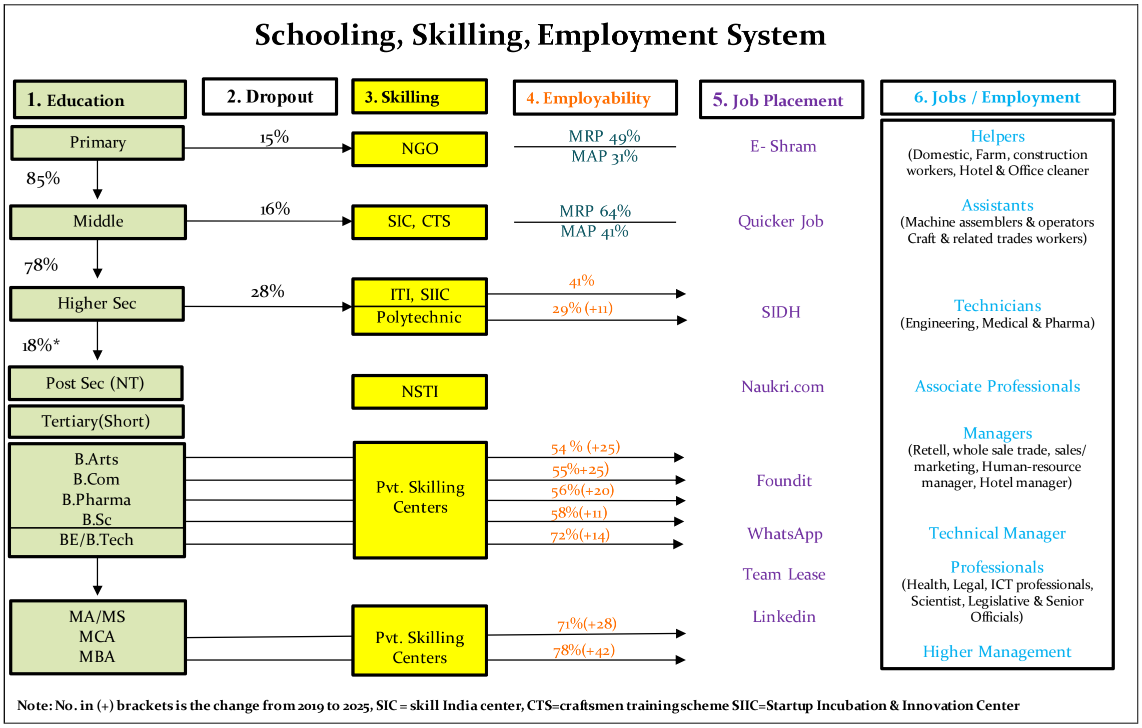
Source: UDISE+ 2024-25, based on NEP structure.
Dropout between class is calculated using Transition rate from UDISE+ (2024-25).

9. Employment Eco-system: Skills for Employability

Figure 3 depicted the education, skilling and employment systems as three pyramids which must be linked to each other at every level (bottom, middle and top), to produce efficient outcomes. Compared to the Education system, built and evolved over 75 years the skilling system is very fragmented and highly variable in quality and efficiency. This is partly due to the fact that the economy consists of a large informal sector, with 57.7% of the workers self-employed and another 19% working as casual laborer. Even within the 23.2% defined as regular workers, many of the them are employed in households or single worker enterprises, so that the top of the employment pyramid consists of about 10% of the labor force.[61] To some extent private markets have developed to train and place potentially skilled workers to high wage jobs in companies, through placement and other services.

[61] Our 34.4% of the regular workers have Bachelor of higher degree, yielding 8% of workers. We add another t 2% to account for tertiary educated and/or highly skilled self-employed workers, like consultants.

Figure 30: Employment Ecosystem: Education, Skilling, Placement & Jobs



Note: Nos in (brackets) is change (2019 to 2025).

SIC = Skill India Center, CTS= Craftsmen Training Scheme, SIIC= Startup Incubation & Innovation Center,

The rest of the system is a complex, fragmented, and nascent one in which the Central Government, the State Govts, NGOs and MSME service companies, have a critical role.

Figure 30 is an attempt to show the complexity of the Indian employment ecosystem, linking schooling, job skilling, placement and employment. This figure can be viewed as an inversion of Figure 3, with the lowest levels on top (instead of at the bottom), with pyramids converted to cylinders for clarity of writing, and the interlinkages between the pyramids/cylinders spelt out in greater detail.

The first column of Figure 30 represents the different levels of the education system from Primary to Masters, which was depicted in Figure 3 as the education pyramid. The third column represents the different levels of the skilling system, represented in Figure 3 as the skilling pyramid, arranged from lowest to highest level of skilling. Some of these layers do not exist or exist in very rudimentary form (e.g., NGOs at the lowest level), which should be viewed as aspirational, rather than existing today. The second column of Figure 30 links the two pyramids through two parameters; School dropouts and job/skill counselling, some of which is aspirational and may not presently exist. Linking the education and skilling system at the lower levels of education is the dropout rate discussed in the previous section. The percentages shown at the primary middle and higher secondary level, represent rough estimates of the percentage of children who leave the education system and enter the job market. All these need to be channeled into the job skilling system, for provision different basic skills but this is not happening today.

The sixth column of Figure 30 consist of different jobs from the minimum wage to the high wage ones, representing a more detailed version of the employment pyramid in Figure 3. The link between the skilling pyramid/system and employment pyramid/system is divided into two columns. Column four of Figure 30, headed employability, which contains estimates of the "employability" of the those with higher secondary and tertiary education and semi-skilled (orange). At the primary and lower middle school educated, the estimates are based on Minimum Reading Proficiency and Minimum Arithmetic Proficiency. Column five of Figure 30, headed job placement, is part of the job market, consisting of placement agencies and job portals. While private platforms like Quikr Jobs, Naukri.com, Foundit, Team Lease, and LinkedIn are reasonably efficient in connecting skills to jobs at the high-end. EkStep foundations Government portals such as NCS, SIDH, and e-Shram are trying to connect the middle and low end of educated-skilled to jobs, they remain largely aspirational.

Empirical research in developed countries finds that Vocational and Technical education (VTE) graduates have faster transition to employment compared to general education graduates [*Eichorst et al (2015), OECD (2021*] and face lower unemployment rates in countries with strong vocational systems [*Deissenger et al (2015)*]. They typically earn higher initial wages than those with general education, due to job-specific readiness, but the gap closes over time. [*Hanushek al (2017)*]. This is not however true in developing countries, including in India, because poorly linked training institutions face skill mismatch and training content lags behind evolving industrial needs [(*King & Palmer (2010), ILO (2020)*]. Job-skilling in India is therefore an even greater challenge than school education.

Virmani (2021, 2024) recommended greater use of expert systems (e.g. E-Guru for skilling) and AI, to bridge information asymmetries and integrate fragmented skill markets. Such an expert system can advise and coordinate between skill seekers and skill providers, and between employers and potential employees. EkStep foundation has created (2025) an "Open network for Employment and Skilling Transformation" (ONEST), on which it has built the BlueDot AI initiative bridge the local information gaps. Blue Dot accelerator and Bharat10M accelerators are designed to promote and support startups, which can narrow the knowledge gaps in the employment market (supply and demand for employment).

10. Skill for India, Skill for the World

In many developing countries, access to education at different levels was thought to be the primary challenge. It was assumed that all kinds of good outcomes would follow automatically from school enrolment. Later this automaticity was modified and attributed to school completion. Quality of education was almost an afterthought, but "Job skilling" is perhaps an addendum or add on. In developed countries, markets exist to meet demand for skills. In India markets for skills exist at the upper end of the skilling pyramid (Figure 3), but are incomplete at medium-high level and for the semi-skilled, and virtually non-existent for basic & low-level skills. Thus, in a country in which almost 58% of workers are self-employed ("Nano-enterprises"), a large fraction of micro enterprises are one worker enterprises and almost 20% of workers are casual workers, government (Central, State and Local) have to play a big role in estimating current and future demand for skills, ensuring that institutions for generating and supplying these skills exist, and helping match supply and demand.

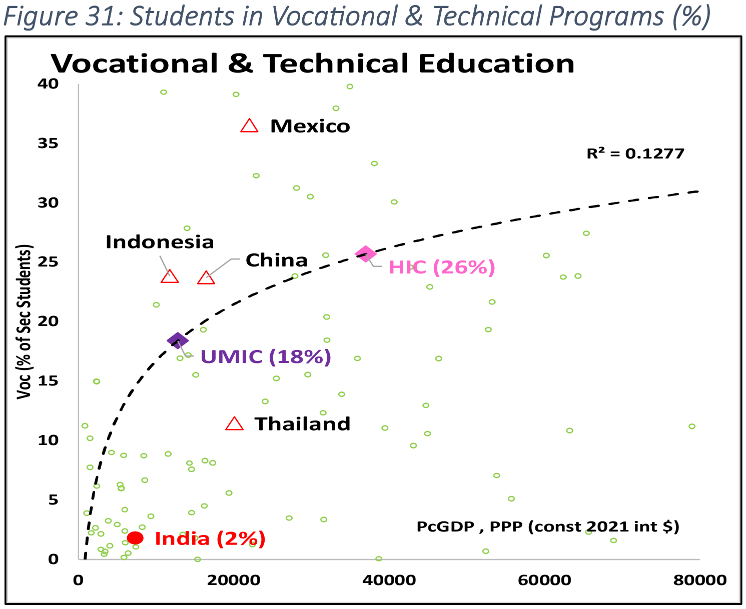
The Skill India Mission was launched in 2015, aims to skill, re-skill, and up-skill individuals through various training programs conducted in skill development centers and institutes under schemes such as PMKVY, JSS, NAPS, and CTS. Under PMKVY around 1.64 crore individuals have been trained and 1.29 crore certified; Under JSS scheme 31.4 lakh trained and 31.0 lakh certified; Under NAPS 40.8 lakh trained and 6.8 lakh certified; Under CTS (ITIs) 92.7 lakh enrolled with 55.9 lakh certified.

The next sub-section 10.1 gives some facts about India's Vocational Education and Training system, and compares India's performance globally. Sub-sections 10.2 and 10.3 survey the skilling institutions set up by the Central and State Govts. Sub-section 10.4 compares the skilling performance of Indian firms with other countries. Sub-section gives an overview of the skilling & employment portals, career conceding and placement agencies

10.1 Vocational Education: International Comparison

International data on Vocational Education and Training (VET) allows us to compare the performance of India, with other countries, at the school level. The share of secondary students enrolled in vocational and technical (VT) programs was 1.8% in 2017, well below the expected/benchmark level at its per capita GDP of $7327 in 2017 (Figure 31).

Figure 31: Students in Vocational & Technical Programs (%)



Source: World Development Indicators, December 2024

This was a bigger gap than seen in any educational attainment indicator in India. And larger gap than for Thailand, which was also well below its benchmark level. Indonesia, China and Mexico were above their expected/benchmark levels. We need to note however that the Rsquare of the benchmarking equation is quite low.[62]

According to NEP 2020, less than 5% of the 19-24 age group had received formal vocational education (Twelfth Five-Year Plan, 2012-2017), primarily because vocational education in the past focused largely on Grades 11-12 and on dropouts in Grade 8 and upwards. In response to the limited participation in vocational education, it proposed early exposure to vocational learning. NEP recommends that all students should undertake a hands-on experience during Grades 6-8, providing practical experience in vocational crafts aligned with local skill needs. It suggests that similar internship opportunities be made available to students throughout Grades 6-12, to learn vocational subjects. Online options should also be used.

The base for India in Figure 31 is 2017, therefore we estimate the percent of students in VET programs for 2023 (3.3%) assuming that the gap remains the same (-)12.8% points. This gap is then added to the expected/benchmark (16.1%) for India at its 2023 per capita GDP. Based on this we estimate the improvement needed to reach UMIC & HIC benchmarks. This shows that we need to improve percentage of students enrolled in vocational-technical programs by over 15% points to reach the UMIC benchmark of 18.4% and by ~22.4% points to reach the HIC benchmark of 25.7% for HIC. This is one of the biggest challenges facing job skilling in India today. Vocational and technical education must be expanded at all levels to improve workforce skills and employability.

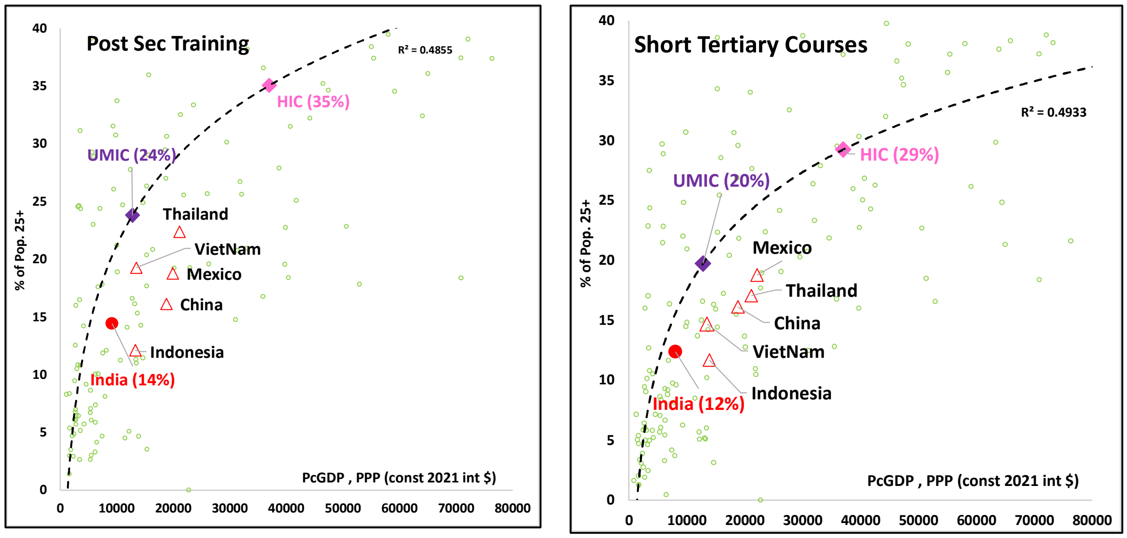
NEP 2020 aims to have 50% of learners through the school and higher education system exposed to vocational education. A clear action plan with targets and timelines was to be developed. The policy further states that focus areas for vocational education will be chosen based on skills gap analysis and mapping of local opportunities. To oversee and coordinate this effort, the Ministry of Human Resource Development (MHRD) would constitute a National Committee for the Integration of Vocational Education (NCIVE), consisting of experts in vocational education and representatives from across Ministries, in collaboration with industry.

International data is also available on VET courses at the post-secondary (non-tertiary) level. India's post-secondary training at 14.4%, 5.8 percent points below it's expected/benchmark of 20.3% for its per capita GDP in 2023 (Figure 32). This is better than its secondary enrolment in Vocational and technical training programs. [63] It is also comparable to the performance of Indonesia (-12.1%), Vietnam (-5.1%), China (-11.8%), Mexico (-9.8%) and Thailand (-6.8%), whose performance gap was worse than India's. India however needs to increase the per cent of students in post-secondar training programs by 9.4% points in 5 years to reach the UMIC (2030) benchmark and by 20.6% points in 25 years to reach the HIC (2050) benchmark.

[62] Secondary education, general pupils- Secondary general pupils are the number of secondary students enrolled in general education programs, including teacher training. Secondary vocational pupils: Number of secondary students enrolled in technical and vocational education programs, including teacher training. (Secondary school students enrolled in vocational -technical program =100* Secondary vocational pupils/ Secondary education, general pupils).

[63] The % of population ages 25 and over that attained or completed post-secondary non-tertiary education.

Figure 32: Adults with Post-Secondary & Short Cycle (tertiary) training (% of pop 25+)



Source: World Development Indicators, December 2024

India's short-cycle tertiary share was 3.2% points below the expected/benchmark level of 15.6% in 2021 (Figure 32, 2nd panel), based on its per capita GDP of 2021.[64] India's potential competitors had a larger performance gap on this indicator: Vietnam (-5.5%), Indonesia (-8.8%), China (-7.1%), Thailand (-7.2%) and Mexico (-5.9%) were also below their expected/benchmark levels.

The number for India in Figure 32 (2nd panel) is 2021. Therefore, we estimate the value for 2023 (13.5%) assuming that the gap remains the same (-3.2% points). This gap is then added to the expected/benchmark (16.7%) for India at its 2023 per capita GDP. Based on this we estimate the improvement needed to reach UMIC & HIC benchmarks. This shows that we need to improve short-cycle tertiary share by about 6.2% points to reach the UMIC benchmark of 19.7% and by ~15.7% points to reach the HIC benchmark of 29.2% for HIC.

NEP 2020 proposed to integrate vocational education into the educational offerings of all secondary schools, in a phased manner over the next decade. To support this integration, the policy proposed collaboration between secondary schools and Industrial Training Institutes (ITIs), polytechnics, and local industry, along with the development of shared skill laboratories to strengthen practical training infrastructure.

10.2 Schemes to improve Job skills

The Central Govt has introduced many schemes to improve the Indian skilling system. **Jan Shikshan Sansthan** (JSS) provides technical and employability skills (NSQF level 2 & 3) to non-literates, neo-literates, and school dropouts up to 12th standard[65]. **Pradhan Mantri Kaushal Vikas Yojana** (PMKVY) (2015) offers Short-Term Training (STT) for school or college dropouts

[64] The % of population ages 25 and over that attained or completed short-cycle tertiary education.

[65] Jan Shikshan Sansthan (JSS), the Shramik Vidyapeeth (SVP), was launched in 1967. The scheme was officially renamed Jan Shikshan Sansthan in the year 2000.

and unemployed youth, focusing on soft skills, entrepreneurship, and financial & digital literacy. It also includes Recognition of Prior Learning (**RPL**), where individuals are assessed and certified based on their prior learning experience. Under Special Projects, training is provided in specific areas and within government or corporate premises.

Under **PMKVY** around 1.3Cr trained, 1.1Cr certified, and 21 lakh placed.[66] 3,300 schools, colleges, and higher education institutions covered under PMKVY, benefiting 4.26 lakh candidates[67].PMKVY 4.0 (2022-26) related to Industry 4.0, AI, robotics, mechatronics, IoT, and drones. **Deen Dayal Upadhyaya Grameen Kaushalya Yojana** (DDU-GKY) launched in 2014, provides placement-linked skill training (3-12 months) to rural youth, covering over 250 trades across sectors such as retail, hospitality, health, construction, automotive, leather, electrical, plumbing, and gems & jewelry.

Under the vision of NEP (2020), 1,200 vocational skill labs were set up across 400 Navodaya Vidyalayas and 200 EMRS schools. In Sikkim, 246 Livelihood Schools offer three-month training programs for educated unemployed youth in organic farming. In secondary and senior secondary schools there is hands-on, life-skill-oriented training. These are supported by Human Resource Development Department (HRDD) grants, tools, seeds, composting materials, and technical support from line departments.

The Craftsmen Training Scheme (CTS) (1950), is a vocational training program aimed at ensuring a supply of skilled workers for industry by providing employable skills to youth through systematic training. CTS courses offered through Government and Private it is, NSQF-compliant courses of 6 months to 2 years duration across 169 trades, classified into 86 engineering trades (Technical, mechanical, electrical, electronics, manufacturing, construction, and industrial), 78 non-engineering trades (IT-enabled services, design, office administration, healthcare, hospitality, tourism, agriculture, retail, and social services), and 5 trades for Persons with Disabilities Currently, CTS operates through 14,643 ITIs (3,331 government and 11,312 private), enrolling about 26.58 lakh trainees in 1-year and 2-year courses across 169 NSQF-compliant trades, with the objective of meeting current and future skilled manpower requirements of the economy.

PM Vishwakarma launched in 2023, supports artisans and craftspeople through certificate recognition, skill upgradation (basic and advanced training), toolkit incentives, credit and marketing support, and incentives for digital transactions. About 12.3 lakh candidates have enrolled for basic training, and 12 lakhs have completed it.

SAMARTH launched in 2017, Scheme for Capacity Building in the Textiles Sector provides entry level training, upskilling, and reskilling, for jobs in textiles and related sectors.

Several schemes have been introduced by the Center and states to improve the quality of post- secondary skilling. One of these is **Future Skills Prime** (2018) offers industry-backed

[66] Source: Legacy PMKVY Dashboard: All

[67] Human Capital for Viskit Bharat, "Skilling: Future Ready Workforce", Fifth National CS Conference.

courses and certifications to build in-demand digital skills, aligned with National Occupational Standards (NOS) and National Skills Qualifications Framework (NSQF). States have also created new institutions to provide post-secondary skills. These are given in Section 10.3.

10.3 Skilling Institutions

India requires a strong network of skilling institutions to address the growing challenge of unemployability among youth, especially those who drop out of school or lack basic education. A large section of young people enters the labor market without adequate skills, making them unprepared for available jobs. Skilling institutions play a crucial role in filling this gap by providing structured, job-oriented training. A strong institutional framework is therefore essential to improve employability, create a steady pipeline of skilled workers, and link learning with livelihood.

10.3.1 Ministry of Skill Development & Entrepreneurship

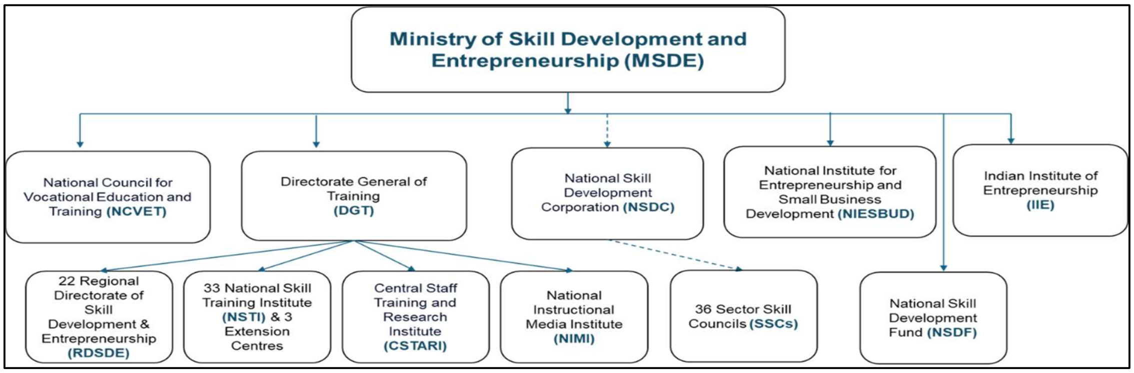
The Ministry of Skill Development and Entrepreneurship (MSDE) (2014) coordinates all skill development efforts in India. It works to reduce the gap between the demand and supply of skilled workers and build a strong system for vocational and technical training. The Ministry focuses on upgrading existing skills and developing new ones to prepare youth for current and future jobs.

MSDE oversees India's national skilling system through a set of specialized institutions (Figure 33). The National Council for Vocational Education and Training (**NCVET**) functions as the regulator for unified regulator for skills training approving qualifications, recognizing awarding and assessment bodies, monitoring implementation, and ensuring grievance redressal. The Directorate General of Training (DGT) oversees Industrial Training Institutes (ITIs), National Skill Training Institutes (NSTIs) and is the apex organization for development and coordination of programs for vocational training institutes.

The National Skill Development Corporation (NSDC) acts as an implementer for various skilling schemes of MSDE and other Ministries/Departments, such as, PMKVY, NAPS, PM Vishwakarma, etc. and the National Skill Development Fund (NSDF) for raising funds from Government and Non-Government sectors for skill development in the country. The Indian Institute of Entrepreneurship (IIE) provide training, research, and consultancy services in the field of SMEs, with a special focus on women entrepreneurship development. The National Instructional Media Institute (NIMI) develops instructional material for vocational training and digital content; ongoing reforms within the skill ecosystem highlight the need to expand such material in video and visual formats to support pedagogy practices.

Together, these institutions create the administrative, regulatory and industry-linked framework that anchors MSDE's skilling initiatives.

Figure 33: Institutional Framework of MSDE



Source: MSDE, Review of Output Outcome Monitoring Framework (OOMF), 2024-25

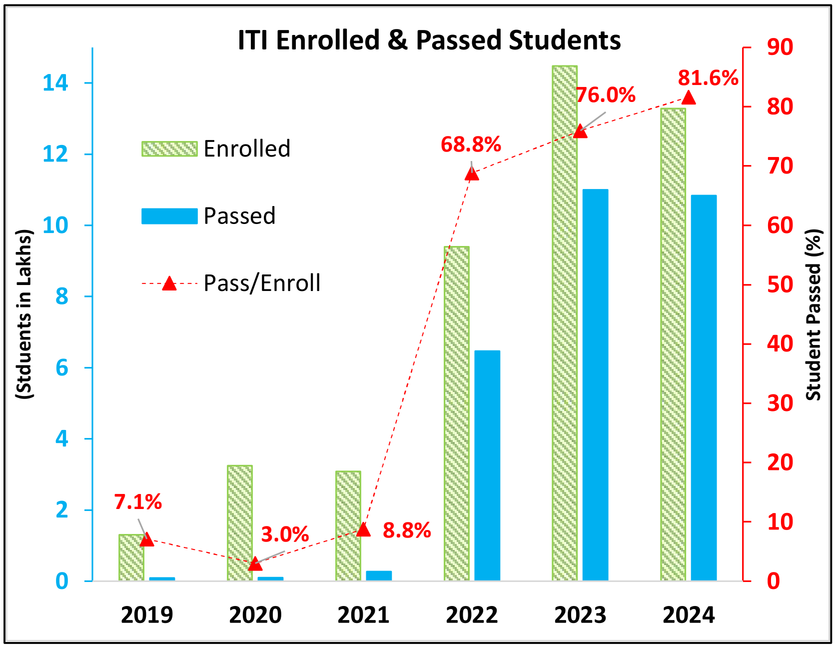
Skill India Centre, are located in every State and UT. They offer short-term, NSQF-aligned training across multiple interest areas such as IT-ITES, electronics, apparel and textiles, beauty and wellness, healthcare, construction, automotive, telecom, logistics, tourism and hospitality, agriculture, retail, green jobs, BFSI, media and entertainment, power, capital goods, and aerospace and aviation. Courses are job-oriented and include roles like data entry operator, electrician, plumber, healthcare aide, beautician, sewing machine operator, junior software developer, solar PV installer, automotive service technician, retail sales associate, office assistant, and related entry- to mid-level occupations aligned with local labor demand.

Industrial Training Institutes (ITIs), and Polytechnics are under the administrative and financial control of State Governments or Union Territory Administrations.

10.3.2 Industrial Training Institutes (ITIs)

The capacity of Industrial Training Institutes (ITIs) in India has expanded over time, but outcomes in terms of student completion have varied across years. The number of students enrolled increased from 1.3 lakh in 2019 to 14.5 lakh in 2023 and slightly to 13.3 lakh in 2024 (Figure 34). The number of students passing also rose from 0.1 lakh in 2019 to 6.5 lakh in 2022, reaching 11.0 lakh in 2023 and 10.8 lakh in 2024. As a result, the pass rate improved from 7.1% in 2019 to 81.6% in 2024 (Figure 34). These outcomes must be interpreted cautiously, as student enrolment and completion were affected by the pandemic during 2020 and 2021. The sharp increase in enrolment and pass rates between 2019 and 2022 may be due to data errors. These figures are currently under verification and may be subject to revision.

Figure 34: Students in Industrial Training Institutes (ITI): Enrolled & Passed



Source: ITI Public Dashboard, Last Updated on 02/03/2026

Table 65 provides a breakdown of students by type of institution, course duration, and location from 2020 to 2024. A notable pattern is the continued dominance of private ITIs in enrolment, though government ITIs has also shown moderate growth (Table 65). The number of students enrolled in Government ITIs increased from 1.2 lakh in 2020 to 5.8 lakh in 2024, with an annual growth rate of 48% likely due to lower fees and better recognition of certificates.

Table 65: Students enrolled in ITI by Institution type & course duration

All India	Number of Students (in lakhs)					Share	CAGR(%)
	2020	2021	2022	2023	2024	2024	2024/2020
Institute Type							
Government	1.2	1.1	3.5	6.6	5.8	0.4	48
Private	2.0	2.0	5.9	7.9	7.5	0.6	38
Course Duration							
6 months	0.0	0.0	0.0	0.0	0.0	0.0	45
1 year	1.1	0.9	0.9	4.5	4.1	0.3	38
2 year	2.1	2.2	8.5	9.9	9.2	0.7	44
Location							
Urban	1.0	0.9	2.8	4.4	3.9	0.3	41
Rural	2.3	2.2	6.6	10.1	9.3	0.7	42
Total	**3.2**	**3.1**	**9.4**	**14.5**	**13.3**		

Source: ITI Public Dashboard, Last Updated on 02/03/2026, Note: Data for 2019 has not been included, as the figures are not comparable with subsequent years and show inconsistencies.

There was also a significant shift from long duration to short duration courses. The two-year courses continue to account for the largest share of students, with enrolment increasing from 2.1 lakh in 2020 to 9.2 lakh in 2024.

Enrolment in one-year courses also increased from 1.1 lakh to 4.1 lakh over the same period. Short duration six-month courses continue to have small share of total enrolments, though they have shown rapid growth over time, with an annual growth rate of about 45%. In terms of location, ITIs continue to serve a predominantly rural population. Enrolment in rural areas increased from 2.3 lakh in 2020 to 9.3 lakh in 2024, 70% of total enrolments, while urban areas accounted for the remaining 30% (Table 65).

Table 66 shows a breakdown of enrolments by stream (engineering and non-engineering) and type of occupation (industrial/service and grey/white-collar). Students enrolled in Engineering trades continue to dominate ITI enrolment, 85% of total students in 2024, while non-engineering trades account for the remaining 15%.

Enrolment in engineering trades increased from 2.6 lakh in 2020 to 11.2 lakh in 2024, reflecting strong growth over time. Most students within the engineering stream are enrolled in industrial work trades. Enrolment in Industrial work trades increased from 2.5 lakh in 2020 to 10.8 lakh in 2024 (Table 66). These trades are related to mining, manufacturing, and construction, as well as repair and maintenance activities in both domestic and commercial spaces. They include electrician, lift mechanic, painter, and refrigeration and air conditioning technician. Grey/white-collar engineering trades, which typically include office-based technical and support roles such as laboratory assistant, draughtsman, or surveyor, continue to account for a small share of enrolments, though they have also grown over time (47%).

Table 66: ITI enrollment in engineering & non-engineering streams (%)

All India	**Number of Students (in lakhs)**					**Share**	**CAGR(%)**
Stream	**2020**	**2021**	**2022**	**2023**	**2024**	**2024**	**2024/2020**
Engineering	2.6	2.6	8.9	12.1	11.2	0.85	44
Industrial work	2.5	2.5	8.5	11.7	10.8	0.97	44
Grey/White collar	0.1	0.1	0.3	0.4	0.4	0.03	47
Non-Engineering	0.6	0.5	0.5	2.3	2.0	0.15	35
Service work	0.4	0.3	0.3	1.1	0.9	0.46	27
Grey/White collar	0.3	0.2	0.2	1.2	1.1	0.54	43
Total	**3.2**	**3.1**	**9.4**	**14.5**	**13.2**		

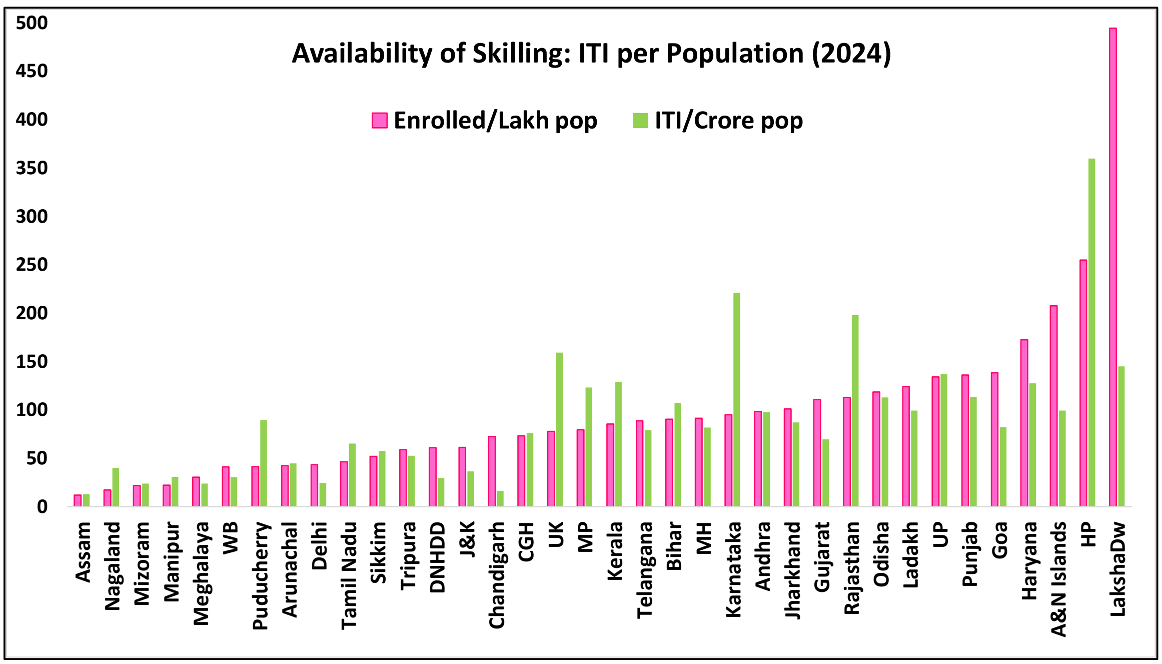
Source: ITI Public Dashboard, Last Updated on 02/03/2026, Note: Data for 2019 has not been included, as the figures are not comparable with subsequent years and show inconsistencies.

Non-engineering trades account for a smaller share of total enrolments, increasing from 0.6 lakh in 2020 to 2.3 lakh in 2023 to 2.0 lakh in 2024 (Table 66). Within this stream, enrolment in service work trades increased from 0.4 lakh in 2020 to 1.1 lakh in 2023, slightly to 0.9 lakh in 2024. These include trades such as artisans using advanced tools, bamboo and wood workers, sewing technology, and weaving technicians. Grey/white-collar non-engineering trades include personal and service-sector occupations such as spa therapy, tourist guide, radiology technician, photographer, human resource assistant, interior designer, and data entry operator, and have shown strong growth over time with an annual growth rate of about 43% as compare to Service work (27%).

Figure 35 gives a comparative analysis of the States in terms of the availability of ITIs and enrolment in ITIs for the latest available year (2024). For interstate comparison, we divide the number of ITIs by the population of the State in crore, and the number of students enrolled by the State's population in lakhs, and rank them by the latter.

Enrolment is highest in Lakshadweep (494 students per lakh population), followed by Himachal Pradesh (255), Andaman & Nicobar Islands (207), Haryana (172), and Goa (138). Among the larger states, Uttar Pradesh (134), Punjab (136), and Odisha (118) also record relatively high enrolment levels per capita. In contrast, Assam (12), Nagaland (17), Mizoram (22), and Manipur (22) record low enrolment per capita, indicating relatively limited participation in ITI training.

Figure 35: Students enrolled in ITIs across States & UTs



Source: ITI Public Dashboard, Last Updated on 03/03/2026 and PIB, "Operational of Industrial Training Institute", 5/08/2024

A comparison of enrolment levels with the number of ITIs also reveals significant variation across states. Some states such as Himachal Pradesh, Rajasthan, Karnataka and Uttarakhand have a relatively large number of ITIs in relation to their enrolment levels. This suggests that these states may need to consider consolidation and better utilization of existing institutions rather than further expansion.

On the other hand, states such as Puducherry, Kerala, Telangana, and Madhya Pradesh also show a disproportionate gap between enrolment levels and the number of it is (Figure 35).

Overall, the national average stands at about 95 students enrolled per lakh population and 107 ITIs per crore population. The wide variation between states indicates uneven access to ITI training opportunities across the country.

At present, there are 14,615 ITI functioning across India, comprising 3,316 Government and 11,299 Private ITIs.[68] During the last five years (2020-2024), a total of 433 new ITIs was established: 146 Government and 287 Private. Among states, West Bengal (38 Government, 11 Private) and Odisha (24 Government) recorded the highest number of new government ITIs. In the private side, expansion was led by Uttar Pradesh (101 Private, 35% share) and Maharashtra (54 Private, 19% share), followed by Bihar (46 Private, 16% share).

Within the skilling ecosystem, Industrial Training Institutes (ITIs) play a central role in providing vocational and technical training. However, despite their expansion, there remains a need to strengthen the quality, relevance, and infrastructure of ITIs to meet industry requirements. Several initiatives have been introduced to improve institutional capacity and align training with labor market demand.

10.3.3 Schemes for Upgrading Skilling Infrastructure

A number of measures have been taken to improve the institutional infrastructure and pedagogy of medium level skills and skills for semi-skilled jobs:

SANKALP (2018): Skill Acquisition and Knowledge Awareness for Livelihood Promotion, is a World Bank supported initiative aimed at improving short-term skill training by strengthening institutional frameworks and delivery systems.

PMSETU: Pradhan Mantri Skilling and Employability Transformation through Upgraded ITIs, A CSS with investment 60Cr to upgrade 1,000 Government ITIs in a hub-and-spoke model (200 hubs and 800 spokes). The scheme includes advanced infrastructure, modern trades, digital learning systems, innovation centers, training-of-trainers facilities, production units, and placement services, support from the World Bank and Asian Development Bank.

STRIVE (Skills Strengthening for Industrial Value Enhancement), World Bank assisted project aimed at improving the relevance and efficiency of skills training through ITIs and apprenticeships. Under the project, 500 ITIs (467 Government and 33 Private) were upgraded with improved infrastructure, labs, equipment, and tools.

State govts have also made efforts to fill gaps in there skilling system by introducing new institutions. Examples of these are given below:

Honda Vocational Training Institute (HVTI) in collaboration with the “Automotive Skill Development Council (ASDC)” at Tapukara, Rajasthan, is a state-of-the-art training center for automotive skilling. It offers specialized courses for 12th-grade pass-outs and IT graduates, training over 3,000 youth annually with a 75% placement rate.

The “Kalike Jothege Kaushalya” initiative, implemented by the Karnataka Skill Development, integrates skill-based learning within the formal education system through a “50-hour, credit-linked training per semester in partnership with leading industries, to 168 colleges across seven universities under KJK 2.0, covering high-demand domains and benefiting over 66,000

[68] Industrial Training Institutes in the country, posted On: 30th July 2025 by PIB Delhi

students through strengthened industry academia linkages, internships, apprenticeships, and placements.

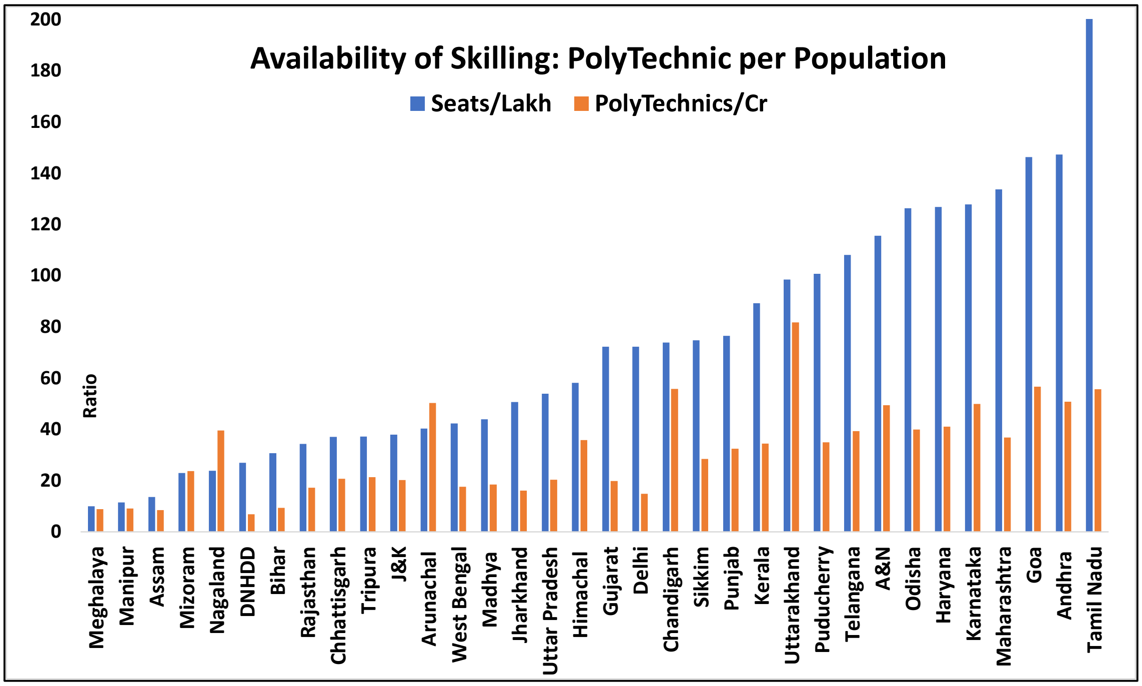
10.3.4 Polytechnics

In India, there are “Standalone Institutions”, which are outside the purview of both Universities/colleges and the school system, but require recognition from a statutory body. These include polytechnics and institutes for Nursing, Teacher training, Paramedical and Post-graduate diploma in management (PGDM). Polytechnics constitute 32% of standalone technical institutions (12,000), with nursing colleges (30%) and teacher training institutions (28%). There are 3550 to 3,850 listed institutes across 35 States and Union Territories, offering around 586 diploma courses with an approved intake of more than 11 lakh students. About 63.5% of Polytechnics are privately managed and 36.5% are government managed, mostly by central govt. Most privately managed polytechnics are self-financing. Privately managed institutions include Private State universities. Government Polytechnics ensure baseline competence of faculty through higher pay and competitive exams. Their infrastructure though functional is dated, resulting wide gap between industry requirement and learning of students. Private polytechnics invest in modern laboratories and smart classrooms aligned with contemporary standards. There is however a wider range in the quality of faculty, from excellent researchers to poor teachers, so learning outcomes are correspondingly diverse.

Diploma programs are concentrated in core engineering disciplines such as Civil, Mechanical, Electrical, Computer, Electronics and Communication, and Automobile Engineering. The distribution of polytechnic colleges is uneven across states, with higher concentration in larger states and limited presence in smaller and northeastern states. There are many gaps in approval status and data reliability, so the data used is not as good as for ITIs. Attempts are being made by AICTE to move from rigid regulations to transparent disclosure of data relevant to student-parent choices. The Approval process Handbook (2024-27) mandates disclosure department-wise disclosure of infrastructure, faculty credentials and student faculty rates. This will facilitate autonomy among better performing institutions.

Figure 36 shows the availability of polytechnics and the availability of seats in polytechnics, across Stats and UTs. It plots the number of Polytechnics per crore and the number of seats per lakh of population in State, and ranks them by the latter. Tamil Nadu, Andhra Pradesh, Goa, Maharashtra and Haryana are ranked on top. It is noteworthy that Maharashtra, Haryana and Tamil Nadu are among the largest producers of manufactured goods. Other States wanting to attract manufacturing need to improve the availability and quality of polytechnics in their State.

Figure 36: Availability of Polytechnics Seats, across States and UTs



Sources: https://list.polytechniccolleges.in/

10.3.5 Employability of ITI and Polytechnic educated

The efforts of the Central and State Govts have improved the employability of the semi-skilled emerging from job skilling institutions, but much remains to be done. Table 67, shows employable talent percentages across different educational domains from 2019 to 2026. The share of graduates from Industrial Training Institute (ITI) programs who are employable has increased from 31.3% in 2022 to 46.0% in 2026. The share of graduates of Polytechnics who are employable has increased from 18.1% in 2019 to 32.9% in 2026. Between 2022 and 2026, the improvement in employability of ITI graduates 14.7% points) is greater than for Polytechnics (11.5% points), increasing the performance gap since 2022. A greater effort is needed to improve the job skill related learning outcomes of Polytechnics.

Table 67: Employability (Below Graduate), 2019-2025

Domains Wise Employable Talent 2019-2026									
Year	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**CAGR**
Polytechnic	18.1	32.0	25.0	21.4	27.6	22.4	29.0	32.9	9.0
Industrial Training Institutes (ITI)				31.3	34.2	40.0	41.0	46.0	10.1
Aggregate	47.3	46.2	45.9	46.2	50.3	51.3	54.8	56.4	2.5

Source: Global Employability Report 2025 & 2026, Global Employability Test (GET)

There is a wide employability gap between States' skilling systems, with Andhra Pradesh graduates twice as employable as UP graduates of it is and polytechnics. Andhra Pradesh's implementation of the NAIPUNYAM skill census portal (assess-learn-apply framework) and cascading skill hub system tries to align polytechnic output with state labor market demand.

Uttar Pradesh needs to improve coordination between state education directorates, industry chambers, and training institutions. The JEECUP (Joint Entrance Examination Polytechnic) admissions system focuses on group-based tracking, which limits flexibility. Data on employment-outcome is critical for updating curriculum and supply-side planning to match demand.

10.3.6 Non-Govt Organizations (NGOs) in Skilling

NGO/NPO-led Skill Development Initiatives, complement government efforts by providing short-term, employment-oriented training through community-based and industry-linked programs. These are particularly important for less educated youth who need to be trained in basic job skills for potential jobs at the local level and for semi-skilled jobs at the local & community level. But private for-profit skilling companies also play a critical role in developing future ready skills.

Nitya Foundation Skill Training Program provides vocational training in areas such as embroidery, art and craft, beautician, technician work, computer training, education, and tourism through experienced trainers. It has also trained youth under government schemes like DDU-GKY, Seekho aur Kamao, and Gharib Nawaz Skill Development.

Jindal South-West (JSW) Skills School aims to improve the employability of youth and women by offering industry-focused vocational skill courses.

Both **Satya Shakti Foundation** (SSF) and **Amuja Foundation** (SEDI) provide a combination of trade skills and soft skills training, along with on-the-job training (OJT), career counseling, and placement support to enhance employability.

The “Telangana Academy for Skill and Knowledge (TASK)”, a NPO by the Government of Telangana, strengthens industry-academia-government linkages by partnering with global technology leaders, setting up “112 Advanced Technology Centers”, supporting initiatives like Genome Valley and Pharma City apprenticeships, and enabling real-time job matching through the “T-GATE platform”, thereby providing affordable, high-quality training, faculty development, and a pool of job-ready talent.

National Institute of Information Technology (**NIIT Foundation**) started in 2004, runs Skill Development Centers offering short-term courses such as Professional Edge, Advanced Word-Excel, Office Automation, CRM BPO, Retail & Inventory Management, BFSI, Digital Marketing, Spoken English, Financial & Digital Literacy, and Career EDGE IT.

10.4 Training the Trainers: NSTI and CITS

The effectiveness of Industrial Training Institutes (ITIs) depends on the availability and qualification of trainers. Only 46.9% (Table 68) of the 2.17 lakh sanctioned trainer positions are filled across all ITIs. The shortfall is more acute in government ITIs (42.2%) compared to private ITIs (49.7%). Among the filled positions, only 18.4% of trainers (around 18,779 individuals) possess the Craft Instructor Training Scheme (CITS) certification while a large majority (over 83,000 trainers) are yet to be formally certified. In terms of employment type, regular positions dominate (78.2%), but a notable share of trainers are on contract (16.1%) or in other (5.8%) on temporary arrangements.

Table 68: Skilling and certifying Trainers (2022)

Position	Sanctioned	Filled	%
Total	**217724**	**102207**	**46.9**
Gov	86154	36381	42.2
Pvt	131570	65382	49.7
CITS certified			
Yes		18779	18.4
No		83493	
Employment Type			
Regular		79905	78.2
Contract		16437	16.1
Others		5930	5.8

Source: NCVT MIS Instructor Dashboard (as of July 28,2025)

Efforts are being made to increase the supply of trained faculty and to upgrade their capabilities. The National Skill Training Institute (NSTI), provides short-duration, modular and customized training programs for engineers, supervisors, technicians, industrial personnel, and faculty of technical institutions, like ITIs. The institute focuses on higher-level skill upgradation using industry-relevant equipment and training aligned with the requirements of industries, government establishments, PSUs, and technical institutions.

The Craft Instructor Training Scheme (CITS) for training instructors engaged in ITIs under the Craftsmen Training Scheme (CTS). Operational since the inception of CTS, CITS provides training techniques of transferring hands-on skills to trainees. During 2024-25, CITS recorded 10,732 admissions against a seating capacity of 17,475. The program offers one-year, NSQF-aligned courses across 55 trades, covering both engineering and non-engineering disciplines.

The Craft Instructor Training Scheme (CITS) plays a central role in preparing qualified instructors for ITIs. In 2021-22, a total of 8,133 trainees were registered for CITS, out of which 6,916 appeared and 5,949 passed the examination (Table 69). As per the institutional divide: government institutes account for nearly 89% of successful trainees (5,297), while private institutes contribute only 11% (652). By trade category, most candidates are from industrial and service-oriented trades (76.5%), which include technical and operational roles such as fitter, electrician, mechanic, or related. The remaining 23.5% represent grey/white-collar trades, covering roles such as laboratory assistant, draughtsman, or office-related instructor training.

Table 69: Craft Instructor Training

CITS Training 2021-22	Registered Trainee	Appeared in Exam	Passed	%
Institute Type	8133	6916	5949	
Gov	5982	5826	5297	89.0
Pvt	2151	1090	652	11.0
Trade				
Blue collar	6483	5410	4553	76.5
Grey/White collar	1650	1506	1396	23.5

Source: Directorate General of Training, CITS Dashboard (as of July 28,2025)

10.5 Training and Skilling in Firms

"Learning by doing" in industry is one of the most celebrated skilling avenues in the growth of human capital, productivity and real wage growth. But formal training courses in firms, are also important in creating a culture of quality and learning in firms. According to Table 70, the percentage of firms providing formal training to their permanent, full-time employees in India stood at 7.7% in 2022, down from 35.9% in 2014. This compares with 8.7% of firms in Vietnam and 8.4% for Indonesia in 2023. Thailand recorded 18% in 2016. In contrast, Mexico reached 37.8% in 2023, and Malaysia reported 24% in 2019.

Table 70: Firms offering formal training (% of firms)

Country	Year	PcGDP	Firms (%)
Lower Middle Income Countries			
India	2022	$8,545	7.7
Viet Nam	2023	$13,492	8.7
Upper Middle Income Countries			
Indonesia	2023	$13,890	8.4
Thailand	2016	$19,370	18.0
Mexico	2023	$22,143	37.8
Malaysia	2019	31301	24.0

Source: World Development Indicators, July 2025

Given the large informal sector organized firms are an important part of the skilling eco-system. Industry participation in training helps bridge the gap between classroom instruction and workplace requirements. Several government initiatives have been designed to promote apprenticeships, internships, and digital skill development through firm-led models.

The **National Apprenticeship Promotion Scheme** (NAPS), launched in 2016, builds on the framework of the Apprentices Act, 1961, which governs apprenticeship training in India. Earlier, apprenticeship programs were largely conducted under the National Apprenticeship Training Scheme (NATS for graduate and diploma students in technical fields), managed by the Ministry of Education. NAPS, introduced by the MSDE, expanded this system to include ITI graduates, school dropouts, and non-technical trades. It provides basic and on-the-job training along with a stipend. Under the scheme, 45 lakh apprentices have been engaged, 23 lakhs have completed training, and 6 lakhs have been certified[69]. NAPS 2.0, launched in 2022, continues to promote apprenticeship by transferring stipend support directly to apprentices through Direct Benefit Transfer.

PM's Internship Scheme (2024) to provide internship opportunities to one crore youth in the top 500 companies over five years. The 12-month internship includes at least six months of on-the-job experience, with monthly assistance of ₹4,500 from the Government and ₹500 from industry.

10.6 **S**killing & Employment Portals & Placement firms

A strong employment ecosystem requires effective linkages between training and actual job opportunities (Figure 30, column 4). The Government has made a big effort to fill the gap in job matching and labor market services, through creation skilling and employment portals that facilitate the link different types of workers to available jobs.

To address these coordination gaps and create a seamless transition from skilling to employment, the Government of India launched the **Skill India Digital Hub** (SIDH) in 2023. This flagship initiative integrates Skill India and Digital India under a single digital public infrastructure for education, skilling, employment, and entrepreneurship. SIDH brings together various initiatives such as PMKVY, Jan Shikshan Sansthan (JSS), Apprenticeship, PM Vishwakarma and ITI training processes onto one digital platform. It enables the entire lifecycle of candidates from enrolment, training, assessment, and certification to placement to be managed digitally and transparently.

By linking with Udyam, e-Shram, NCS, and ASEEM portals, SIDH ensures interoperability between training, job matching, and social welfare databases. With over 5,000 courses, AI-driven career recommendations, and QR-enabled digital certificates, the platform supports evidence-based monitoring and personalized employability pathways. This convergence marks a major step toward transforming India's fragmented skilling landscape into a connected and data-driven employment ecosystem.

The citizen-centric design (Figure 37) of the Skill India Digital Hub (SIDH), which connects key components of the skill ecosystem: education, skilling, employment, entrepreneurship, and industry linkages. Each node represents a service layer integrated into SIDH, ensuring that individuals can access courses, certifications, job opportunities, and entrepreneurial support through a single unified digital platform.

Employment services in India are supported by both government and private digital platforms. The Ministry of Labor & Employment plays a central role through the National Career Service (NCS), eShram which connects job seekers, employers, and training providers. Alongside this, several private portals have emerged to match workers with opportunities across sectors. Together, these platforms form an important bridge between skilling and employment, helping youth access jobs, apprenticeships, and career information more easily.

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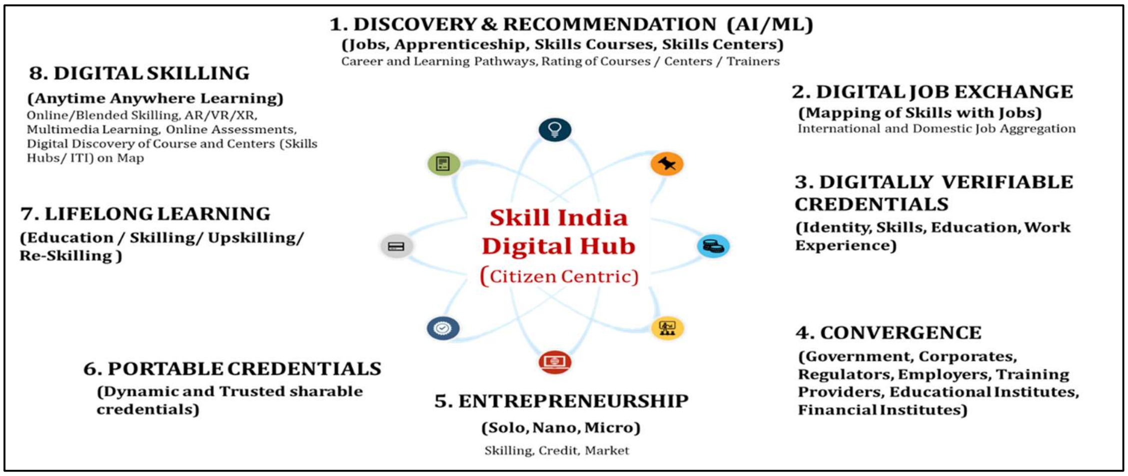
[69] Data sourced from Apprenticeship Performance Dashboard (as of 10/Nov/2025)

Figure 37: Skill India Digital Hub (SIDH): One platform for all skilling needs

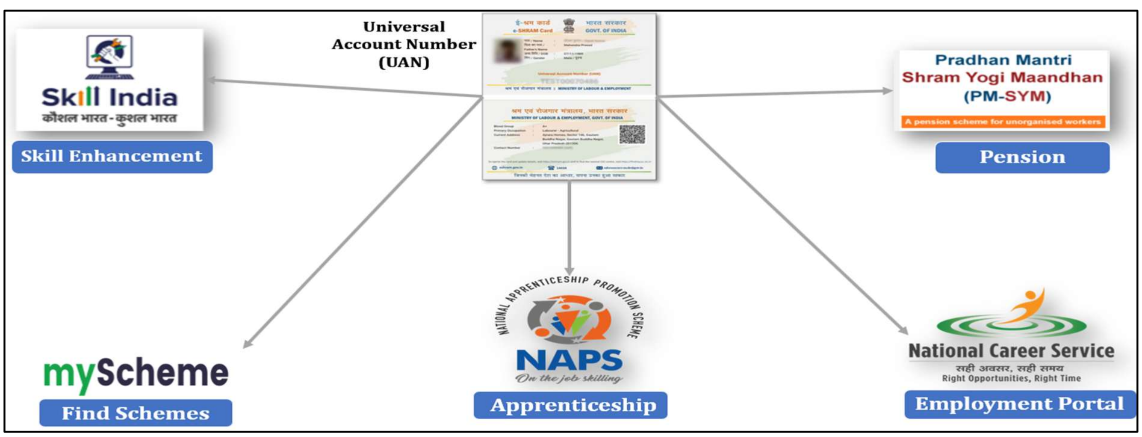


Source: MSDE, Review of Output Outcome Monitoring Framework (OOMF), 2024-25

The **e-Shram** Portal (launched in 2021) is India's first national database of unorganized workers including migrant workers, construction workers, gig and platform workers, street vendors, domestic workers, and others. Each registered worker is issued a Universal Account Number (UAN) linked to Aadhaar, which enables portability of identity and access across schemes.

Through this single UAN, workers can be connected to multiple services shown in the (Figure 38**)** such as skill development (Skill India), apprenticeship opportunities (NAPS), scheme discovery (myScheme), pension benefits (PM-SYM), and employment services (National Career Service). The portal helps the Government deliver social security and welfare benefits more efficiently to this large and diverse workforce.

Figure 38: Services through eShram



Government initiatives are designed to fill gaps in the private eco system and to promote inclusive growth. Private sector has to eventually play the primary role in generating medium and high-end skills needed by industry, and in connecting demand and supply of skills. Several private employment portals such as QuikrJobs, Naukri.com, Foundit (formerly Monster India), TeamLease, and LinkedIn provide large-scale digital marketplaces for job search and recruitment. These platforms use technology for real-time job matching, resume building, and candidate tracking.

QuikrJobs (2008) is an online platform for blue-collar, grey-collar, and entry-level jobs. It connects employers and job seekers through listings for roles such as delivery staff, data entry operators, BPO/tele-callers, and technicians.

Naukri.com (1997) is online recruitment platform operated by Info Edge that provides hiring related services to corporates/recruiters, placement agencies and to job seekers in India and overseas. The platform offers services such as resume database access, job listings, and response management tools.

Foundit (formerly Monster) (1999) is an online job platform that connects job seekers with openings across roles and sectors. It offers personalized job recommendations using user profiles, skills, and preferences. The platform also supports career needs such as skill development, mentorship, and flexible work options, helping users find relevant opportunities more efficiently.

Additionally, platforms like **WhatsApp Business** are increasingly being used by recruiters for outreach, interviews, and information sharing.

TeamLease Services (est. 2002) act as a supply chain company offering solutions to employers for their hiring, productivity and scale challenges. It provides hiring, staffing, apprenticeships, and skill-development services to employers across sectors. Supports the full employment cycle through three areas (3Es): Employment (large-scale staffing and trainees), Employability (skill and training programs), and Ease-of-Doing-Business (HR services).
The company also runs TeamLease Skills University (TLSU) in Gujarat, India's first vocational university, and operates major apprenticeship programs such as NETAP (National Employability through Apprenticeship Program) offering on-the-job training to apprentices.

LinkedIn (launched in 2003) is the world's largest professional networking platform, with more than 1 billion members across 200+ countries. It helps users build professional profiles, connect with employers, search for jobs, and access learning and career resources. LinkedIn operates through recruitment solutions, advertising, and premium subscriptions. Since 2016, it has been part of Microsoft. The platform is widely used for hiring, networking, and showcasing skills and work experience.

Indeed (2004) global platform for job search and hiring. It operates in more than 60 countries and allows users to search jobs, post resumes, and research companies. Powered by AI and its large hiring.

EkStep's **BlueDots AI initiative** (2025), creates open digital rails- simple, AI-powered signals that light up "Blue Dots" on maps to make hyperlocal livelihoods, jobs, skilling opportunities, services, and welfare digitally discoverable at district and village levels. It tackles the "discovery crisis" where abundant local supply and demand remain "digitally dark," using vernacular voice AI to connect youth with nearby opportunities within two bus stops.

Together, these public and private systems form a digital bridge between skilling and employment, improving visibility, access, and efficiency in India's labor market.

10.7 Skill Policy and Planning

The skilling system poses a much greater challenge than the education system, because we are not even at the stage of universal access to job skilling, whereas the education system has already achieved it or is or close to it. We need not however follow the historical education strategy, of first providing access and then focusing on pedagogy and learning outcomes (section 5.4 & 6.3). Nor should we build a cylindrical skilling system and then try to convert it into a pyramid, as happened with education (Figure 1). We must aim for a good quality pyramid, which links to the education and jobs pyramid at every level (Figure 3). Earlier sub-sections have tried to provide a data-based understanding of the Skilling eco-system, which identifies the gaps in the system. This allowed us to sketch a picture of the enormous challenge in many dimensions of the skilling system. In this sub-section we turn to an understanding of the locational and public policy aspects of the challenge.

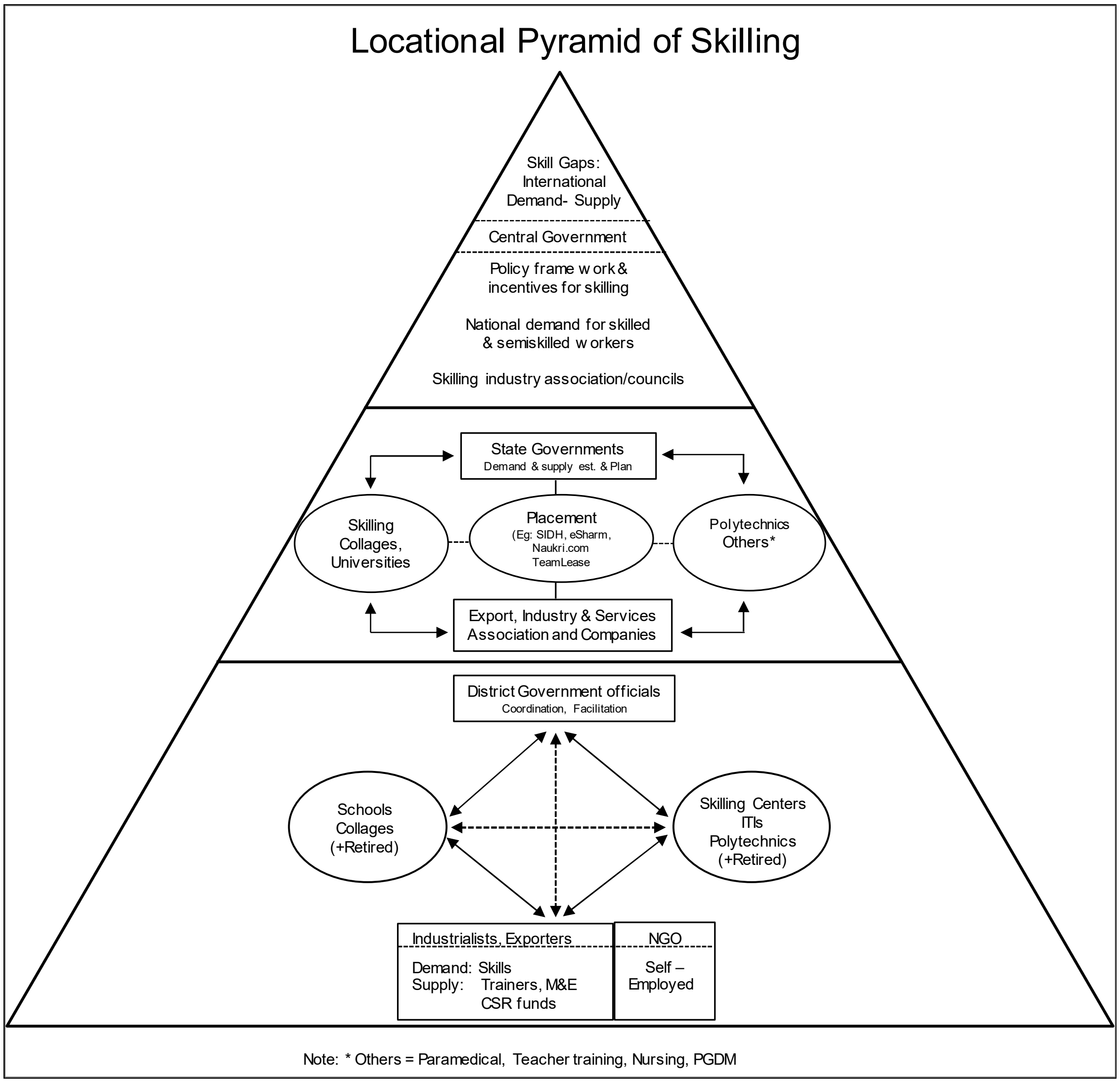
The confluence of Govt, Industry, NGO and skilling institutions which operate at the National level, are different from those which operate at the State level, and those which operate at the local level (District, City, Industrial area). These differences mirror the differences in information and co-ordination problems which plague the system at each level, with respect to the goal of optimal skilling outcomes and employability. Broadly speaking, the different levels of skills -- basic, medium (semi-skilled) and High (skilled) -- have ultimately to be addressed at the Local, State and National level respectively.

Figure 39 attempts to capture and encapsulate the complexity of the skilling system from the perspective of public policy and planning. The author's tour of skilling centers of different levels and across many States, has shown how weak the base of the skilling pyramid is, despite a decade or more of Central programs to strengthen it! This is partly due to the fact that State level official, in middle of pyramid (Figure 39), still give more weight to traditional social welfare issues, than to job skilling for employment generation and real wage growth.

To some extent this is the historical legacy of a system which till recently, did not appreciate the importance of learning outcomes at the bottom of the pyramid (primary & lower secondary school) for inclusion.[70] The fact that the governance system still pays more attention to higher education and futuristic skills than to the semi-skilled/medium skills, adds to the concern. Another indicator of the governing elite's bias is the fact that CSR funds going to job skilling are a tiny fraction of the CST funds going into health.

[70] National Education Policy, NEP (2022) which does recognize is less than five years old.

Figure 39: Role of Govt(C&S), Private sector and NGOs, in an Inclusive Skilling System



At the ***local level***, successful exporters and growing/expanding MSME firms, were found by the author to be the most enthusiastic proponents of skilling. Quality output is the driver of their success and their growth, as they need well trained semi-skilled workers (including supervisors) to sustain the quality, as they expand. They are willing to help develop curricula relevant to needs of their industry, donate old equipment & machinery and even depute skilled workers to train the trainers, of the skilling institution. The MSME producers and exporters do not feel they have the power to influence the courses & pedagogy in the schools, ITIs and Polytechnics around them. Local industry associations have little interest in doing so, if they are run by owners of large stagnant industries.

At one of the skilling centers visited by the author in a small town, 90% of the trainees were women and half of them were planning to set up their own beauty parlors, mostly in neighboring villages where they lived. The authors suggestion of adding a small training module on entrepreneurship at the end of the beautician training, which would familiarize them with basic ideas of accounting, financial returns, raw material procurement and marketing. Given that almost 58% of workers are self-employed, this module should be added to skilling programs in personal care, Repair & maintenance of household durables and semi-durables and repair & maintenance of housing/commercial real estate (electricians and plumbers).[71]

There are also NGOs operating at the ***local*** level which understand the needs of the society and work to close the gaps in learning and provide job skills. One NGO, which the author heard off, is particularly striking and perhaps exceptional. This NGO identified a need in the community for semi-skilled, education para-professionals, below the level of primary teacher, and outside the formal system. It defined 11 different levels, for which it created courses (pedagogy), standards and certification and trained & certified thousands of aspirants and placed all of them in employment. This leads us to the aphorism: "***Jobs and skills are two sides of the same coin***" Governments need to help and support NGOs which are adding job skilling and job placement to their traditional focus on basic education for deprived groups.

District and local officials may have little knowledge/appreciation about the importance of skilling for employment, wage growth and fast inclusive growth, nor are they trained on their role in promoting it. There are no standard operating procedures with respect to job skilling. These officers however did try to implement Central Govt skilling programs as per the instructions coming down to them. Contact with the local institutions and companies relevant to job skilling and employment appeared to be minimal. The most basic job of any skill development officer should be to start by carrying out an informal survey of the demand for semi-skilled workers in the district/block and the supply of these skills by the local ITIs. The second critical role would be to facilitate information flows between local schools, colleges, skilling centers, ITIs, Polytechnics, and industrial firms and education-skilling-job oriented NGOs, in the district. Only on the basis of these can they do the real job of coordinating the supply and demand of semi-skilled manpower required in their area (*pyramid base in fig 35*). Any expenditures required for this purpose or for basic job skills, has to come from the State budget. Another important role can be played at the local level is to convert Krishi Vikas Kendra (KVKs) into skilling Centers for Viksit agriculture and Agro-processing. This has been successfully done in the Satara district of Maharashtra.

The ***States*** therefore have a key role in State's skilling policy, manpower planning and skill budgeting. Besides information from the districts, they need to interact with State level Universities, skilling colleges, Polytechnics, Industry associations, placement companies and large NGOs operating in the State (*middle panel,* Figure 39). A State Manpower institute could also do regular survey of demand for skills from Agriculture, Industry and Services, and the supply of skills by education and skilling institutions in the State. The manpower skill requirements arising from capital expenditures and repair and maintenance of old equipment,

[71] Chioda (2021) showed that a 3-week MBA program with a soft skill component of 75% and 25% hard skills component (in Uganda), increased earnings by 30% over 3-5 years.

machinery and structures should also be input on the demand side. Tripartite committees of senior State govt officers with industry and education & Skilling institutions need to be set up by all States following the pattern of the most progressive States, and must meet every year to review the previous year and plan for the next. Attempt must be made to include representatives of exporting industries and those which are growing, and thus have the greatest need for semi-skilled and skilled manpower. Private colleges and skilling institutes must be fully represented in the committee.

The State govts need to focus on the gap in the availability of good quality job skilling ***trainers*** in their State, by incentivizing semi-skilled workers to become trainers and raising their status through recognition and rewards. In my visits I discovered an expert trainer, close to retirement, who had made attractive, working models of complex machines and processes, which are invaluable aid to teaching. A modern manufacturing company, had put up visual representation of the process, at the workstation used to train the workers, assigned to that job.[72] In some of the most advanced Govt Skill development institutes visited, however, the availability of training videos was still very patchy. States need to set up a digital library of videos which fascinate and inspire both trainers and the trained, and which can be used to make learning more relatable and less abstract for the average youth. These must be conveniently accessible from the districts. A fund could also be set up for purchasing tools, equipment and machinery to replace old/outdated ones in the its ITIs and Polytechnics. A forum should be set up where teachers from Govt and Private, ITIs and Polytechnics, can interact with, and learn, from each other. Initially an appropriate IAS officer could be seconded to organize the forum.

The ***Central govt*** has initiated many programs for skilling, re-skilling and upskilling, set up key platforms to link youth skilling and employment, and initiatives for upgrading the quality of infrastructure and training. Policy liberalization related to internship and apprenticeship has also helped in promoting "learning by doing," and "on the job training." Extension of apprenticeship schemes to export oriented and dynamic MSMEs would also help. Large and Medium companies are the best placed to help develop semi-skilled workers. They should be allowed and encouraged, perhaps even mandated, to spend a larger proportion of their CSR funds on job skilling. The rules should be flexible enough so that they can use these funds to subsidize the training of poorer children in their own training institutes. Companies should be encouraged to use CSR funds for skilling of trainers from Industrial Training Institutes (ITIs) and Polytechnics, and for providing sabbatical to Engineering Professors from local Colleges and Universities.

Central government could set up a National Skill development Council, and encourage the private ITIs, Polytechnics, skilling colleges and placement industry to form a Skill development Association (Figure 39). Either the National Skill development corporation or a manpower institute should be mandated to make periodic estimates of the supply and demand for skills

[72] This was the first time they had done this to be able to train more workers, more quickly.

at every level (basic, semi-skilled and highly skilled). The results of the surveys/estimates must be available to the public to facilitate their education, training and job planning. The same or different institution could be charged to study global demographic trends and estimate the demand - supply gaps in semi-skilled labor, which can potentially be filled by Indian labor. gaps that global demand. The govt should also consider switching from credential-based hiring to skill-based hiring. Before this is done however, the set of skills required for each type of job, would have to be defined.

10.8 Summary and Conclusion

This section summarizes the analyses of job skilling in India, based on the limited data available at both international and national levels. It covers international comparisons of vocational and technical enrolment, post-secondary training, and short-cycle tertiary education and the schemes related to them. The quality of skilling, measured by employability is also shown. Skilling requires qualified trainers and quality infrastructure and some of the gaps in these, including in States, are analyzed along with the schemes to improve these two critical aspects. It delves into the kind of trades for which training is being given. The adequacy of training provided by firms to regular employees is also compared with other countries.

10.8.1 Summary

The share of secondary students enrolled in Vocational & Technical program was a low 1.8% in 2017. This was 12.8% below the benchmark for India's per capita GDP in 2017. Comparator countries like Vietnam, Thailand, China and Mexico, had enrolment rates which were higher than their benchmark for their level of Per capita GDP. We have to raise this share to 18.4% in five years and to 25.7% in two decades, in line with the projected growth of PCGDP. Though ITI seat availability averages 103 seats per lakh population for the country as a whole, it varies greatly across States, with only Himachal Pradesh, Karnataka, and Rajasthan having relatively higher availability.

Implicitly recognizing this structural gap, the National Education Policy (NEP 2020) recommended integration of vocational education into mainstream education, in a phased manner and the elimination of the "hard separation" between academic and vocational streams. It recommends early and continuous vocational exposure from Grade 6 onwards, including hands-on sampling of crafts, 10-day "bagless" internships with local artisans, and industry exposure through Grades 6-12. NEP specified that focus areas for vocational education, be identified based on skills gap analysis and mapping of local economic opportunities. It suggested, that "By 2025, at least 50% of learners through the school and higher education system shall have exposure to vocational education, for which a clear action plan with targets and timelines will be developed. Towards this end, secondary schools will also collaborate with ITIs, polytechnics, local industry with and hub-and-spoke skill laboratories". To oversee this effort, the NEP suggested the constitution of a National Committee for the Integration of Vocational Education (NCIVE), consisting of experts in vocational education and representatives from across Ministries, in collaboration with industry.

Many schemes have been launched to address the daunting challenge of skilling the labor force. These include the Skill India Mission and associated programs such as Pradhan Mantri Kaushal Vikas Yojana, Jan Shikshan Sansthan, Craftsmen Training Scheme, PM Vishwakarma, and SAMARTH. These aim to expand vocational participation, strengthen training quality, and improve the transition from skills to employment. NEP 2020 has recognized the importance of VET, non-academic skills and holistic education. Raising the enrolment of secondary school students in VET programs, however remains a massive challenge, requiring concerted effort by all States, in cooperation with private industry, non-profit organizations and the Central Government.

NEP 2020 promotes multidisciplinary higher education institutions that offer vocational programs alongside academic degrees, including within four-year undergraduate programs. It encourages short-term certificate courses, credit accumulation and transfer, and alignment of qualifications with the National Skills Qualifications Framework (NSQF), thereby addressing the historical lack of vertical mobility for vocational learners.

Of India's adults aged 25 & over, 14.4% had post-secondary training, which was 5.8% points below benchmark for its per capita GDP in 2023. This gap was smaller than for secondary school enrolment in VET programs. The post-secondary training gap was also smaller than for comparator countries such as Indonesia, China, Mexico and Thailand. In India we need to increase post-secondary training to 24% of adults, by the time we become an Upper-Middle Income Country around 2030 and further to 35% by mid-century.

There was an increasing trend (2019-22) in shorter-duration courses, both 6 month (122%) and one year (7.1) in Industrial Training Institutes (ITIs). At the same time, enrolment in 2-year courses declined. The latter needs to be reviewed, and course content and pedagogy modified accordingly.

ITI enrolment is classified into engineering and non-engineering trades. Engineering trades are sub-categorized into industrial and grey/white-collar occupations, while non-engineering trades include service and grey/white-collar occupations. Enrolment in engineering trades has unfortunately declined by about 9.8%, largely in industrial work, though fortunately they still account for the majority of enrolments. Within engineering trade, enrolment in grey/white-collar engineering trades expanded by 3.6% from 2019 to 2022. In contrast, enrollment in non-engineering trades grew by 2.4%, led by a growth of 19.2% in enrollment in service work from 2019 to 2022. With the increased focus on manufacturing there is a need to strengthen industrial-work technical/engineering skills, to facilitate employment in quality manufacturing and manufactured exports.

To strengthen skilling infrastructure and training quality, several initiatives such as SANKALP, PM SETU and STRIVE, have been implemented by the Central Government, Some States have also collaborated with private, industry related, NGOs such as the Honda India Foundation.

They have introduced new, more relevant, skilling courses, upgrading infrastructure, and training the trainers in modern, industrially demanded, skills. These efforts are bearing fruit. ITI capacity has increased from 18.2 lakh in 2014 to 23.2 lakh in 2022. There was a 21% increase in student enrolment in Government ITIs, likely due to lower fees and improved recognition of certificates. The employability of ITI graduates has improved from 31.3% in 2022 to 46% in 2026.

The effectiveness of Industrial Training Institutes depends on the availability and quality of trainers, yet only 46.9% of sanctioned trainer positions are currently filled, with shortfalls more acute in government institutions. To strengthen trainer capacity, the National Skill Training Institute provides modular, industry-aligned programs aimed at upgrading instructional skills. However, only 18.4% of trainers hold CITS certification, and staffing remains mixed, with 78.2% regular, 16.1% contractual, and 5.8% temporary trainers. To address this, the Craft Instructor Training Scheme operates under the Craftsmen Training Scheme to strengthen instructor capacity by training ITI trainers in techniques for effectively transferring hands-on vocational skills to trainees. NEP pointed to the need to train teachers for vocational subjects, create standards, and set up a National Committee for Integration of Vocational Education (NCIVE) to oversee implementation. Much more needs to be done to increase the availability of teaching material and to improve the pedagogy for training the trainers.

India's short-cycle tertiary gap was 3.2% points below the benchmark for its Per capita GDP, The performance gap was, however, smaller than the corresponding gap of comparator countries such as Vietnam, China, Indonesia and Thailand relative to their benchmarks. The enrolment in such courses will have to be raised by 7.4% points by 2030 and by 16.8% points by 2050 to meet the benchmark for High income country. Polytechnics, have a key role in improving technical education at the tertiary level. There are 3,850 Polytechnics institutes across 35 States and Union Territories, offering around 586 diploma courses. Polytechnics are concentrated in larger states such as Tamil Nadu, Andhra Pradesh, and Maharashtra. 63.5% of polytechnics are privately managed as they are self-financing, invest in modern laboratories and smart classrooms aligned with contemporary standards. Several non-government initiatives including Nitya Foundation, Jindal South-West, Satya Shakti Foundation, Ambuja Foundation, Telangana Academy for Skill and Knowledge, and NIIT Foundation, support government efforts through short-term, employment-oriented training and industry-linked community programs. As result of all these public and private efforts, employability of Polytechnic graduates has improved from 18.1% in 2019 to 32.9% in 2026.

"Learning by doing" in industry remains an important skilling avenue, yet formal firm-level training in India has declined, with only 7.7% of firms providing training in 2022. This is less than in comparator countries like Vietnam, Indonesia, and Malaysia. Strengthening industry participation is therefore critical to link training with jobs. Initiatives such as the National Apprenticeship Promotion Scheme and the PM Internship Scheme aim to expand apprenticeship and internship opportunities through firm-led training. Rules for treatment of training expenses in income tax law, may need to be changed to facilitate training & re-training od employees.

10.8.2 Conclusion

To strengthen India's skilling ecosystem, the paper recommends a national Job Skilling Policy. This includes integrating employment and skill development ministries, launching an Annual Skills and Employment Survey with a data bank and portal, projecting skill demand, and creating course material and teaching aids. Investments are required for training the trainers, especially for low- and medium-skill occupations and blue-collar work such as repair, maintenance, and construction. Raising the social status of blue-collar skills through awards, contests, role models, and community outreach is important. Training quality also depends on the quality of tools and equipment; capital subsidies can help. Partnerships with Australia (TAFE), Canada, and Germany can support master-trainer development. Recognizing skill development as a service industry can expand access to bank credit and visas. A Skill Development Industry Council and an AI-based expert system (E-Guru) can help connect skill seekers, providers, and employers. The Government's training portal, iGOT, can be used for strengthening job skills of district skill development officers.

States have a key role in State's skilling policy, manpower planning and skill budgeting. Besides collecting information from the districts, they need to interact with State level Universities, skilling colleges, Polytechnics, Industry associations, placement companies and large NGOs operating in the State. A State Manpower institute could also do regular survey of demand for skills from Agriculture, Industry and Services, and the supply of skills by education and skilling institutions in the State. The manpower skill requirements arising from capital expenditures and repair and maintenance of old equipment, machinery and structures should also be input on the demand side. Tripartite committees of senior State govt officers with industry and education & Skilling institutions need to be set up by all States following the pattern of the most progressive States, and must meet every year to review the previous year and plan for the next. Attempt must be made to include representatives of exporting industries and those which are growing, and thus have the greatest need for semi-skilled and skilled manpower.

There is a need to create libraries of audio-visual teaching materials, establishing tripartite committees (Skill Department, Industry Body, Skill Development University), and setting up institutes for trainer training, curriculum development, and job platforms. States need dedicated funds for tools and equipment and should establish skill development Centers in hub schools. NITI Aayog may design a benchmark skilling system and pilot it in selected states. Local committees (SDO, ITI, industry) can identify skills in demand and introduce new ITI courses, trainers, and equipment with support from local industry and the state.

Training in skilling centers providing skilling' in personal care, repair and maintenance of household durables and semi durables, and repair & maintenance of housing/commercial real estate (electricians & plumbers), should add a small training module on entrepreneurship as

58% of India's workers are self-employed. This module would familiarize them with basic ideas of accounting, financial returns, raw material procurement and marketing.

Government needs to help and support NGOs which are adding job skilling and placement to their traditional focus on basic education. Govt should consider converting Krishi Vikas Kendra (KVKs) into skilling centers for Viksit agriculture and agro-processing.

Skill development officer should be trained in carrying out survey of demand for semi-skilled workers in the district and block. They should also investigate the supply of these skills by it is in the district/block. They should be armed with standard operating procedures (SOPs), to facilitate flow of information between local schools, colleges, skilling centers, ITIs, Polytechnics, on one hand and industrial firms and education-skilling-job oriented NGOs.

Global evidence from vocational education and training (VET) shows its advantages. Only 3-4% of youth received formal VET in 2004-05, yet VET graduates had lower unemployment (11%) than general secondary graduates (14%). Workers with formal VET earned 13-16% more than those with no or informal VET in 2018-19, and this wage advantage increases with age.

11. Tertiary Education

11.1 Introduction

According to AISHE (2021-22), India had 1,168 universities, of which 423 were State Public Universities (37%), 53 were Central Universities and 153 were Institutes of National Importance. Private universities account for 34% of total, with 391 State Private Universities and 81 Private Deemed Universities. 56% of universities specialized in general programs and 16.5% in technical programs. The remaining universities offer medical (6.8%), agriculture (4.6%), science (2.8%), law (2.3%), and management (2.0%) programs.

There are 47,845 colleges in India of which 21.5% are Government colleges, with 34.8% of total enrolment. Private aided colleges account for 13.3% of colleges and 20.6% of enrolment, while private unaided colleges are 65.3% of colleges and 44.6% of enrolment. Colleges are also concentrated on general education (59.5%), followed by teacher education (8.7%), engineering & technology (7.0%), nursing (4.3%), arts (2.7%).

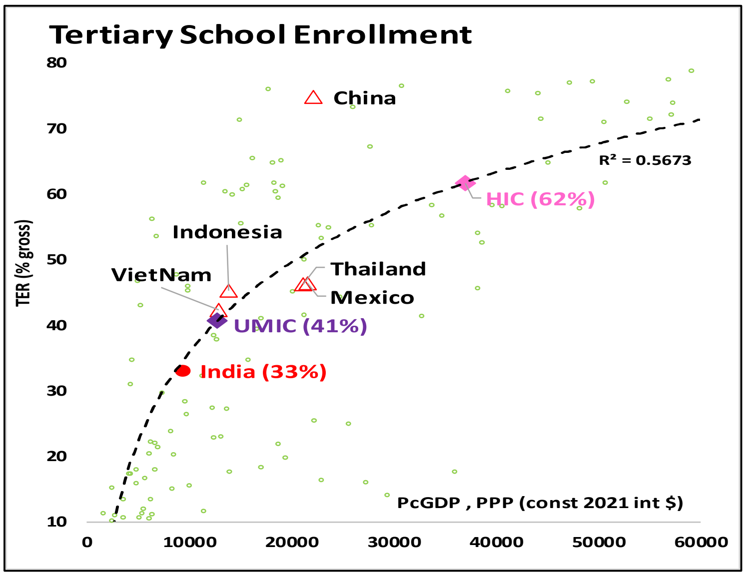
Standalone institutions are evenly distributed across polytechnics (32%), nursing institutions (30%), and teacher training institutes (28%). Other institutes include Paramedical (6%), PGDM (3%), and institutes under ministries (1%).

In this section, we compare India's tertiary education, such as enrollment, and share of adult population with bachelor's and master's degrees. To add to Human capital and factor productivity, this education must generate skills which are needed by industry and services. So, we also look at the employability of the credentialed. The section concludes with a review of Programs and Initiatives aimed at improving access, quality, and employability outcomes in higher education.

11.2 Tertiary School Enrollment

This sub-section presents India's tertiary (college, university) gross enrolment ratio (GER) in an international comparative framework. India's GER for tertiary education was 33.1% in 2023 (Figure 40) marginally below the expected/benchmark level at its per capita GDP of 2023. This is a commendable achievement. Thailand (-4.4%) and Mexico (-4.7%) are below the expected level for their respective Per capita GDP levels. However, Vietnam (+1.4), Indonesia (+2.9) performed somewhat better than their benchmark while China exceeded the level expected at its per capita GDP by +23.3 per cent points.

Figure 40: Tertiary Schooling: College enrollment, (% gross)



Source: World Development Indicators, December 2024

Though India is close to its current benchmark, tertiary enrolment will have to be increased by 7.5% points in next five years to meet the minimum UMIC benchmark of 40.7% (Figure 40). To reach the HIC benchmark of 61.7% it will require an improvement of 28.6 percentage points over twenty-five years. We cannot rest on our laurels, in our quest to make Bharat Viksit by 2047.

Table 71 presents India's estimated number of enrolled students at the tertiary levels for 2023, using population projections from both the Technical Group on Population Projections and the UN Population Division. Estimated Student enrolled = Gross enrolment rate of cohort (%) * Cohort (18-223) Population (million). this yields an estimate 50 million tertiary students using TGoPP, and 52 million, using UNpop.

Table 71: Tertiary enrolment Gross rates & numbers

		Technical group on Pop		UN Population	
	Enrolment	Pop aged	Enrolled	Pop aged	Enrolled
	Gross (%)	(Millions)	(million)	(Millions)	(million)
Tertiary Enrolment Gross(%)		Pop aged 18-23yr			
2023	33.1	150	50	156	52
2030 (proj)	40.7	141	58	150	61
2050 (proj)	61.7	na	na	131	81

Sources: WDI/UNESCO (completion rates), UN population (2024 rev).
Technical Group on Pop projections (2020); na = not available

Although India's tertiary enrolment rate (33.1%) is below that of China and the MIC4 (Vietnam, Indonesia, Thailand, and Mexico), India's absolute enrolment is still 2.2 times that of the MIC4 combined (Table 72).

Table 72: Comparison of Youth enrolled in Tertiary education

	India	Vietnam	Indonesia	Thailand	China	Mexico
Tertiary Enrolment Gross(%)						
Enrolled (million)	52	3	12	3	72	6
Enrolment Rate(%)	33.1	42.2	45.1	46.2	74.8	46.4
Pop aged 18-23(mil)	156	8	26	6	96	13

Sources: WDI/UNESCO (completion rates), Population Division (2026), Vietnam & Mexico are 2022

11.2.1 Courses and Programs

The division of tertiary education between STEM courses and Humanities and Arts is emerging as a factor in determining productivity and growth. India has also introduced distance learning, in addition to the conventional Physical facility-based learning in tertiary education; these are classified as "distance mode" and "regular mode" respectively. The distribution of tertiary student across programs and mode, for the latest available year (2020-21) is shown in Table 73. In regular mode, 24.1% of students were enrolled in B.A. programs, 12.6% in B.Sc. and 10.3% in B. Com. In 2020-21 (rows 1 to 3, Table 73). Total enrollment in graduate courses continued to grow during the entire period 2017-18 to 2021-22. During this period, the fastest growing undergraduate programs were B. Pharma, B. Sc Nursing, BBA LLB, and B.Ed. B.Sc. was the only program in which enrolment declined (-0.6).

Table 73: Enrolment, Share & Growth in Regular & Distance Programs: 2021-22

	Graduate programmes	All programmes			Regular Mode			Distance mode			Raio:
		Abs	Share	CAGR	Abs	Share	CAGR	Abs	Share	CAGR	Distance/
		(Lakhs)	(%)	Fy22/Fy18	(Lakhs)	(%)	Fy22/Fy18	(Lakhs)	(%)	Fy22/Fy18	Regular
		1	2	3	4	5	6	7	8	9	10
1	**Bachelor of Arts (BA)**	113.3	26.9	4.5	90.4	24.1	3.6	19.5	42.6	4.2	0.22
2	**B.Com**	43.4	10.3	2.0	38.7	10.3	2.2	4.3	9.4	-1.9	0.11
3	**B.Pharma**	4.5	1.1	19.0	4.5	1.2	19.0				0.00
4	**Bachelor of Science (B.Sc)**	49.7	11.8	0.8	47.2	12.6	0.7	2.2	4.8	-0.2	0.05
5	**B.E/B.Tech**	38.5	9.1	-0.6	38.5	10.2	-0.6				0.00
6	**BCA**	6.2	1.5	5.5	5.7	1.5	7.2	0.5	1.1	-7.1	0.09
7	**B Ed**	15.2	3.6	9.9	14.9	4.0	10.0	0.3	0.7	5.6	0.02
8	**BBA**	7.2	1.7	10.9	6.6	1.8	11.8	0.5	1.1	0.7	0.07
9	**LLB**	4.6	1.1	7.6	4.6	1.2	7.7	0.0	0.0	-4.2	0.00
10	**BSc Nursing**	4.0	1.0	13.6	4.0	1.1	13.7	0.0	0.0	-2.2	0.00
11	**M.B.B.S.**	3.2	0.8	7.3	3.2	0.9	7.3				0.00
12	**Post-Graduate programmes**										
13	**Master of Arts (MA)**	20.9	4.9	7.2	11.4	3.0	6.1	8.2	18.0	5.0	0.72
14	**MBA**	6.5	1.5	2.8	5.3	1.4	5.7	1.2	2.6	-6.4	0.23
15	**M.Com**	5.2	1.2	3.1	3.4	0.9	4.2	1.5	3.3	-2.9	0.45
16	**M.Sc**	9.5	2.3	7.6	8.3	2.2	8.3	1.1	2.5	1.8	0.14
17	**Sub-total (Tertiary)**	331.7	78.7	3.7	286.8	76.3	3.4	39.5	86.3	2.3	0.14
18	**Other Tertiary**	89.8	21.3	5.2	89.1	23.7	6.6	6.3	13.7	9.6	0.07
19	**Total Tertiary**	421.6	100.0	4.0	375.8	100.0	4.1	45.7	100.0	3.2	0.12

Source: All India Survey on Higher Education (AISHE), 2021-22

At the postgraduate level (regular), M.Sc. had a share of (2.2%) in 2021-22, but at 8.3% was the fastest growing program (line 18, Table 73). The share of Masters of arts (MA) program in post-graduate enrolment was however higher than the share of Bachelor of Arts (BA) in under-graduate enrolment.

In the distance mode, enrolment was concentrated more heavily in B.A (42.6%) and M.A (18%) and these were also the fastest growing programs between 2017-18 and 2021-22 (Table 73). Enrolment in distance MBA and M. Com courses declined during this period. The demand for distance education seems to be related to the desire to get a (under-) graduate or post-graduate degree to enhance credentials, rather than to learn and train for specific jobs. This in turn related to the practice of credential-based hiring rather than job skill-based hiring for basic and medium skill jobs.

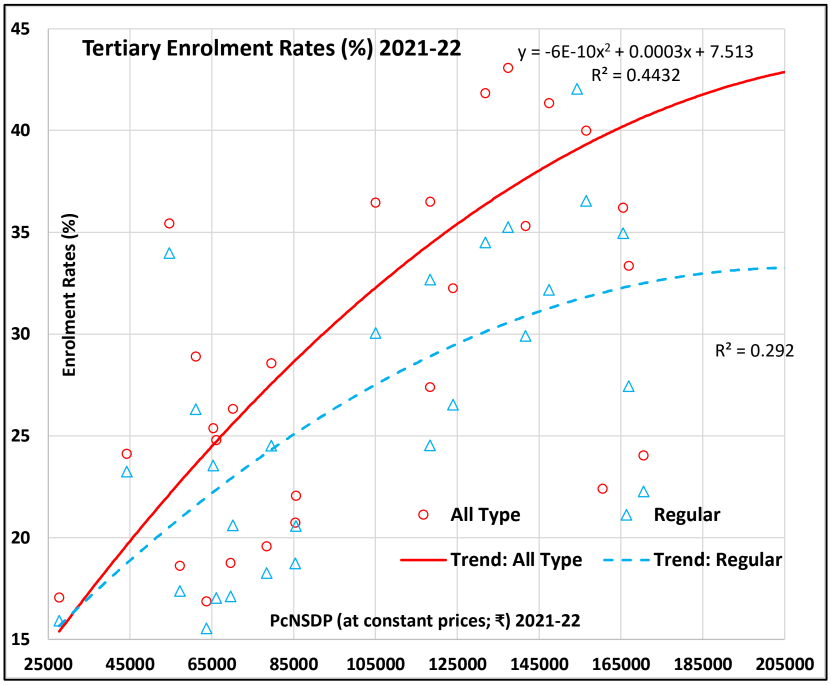
11.2.2 Enrolment Rates across states

As State-wise completion data are not available for tertiary education, enrolment rates are used to analyses inter-State performance. AISHE 2021-22 provides tertiary enrolment data in absolute numbers, which are converted into enrolment rates using the population aged 18-23 years for each State (Enrolment/Population aged 18-23) *100. State-wise estimates are available by mode- Al, Regular, and Distance.

Figure 41 shows enrolment rates in All Type & Regular modes for 2021-22 across States and Union Territories, arranged according to their per capita Net State Domestic Product (PC NSDP) for 2021-22. The regression trendline between All enrolment and per capita Net State

Domestic Product (Pc NSDP) is shown in red in Figure 41, with an R^2 of 0.44. The R^2 for regular mode is much less (0.29) sowing a weaker dependence on Per capita NSDP. [73]

Figure 41: Tertiary State wise Enrolment Rates at different level, 2021-22



Source: Author's Calc based on 1. AISHE 2021-22, (Table- 6 (a) & (b), 2. Population projection for India & States 2011-36 (Table 20) and for NE & UT- pop-proj. (Education.Gov.in) 3. PCNSP: National Statistics Office (NSO), RBI (on Aug 29, 2025).

Using the regression equation from Figure 41, an expected or benchmark enrolment rate (all) is calculated for each State based on its Pc NSDP, and the gap is defined as the difference between actual and expected enrolment. States are then grouped by over-performance (positive gap) and under-performance (negative gap), with States having a gap of +/- 3.0% [= (std.dev) 8.9%/3] points defined as having little or no gap (Table 74). Uttar Pradesh (+4.5%), Madhya Pradesh (+5.3%) and Manipur (+13.3%) were above the enrollment rate expected of their PCNSD (among States with per capita NSDP less than ₹10,000). Among States with per capita NSDP of more than Rs. 10,000/ Arunachal Pradesh (+1.9%), Delhi (+4.0), Uttarakhand (+5.2%), Himachal Pradesh (+5.7%), Tamil Nadu (+7.5%), Chandigarh (+20.4%) and Puducherry (+24.3%) performed better than expected at their PCNSDP (Table 74, 1st 3 columns).

[73] The regression trendline between Distance Mode and PCNSDP has an R^2 of 0.31.

Table 74: Performance of States in Tertiary Enrolment: All Types (2021-22)

Performance of States in Tertiary Enrolment : All (2021-22)			
	Negative Gap	**Little or No gap**	**Positive Gap**
PcNsdp < ₹10,000	Tripura (-8.0)	J&K (+0.1)	UP (+4.5)
	ChhattisG (-7.8)	WB (+0.7)	MP (+5.3)
	Assam (-7.3)	Meghalaya (+0.8)	Manipur (+13.3)
	Odisha (-6.7)	Rajasthan (+1.0)	
	Nagaland (-6.7)	Bihar (+1.7)	
	Jharkhand (-4.1)		
PcNsdp > ₹10,000	A&NIslands(-17.8)	MH (-2.7)	Delhi (+4.0)
	Gujarat (-17.2)	TelanG (+0.2)	Arunachal (+1.9)
	Goa (-8.1)	Andhra (+1.9)	UttaraK (+5.2)
	Haryana (-7.5)	Kerala (+2.7)	HP (+5.7)
	Punjab (-7.2)		Tamil Nadu (+7.5)
	Sikkim (-6.2)		Chandigarh (+20.4)
	Karnataka (-4.5)		Puducherry (+24.3)
	Mizoram (-3.2)		

Source: Authors calc based on AISHE 2021-22.; Note: PC NSDP is for 2021-22. Gaps are in brackets.

Though major States above the national average of 28.4% include Sikkim (38.8%), Goa (35.7%), Karnataka (36.2%) and Mizoram (32.3%) their enrolment rate is below the rate expected of States at their level of per capita NSDP'.

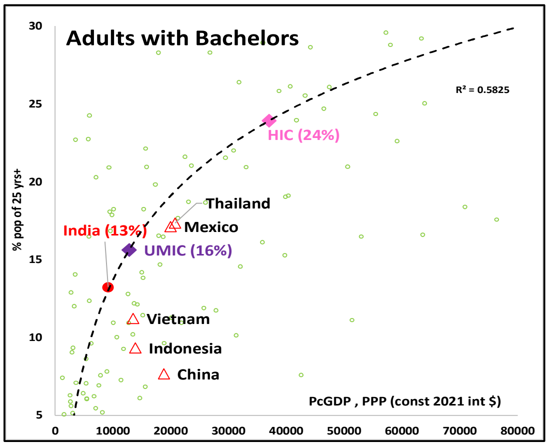
11.3 Tertiary Attainment: Adult (25+)

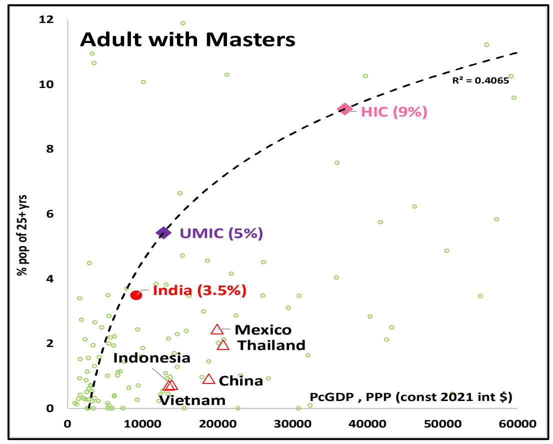
This section compares the tertiary education levels of India's adult population, aged 25 and over, with that of other countries. India's share of adults (25+) with a Bachelor's or equivalent was 13.2% in 2023 (Figure 42), 0.2% points above the expected/benchmark level at its per capita GDP. In contrast, Vietnam (-5%), Indonesia (-7%), Mexico (-2%) and Thailand (-2%) were all below their expected/benchmark levels, with China showing the largest negative gap (-11%). India however, needs to increase the percent of students with bachelor's or equivalent by 2.4% points in 5 years to reach min UMIC benchmark, and by 10.7% points to reach min HIC benchmark in 25 years.

India's share of adults (25+) with a Master's or equivalent was 3.5% in 2023 (Figure 42, 2nd panel) which is (-) 0.7% point below the expected/benchmark level at its per capita GDP. India's potential competitors had a larger performance gap on this indicator: Vietnam (-4.9%), Indonesia (-5.0%), China (-5.9%), Mexico (-4.6%) and Thailand (-5.2%) are all below their expected/benchmark levels. The share of adults with Masters or equivalent needs to be increased by 1.9% points by 2030 (UMIC), and by 5.7% points by 2050 (HIC).

This comparison of higher education suggests that historically, tertiary education was more important for India's service-oriented economy, than it was for the manufacturing focused economies of East and South East Asia.

Figure 42: Adults with Bachelor & Master Degree (% of population 25+)





Source: World Development Indicators, December 2024

National Education Policy 2020 (NEP 2020) noted that students completing Grades 11-12 with vocational subjects often lacked clear pathways to continue their chosen vocations in higher education. Admission criteria in general higher education institutions were not aligned to accommodate vocational qualifications, resulting in limited vertical mobility for students from the vocational stream. NEP 2020 proposed the integration of vocational education within Higher Education Institutions (HEIs) will offer vocational education either independently or in partnership with industry and NGOs. The B.Voc. programs, vocational courses will be made available within regular Bachelor's degree programs, including four-year multidisciplinary degrees. HEIs may also offer short-term certificate courses, integrate 'Lok Vidya' into vocational curricula, and explore delivery through Open and Distance Learning (ODL) modes.

11.4 Employability of the Credentialed

The issue of the employability of those who have obtained credentials has come to the fore in the past decade. Either the degree does not measure what they are supposed to have learnt, or the course curriculum is so divorced from the skills required in jobs, that they are not employable. Those who have graduated from professional courses (MCA, BE/BTech) are more employable than those who have general education degrees (BA, BCom, B Pharma, BSc). MBAs have the highest employability of 72.3% in 2026, followed by BE/BTech at 70.2% and MCA at 68.2%. Those with general education have an employability of between 55.6% for BA degree holders and 62.8% for BCom degree graduates, in 2026 (Table 75).

Table 75: Employability of Graduates from University & Professional programs

Year	2019	2020	2021	2022	2023	2024	2025	2026	CAGR
Bachelor of Arts (B.A.)	29.3	48.0	42.7	44.2	49.2	47.1	54.0	55.6	9.6
Bachelor of Commerce (B.Com)	30.1	47.0	40.3	42.6	60.6	48.1	55.0	62.8	11.1
Bachelor of Pharmacy (B.Pharma)	36.3	45.0	37.2	44.6	57.5	54.0	56.0	58.0	6.9
Bachelor of Science (B.Sc)	47.4	34.0	30.3	38.1	37.7	51.3	58.0	61.0	3.7
Master of Computer Applications (MCA)	43.1	25.0	22.4	29.3	30.6	64.6	71.0	68.3	6.8
Bachelor of Engineering/ Technology (B.E/B.Tech)	57.1	49.0	46.8	55.2	57.4	64.7	71.5	70.2	3.0
Master of Business Administration (MBA)	36.4	54.0	46.6	55.1	60.1	71.2	78.0	72.8	10.4
Average of									
University Courses	35.8	43.5	37.7	42.4	51.3	50.1	55.8	59.3	7.5
Professional Programs	45.5	42.7	38.6	46.5	49.4	66.8	73.5	70.4	6.4
STEM	46.0	38.3	34.2	41.8	45.8	58.6	64.1	64.4	4.9

Source: Global Employability Report 2025 & 2026; Global Employability Test (GET).

Employability among all post school degree holders (including from Polytechnics) has shown gradual improvement between 2019 and 2026, rising from 47.3% to 56.4% in aggregate (Table 75). BCOMs have shown the fastest increase of 11.1% per annum (compound growth), followed by MBAs with a compound annual increase of 10.4% over seven years (column CAGR, Table 75). Average employability for general education has increased at a faster rate (7.5% per annum), than for professional degrees (6.4% per annum) suggests a steady recovery and better alignment of higher education with market needs.

The slow improvement in employability of BSc (3.7% per annum) and BE/BTech (3.0%) degree holders, and STEM courses in general (4.9% per annum) suggest that there is great scope of improving the quality of pedagogy, by replacing outdated instruments & lab equipment, and introducing an apprenticeship/ internship program for Professors in industry. This issue may also be connected to the difference in minimum learning outcomes in Arithmetic vs Reading in school (section 6) with the much lower MAP relative to MRP.

Top performing States by Youth Employability, were Utter Pradesh (78.6%), Maharashtra (75.4%), Karnataka (73.9%), Kerela (72.2%) and Delhi (71.2%) in 2026 (India Skills Report, 2026).

11.5 Institutional Capacity

Table 76 presents the distribution of universities in 2021-22 and the change since 2017. State Public Universities form the largest share (37%), with 423 institutions, followed closely by State Private Universities, which account for 35%. State Private Universities also show the highest growth, adding 129 institutions since 2017. Institutions of National Importance make up around 14% of the system and have increased by 52 during this period. In contrast, Deemed Universities both private and government form a small share of the total and show marginal change. Central Universities account for about 5% of all universities and have expanded modestly. Overall, the growth in the university system is driven mainly by State Private Universities and Institutions of National Importance, while other categories have remained stable.

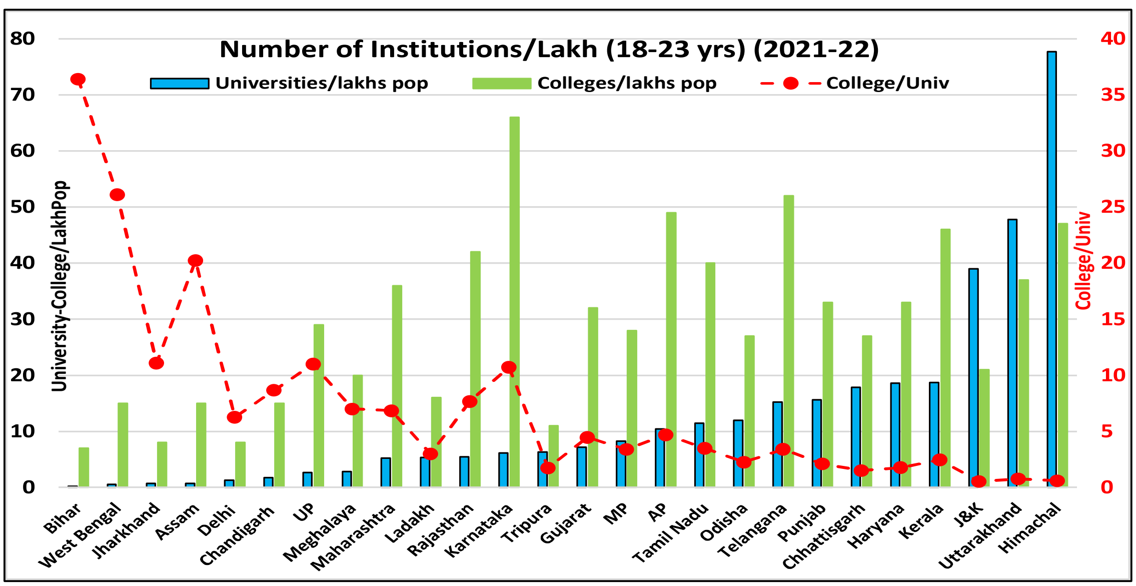
Table 76: Share of different type Universities, & Change (2017-18 to 2021-22)

Number of Universities	No. of Univ	Share(%)	Change: 2017-18 to 2021-22	
	2021-22	2021-22	Numbers	Shares (%)
State Public University	423	37	72	-3.0
State Private University	391	34	129	4.4
Deemed University Private	81	7	1	-2.0
Institue of National Importance	153	13	52	1.9
Central University	53	5	8	-0.5
Deemed University Government	33	3	0	-0.9
Total	1134	100	262	0.0

Source: All India Survey on Higher Education (AISHE), 2021-22

Figure 43 shows the availability of universities and colleges per lakh population (18-23 years) across major states. The pattern is uneven, and in most states, college presence far exceeds university presence. Large states such as Bihar, West Bengal, Jharkhand and Assam have very low university density (0.2-0.7 per lakh youth), yet their college numbers are much higher ranging from 7 to 15 per lakh youth. Even in states with relatively better access Delhi (1.3 universities; 8 colleges) and Uttar Pradesh (2.6 universities; 29 colleges) the gap remains. Southern and western states such as Maharashtra, Karnataka, Andhra Pradesh, Tamil Nadu and Gujarat show colleges outnumber universities by a large margin.

Figure 43: University & College Density (per lakhs): 2021-22



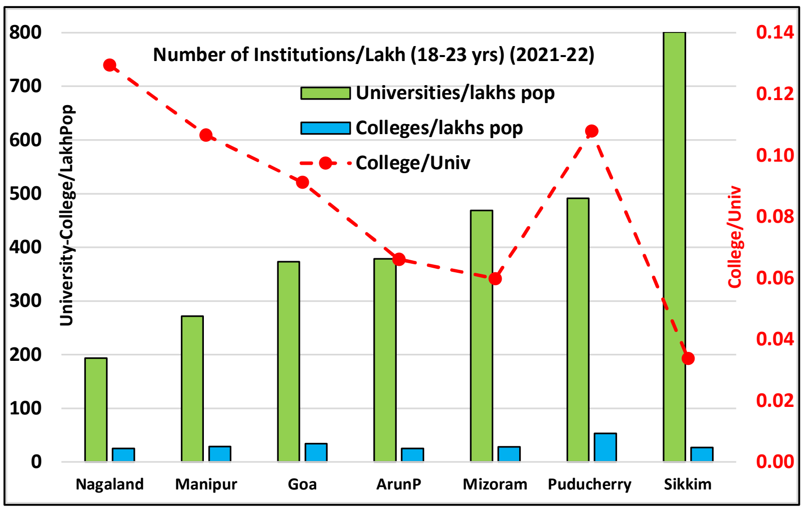
Source: All India Survey on Higher Education (AISHE), 2021-22.

Overall, the national picture suggests that India's higher education system has grown through colleges far more than universities, leading to limited university-level capacity relative to the size of the youth population.

In contrast to major states, the North-Eastern states and some Union Territories (Figure 44) show a completely different pattern. The number of universities per lakh youth is extremely high, possibly because the population base is small, while the number of colleges remains limited. As a result, these regions have more universities than colleges in per lakh terms.

States such as Arunachal Pradesh, Mizoram, Sikkim and Manipur report very high university density but only a modest number of colleges. This creates very low college-to-university ratios (often below 1), the pattern is similar in small UTs like Puducherry and Goa. This imbalance indicates that NE states and UTs require more colleges to create a balanced higher education structure. Unlike large states where colleges are far ahead of universities the challenge here is to expand college capacity.

Figure 44: University & College Density (per lakhs): NE states & UT's



Source: All India Survey on Higher Education (AISHE), 2021-22.

11.6 Programs and Initiatives

India's tertiary education system is undergoing major reforms to expand access, improve quality, and make learning more flexible and employment-oriented. Recent policies and initiatives focus on increasing enrolment, strengthening universities and colleges, promoting digital and multidisciplinary learning, and improving governance and regulation. Together, these efforts aim to build a higher education ecosystem that supports both academic inclusivity and the emerging needs of the labor market.

NEP 2020 proposed major reforms to expand and improve higher education in India. The policy aims to increase the Gross Enrolment Ratio (GER) in higher education from 26.3% in 2018 to 50% by 2035, including vocational and online learning. To give students more flexibility, NEP introduces Multiple Entry and Exit Options, where an undergraduate program allows a certificate after one year, a diploma after two years, and a three- or four-year bachelor's degree, with a research option in the fourth year. The policy also plans a new Higher Education Commission of India (HECI) as a single regulatory structure replacing bodies like the

UGC and AICTE, with separate verticals for regulation, accreditation, funding, and academic standards. NEP further promotes digital transformation through the National Educational Technology Forum (NETF) to support e-learning, AI-enabled tools, and blended teaching-learning models. Overall, these reforms seek to improve access, flexibility, quality, and governance within the higher education system.

As part of NEP 2020's push for digital transformation in higher education, **SWAYAM** serves as national Massive Open Online Course (MOOC) platform, 5.15 crore enrolments, 16,530+ courses, and 388 universities permitting up to 40% credit transfer. In February 2024, the **SWAYAM Plus** initiative was launched; it delivers industry-integrated courses in high-demand areas such as AI, Data Analytics, and Healthcare, forming the base of the Digital University. [74]

Academic Bank of Credits (ABC), platform securely stores, accumulates, and transfers academic credits earned by students across recognized educational institutions. It acts as a digital "credit bank," where each learner's credits are recorded through their unique APAAR ID, enabling flexible learning and smooth credit mobility under the Multiple Entry-Exit system.

Hoque (2025), examined the integration of Academic Bank of Credits (ABC) with MOOCs among Social Sciences 186 students of Bihar central university.[75] The study reports improvement in research & critical thinking, communication, and interdisciplinary understanding and application of theoretical knowledge to real-world situations. Students also reported autonomy in designing learning paths and deciding what, when, and how to learn. Students reported positive outcomes in skill development, particularly data analysis and practical applications. Author found that students "appreciate the flexibility and personalized learning opportunities, challenges such as managing workloads, perceived lack of depth in some MOOCs and technical issues hinder the ABC-MOOC model's effectiveness. Concern about limited interaction, affecting collaborative learning, also emerged." Authors suggested that improvements are needed in course quality, workload support, and infrastructure.

Rashtriya Uchchatar Shiksha Abhiyan (RUSA) 2013, designed to support State and State-aided higher education institutions in improving access, equity, quality, and employability. The first phase of the scheme was launched in 2013 and the second phase was launched in 2018. Now, in the light of the National Education Policy, RUSA scheme has been launched as Pradhan Mantri Uchchatar Shiksha Abhiyan (PM-USHA). *Dobi and Tripathi (2020),* found an improvement in male & female GER in Govt Degree Colleges in Jammu & Kashmir[76].

PM-USHA strengthens innovative pedagogy, learning, digital infrastructure, accreditation, and governance across colleges and universities. It promotes flexible learning through Multiple Entry-Exit, the Academic Bank of Credits, Choice Based Credit System (CBCS), and digital

[74] Details discussed earlier in Section 6.4.1.
[75] By combining quantitative and qualitative data; sample comprised 186 students for a questionnaire survey and 40 students for semi-structured interviews, specifically from Social Sciences programs such as Economics, Psychology, Sociology, Political Science, Hindi, History, and English.
[76] Based on 15 Government Degree Colleges from four districts of Jammu & Kashmir (Anantnag, Pulwama, Kulgam, Shopian), selected through stratified sampling by literacy levels; institutions established before 2010-11 and offering Arts, Science, and Commerce undergraduate programs.

education platforms such as SWAYAM. It also aims to enhance research, skilling, and industry linkages so that higher education becomes more multidisciplinary, employment-oriented, and aligned with NEP 2020 targets for quality and participation. *Shanti Priya & Vijayalakshmi (2025)*, that institutions participating in PM-USHA increased infrastructure investment by 30% increase over five years. Funds have also been used for expansion of digital infrastructure such as smart classrooms and e-libraries. 70% participants reported improved pedagogical skills after attending PM-USHA-sponsored training sessions

Vidya Lakshmi Portal (August 2015), is a single-window digital platform that allows students to apply for education loans from multiple banks in one place. It connects students with banks following Indian Banks' Association (IBA) guidelines, which require loan applications to be processed within 15-30 days. The portal simplifies the loan process by providing a common application form, tracking facility, and access to government scholarship links, helping students secure timely financial support for higher education. *Gagan and Malagi (2025)* Survey data from 286 student respondents indicate, that (1) "Digital loan services are more effective than traditional methods", (2) digital channels improve timely approval.

National Scholarship Portal (NSP) is a single-window digital platform of the Government of India that brings together scholarship schemes from the Centre, States, UGC, AICTE, and other agencies. It allows students to register, apply, and track applications online, while providing scheme-wise eligibility and documentation details. By centralizing the entire process, NSP improves transparency, reduces duplicate entries, and ensures timely and efficient disbursement of scholarships to eligible students across the country. *Mohapatra,* impact evaluation report on National Scholarship Portal have contributed to improving access to higher education among disadvantaged groups.

Unnat Bharat Abhiyan (UBA) 2.0 is a flagship rural development initiative of the Ministry of education, which connects higher education institutions (HEIs) with local communities. Under UBA 2.0, 688 selected HEIs both technical and non-technical have adopted around 3,555 villages to support their development. Institutions conduct surveys, identify local challenges, and work with Panchayats to prepare village development plans, which are finalized through Gram Sabhas. IIT Delhi serves as the National Coordinating Institute. The program focuses on key areas such as sanitation, water management, rural infrastructure, energy access, education, health, agriculture, skill development, and awareness about government schemes, aiming to link academic expertise with grassroots needs for sustainable rural development.

11.7 Summary & Conclusion

This section summarizes the analyses of Tertiary education in India. It covers enrolment rate at International, national and state-level, employability outcomes, tertiary attainment, along with the programs and schemes aimed at improving quality, pedagogy and alignment with labor-market needs.

At the Inter-national level, the Gross Enrolment Ratio (GER) for tertiary education was 33.1% in 2023, at around the benchmark expected at India's per capita GDP. States which have performed above the level expected of their Per capita NSDP (PCNSDP) include Uttar Pradesh, Madhya Pradesh, Manipur, Uttarakhand, Himachal Pradesh, and Tamil Nadu. The number of students enrolled in India's tertiary education is estimated to be 50-52 million. This is less than Chinas, but 2.2 times that of Vietnam, Indonesia, Thailand and Mexico taken together, despite their performance being better than ours for their level of PCGDP. The GER for tertiary education must keep pace with the projected pace of per capita GDP growth. This requires an increase in Tertiary GER of 7.5% points, to 40.7 % by 2030, and an increase of 28.6% points to 61.7% by 2050.

Several programs and initiatives aim to improve access, quality, and employability outcomes. SWAYAM provides a MOOC (Massive Open Online Course) platform for online learning. ABC (Academic Bank of Credits) enables digital storage and transfer of academic credits. PM-USHA supports infrastructure, governance, and quality improvements in higher education.

Employability of graduates has improved from 47.3% to 56.4% on average, between 2019 to 2026. Professional degrees such as MBA (72.3%), BE/BTech (70.2%), and MCA (68.2%) continue to show higher employability, while general degrees like BA (55.6%) and BCom (62.8%) lag but are improving faster. The slow improvement in employability of BSc (3.7% per annum) and BE/BTech (3.0%) degree holders, and STEM courses in general (4.9% per annum) reflecting the need for better pedagogy, updated laboratories, and stronger industry linkages.

In terms of attainment, India's share of adults (25+) with a Bachelor's degree is 13.2%, slightly above the level expected of its per capita GDP. This is better than the performance of Vietnam, Indonesia, Mexico, and Thailand for their per capita GDP. The challenge will be to raise this to 15.6% (2030) and 23.9% by 2050, in line with the projected increase in PCGDP. The relative performance in Master's degrees is less than for Bachelors, 3.5% fewer adults having an MA than the PCGDP related benchmark. However, Vietnam, Indonesia, China, Thailand and Mexico showing larger negative gaps.

The National Education Policy (NEP) 2020 outlines major reforms for tertiary education expanding the Gross Enrollment Ratio to 50% by 2035, integrating vocational education within tertiary education, and accelerating the adoption of online and digital learning through platforms such as SWAYAM. Together, these shifts aim to improve access, quality, and employment relevance across India's higher education system.

One of the recurring problems of Higher education in India is its weak connect with the skills required to become employable. The following steps can be considered to improve the link between Higher education, Job skills and formal employment.

1. Map every University to local industry and significant regional economic actors.
2. Introduce Faculty Apprenticeships with industry, changes rules to make these eligible for faculty Sabbatical and approved refresher course work and/or retraining.

3. Make provision in all engineering departments for appointment of "Professor of Practice" from the set of retired or serving engineers in Industry.
4. Liberalize the rules for setting up and running specialized colleges, such as for risk analysis and risk management. Regulate Private colleges on the basis of learning outcomes and employability (GET test), then resident the number of resident professors.
5. Soft skill: Ability to discuss and debate, search for questions and answers, is best learnt by doing. Universities should promote forums to facilitate such activities.
6. National and State universities should have as one of their primary goals, searching for cost-effective, sustainable solutions to National and State problems, respectively. The learning occurs by the attempt to solve problems, even if few solutions are found
7. Complete liberalization of Govt rules for STEM professors, conferences foreign visits and foreign visitors.

12. Comparative Scale of Human Capital

In an international context, the scale of India's Human capital is as, if not more, important than attainment rates, as this determines international comparative advantage, and evolving (dynamic) comparative advantage. Table 77 presents two sets of estimates of educational attainment of India's adult population aged 25 years & over. Number of adults with given level of education are based on two sets of population estimates; One, the Technical Group on Population Projections, and two the UN Population Division. Adults at specific education (mi) = Population aged 25 & over (mi) * Per cent of total adults with the specific attainment (%).

Table 77: Number of Adults (25+) with different levels of Education

		Technical group on Pop		UN Population	
	Completion Rates (%)	Pop aged (Millions)	Completers (million)	Pop aged (Millions)	Completers (million)
Primary Completed					
2023	65.6	795	522	820	538
2030 (proj)	78.6	906	712	936	735
2050 (proj)	93.0	na	na	1164	1083
Lower secondary completed					
2023	52.2	795	415	820	428
2030 (proj)	62.9	906	570	936	589
2050 (proj)	81.4	na	na	1164	947
Upper secondary completed					
2023	33.7	795	268	820	276
2030 (proj)	46.8	906	424	936	438
2050 (proj)	65.0	na	na	1164	757
Bachelors completed					
2023	13.2	795	105	820	108
2030 (proj)	15.6	906	142	936	146
2050 (proj)	23.9	na	na	1164	278
Masters completed					
2023	3.5	795	28	820	29
2030 (proj)	5.4	906	49	936	51
2050 (proj)	9.2	na	na	1164	108

Source: Author calculation based on World Development Indicators, December 2024 & Census of 2011, Population projection for India & States 2011-36, Report of the Technical group on population projection, July 2020 (MoHFW).

In 2023, based on Technical Group estimates, around 522 million adults had completed primary education, 415 million had completed lower secondary education, and 268 million had completed upper secondary education (Table 77). Corresponding estimates using UN population projections are slightly higher, at about 538 million, 428 million, and 276 million, respectively. Even at the tertiary level, India had approximately 105-108 million adults with a bachelor's degree and nearly 28-29 million with a master's degree (Table 77).

12.1 International comparison of Educated Adults

Table 78 shows, that the number of adults with primary and lower secondary education in India is significantly lower than in China (982 mil & 742 mil, respectively), but the gap is only 15% at the upper (overall) secondary school level. Number of Indian adults with primary, lower secondary and upper secondary education is 1.8 to 2 times that of Vietnam, Indonesia, Thailand, and Mexico combined (MIC4).

Table 78: International comparison of adults with different levels of education

	India	Vietnam	Indonesia	Thailand	China	Mexico
Primary Education						
Completers (million)	538	55	139	39	982	64
Completion Rates(%)	65.6	87.3	83.8	74.8	95.8	85.7
Pop aged (millions)	820	63	166	52	1025	75
Lower secondary						
Completers (million)	428	41	94	28	742	52
Completion Rates(%)	52.2	65.6	56.7	54.2	72.4	68.9
Pop aged (millions)	820	63	166	52	1025	75
Upper secondary						
Completers (million)	276	25	65	20	326	31
Completion Rates(%)	33.7	39.1	39.1	39.4	31.8	40.9
Pop aged (millions)	820	63	166	52	1025	75
Bachelors education						
Completers (million)	108	7	15	9	79	13
Completion Rates(%)	13.2	11.2	9.3	17.4	7.7	17.1
Pop aged (millions)	820	63	166	52	1025	75
Masters education						
Completers (million)	29	0	1	1	9	2
Completion Rates(%)	3.5	0.7	0.7	2.0	0.9	2.5
Pop aged (millions)	820	63	166	52	1025	75

Sources: WDI/UNESCO (completion rates), Population Division (2026)
Note: China rates are 2020, Maters rates for Thailand 2022 & Mexico 2020

For bachelor's-level education, India's adult attainment rate was higher than that of Vietnam, Indonesia, and China, but lower than Thailand and Mexico. India has around 108 million adults with a bachelor's degree, which is 1.4 times that of China (79 mil) and 2.4 times that of the MIC4. At the master's level, India's attainment rate (3.5%) is higher than that of Vietnam, Indonesia, China, and Thailand, but lower than Mexico. In absolute numbers, India has approximately 29 million adults which is 3.1 times China's and 6.3 times the MIC4, which together (China + MIC4) have only 13 million Master degree holders (Table 78).

13. Research & Development

Research and Development (R&D) forms the core of a knowledge-based economy and depends on both the strength of the education system and the availability of skilled human capital. India's R&D performance is shaped by the education base, the rate at which students complete doctoral programs, overall R&D expenditure, and the size and quality of its research workforce, including researchers and technicians. Firm-level investment in R&D and the ability to translate research into innovation outcomes also play a crucial role. In recent years, the Government has introduced initiatives such as the National Research Foundation (NRF) to promote high-quality research and Startup India to encourage innovation and entrepreneurship. In this section we compare India with some of its potential competitors, using WDI and other international data.

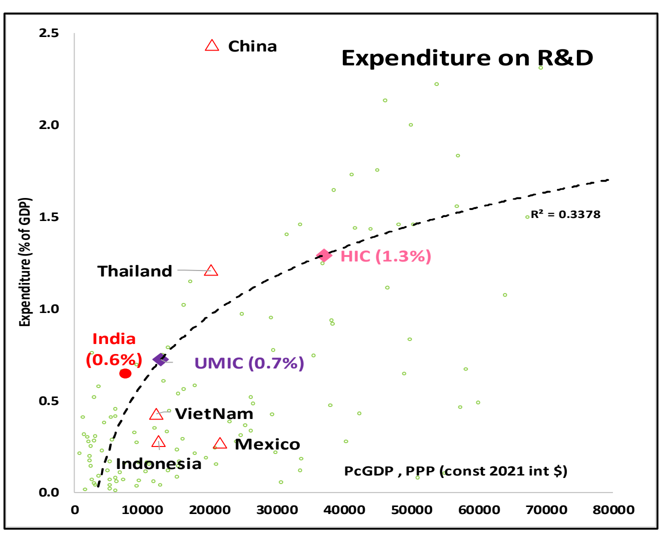
13.1 Doctoral Completion

The paper found no relationship between the percent of adults in a country who had acquired Doctorates, and the per capita GDP of the country. This section, therefore compares India's performance with a selection of lower middle income and upper middle-income countries. India's doctoral completion rate was 0.08% in 2023, which is higher than Vietnam (0.07%) and Indonesia (0.05%), but lower than that of Malaysia (0.10%), China (0.12%), Thailand (0.12%), and Mexico (0.31%).

13.2 R&D Expenditure

India's R&D expenditure was 0.6% of GDP in 2020 (Figure 45), 0.2 percentage points above the expected level. Thailand (+0.2%) and China (+1.5%) were also above their benchmark levels, while Vietnam (-0.3%), Indonesia (-0.4%), and Mexico (-0.7%) fall below their benchmark levels (Figure 45).

Figure 45: Research and development expenditure (% of GDP)



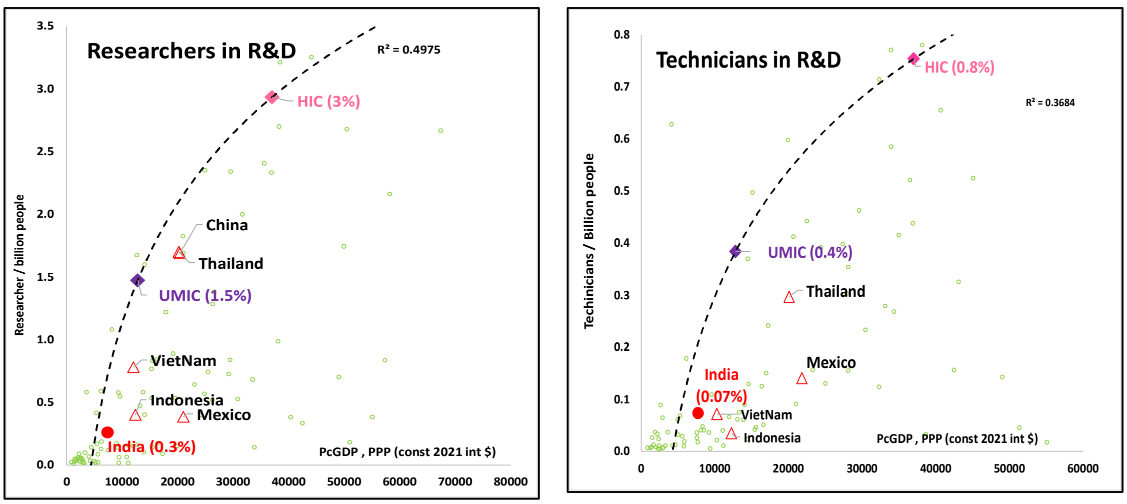
Source: World Development Indicators, December 2024

The base for India in Figure 45 is 2020, therefore we estimate the value for 2023 (0.7%) assuming that the gap remained the same (0.2% points). This gap is then added to the expected expected/benchmark (0.5%) for India at its 2023 per capita GDP. Based on this we estimate the improvement needed to reach UMIC & HIC benchmarks. This shows that we are likely already above the UMIC benchmark, and need an increase of 0.6% points to reach the benchmark of 1.3% for HIC (2050).

13.3 Researchers & Technician in R&D

India had 0.3 researchers per billion people in 2020 (Figure 46), 0.4 percent point below the expected level. Vietnam (-0.6/billion), Indonesia (-1.0/billion), and Mexico (-1.8/billion) fall below their benchmarks, while Thailand and China had a smaller gap of -0.4/billion.

Figure 46: Researchers & Technicians in R&D (per billion people)



Source: World Development Indicators, December 2024

The base for India in Figure 46 is 2020, therefore we estimate the value for 2023 (0.6%) assuming that the gap remains the same (-0.4% points). This gap is then added to the expected expected/benchmark (1.0%) for India at its 2023 per capita GDP. Based on this we estimate the improvement needed to reach UMIC & HIC benchmarks. This shows that we need to improve researchers per billion people by about 0.9% points to reach the UMIC benchmark of 1.5% and by ~2.3% points to reach the HIC benchmark of 2.9% for HIC India has a much smaller research workforce and must expand it significantly to support future R&D and Innovation.

India had 0.07 technicians in R&D per billion people in 2018 (Figure 46, 2nd panel), 0.13 below the expected level. Vietnam (-0.24/billion), Indonesia (-0.33/billion), Thailand (-0.24/billion), and Mexico (-0.43/billion) were also below their benchmark levels, with Indonesia and Mexico showing the largest gap.

The base for India in Figure 46 (2nd panel) is 2018, therefore we estimate the value for 2023 (0.2%) assuming that the gap remains the same (-0.1% points). This gap is then added to the expected expected/benchmark (0.3%) for India at its 2023 per capita GDP. Based on this we estimate the improvement needed to reach UMIC & HIC benchmarks. This shows that we need to improve technicians per billion people by about 0.2% points to reach the UMIC benchmark of 0.4% and by ~0.6% points to reach the HIC benchmark of 0.8% for HIC.

This again illustrates the big challenge that India faces in training semi-skilled workers for all sectors of the economy, Agriculture, Industry and Services, modern and traditional. This can also be seen as an opportunity to raise the productivity and wages in every sector of the economy, formal and informal, employed or self-employed.

13.4 Firms that do R&D and Innovate

We found no relationship between the percent of firms that spend on R&D, and the per capita GDP of the country.[77] The share of firms which have developed products, improved processes and do R&D in India is 1.4% (Table 79). This is higher than Vietnam (0.9%), Indonesia (0.9%), Thailand (0.8%), but lower than Mexico (2.4%) and Malaysia (8.1%). China at 18.2% was way ahead of the pack (Table 79). This data suggests that Mexico and Malaysia are likely to be our peer competitors in high tech manufacturing.[78]

Table 79: Firms that spend on R&D (% of firms)

Country	Year	PcGDP	%firms
India	2022	$8,594	1.4
Viet Nam	2023	$13,546	0.9
Indonesia	2023	$13,890	0.9
Thailand	2016	$19,371	0.8
Mexico	2023	$21,917	2.4
China	2024	$23,846	18.2
Malaysia	2024	$34,116	8.1

Source: World Development Indicators, December 2025.

13.5 Innovation

India ranks 38th out of 133 countries (Table 80) in the Global Innovation Index (GII). Among major competitors, India ranks 6 positions above Viet Nam (44), 3 positions above Thailand (41), 17 ranks above Indonesia (54), and 20 ranks above Mexico (56). Malaysia is however ranked 4 ranks above India. China is an outlies at rank 10, with 19th rank on inputs, but 5th oh output. This may be connected to its highly successful policy of Reverse Engineering and Developing (READ) technologies of foreign companies located in China, and companies, startups and research institutions possessing advanced technology, innovative solutions, in High Income, technologically developed, countries (HITDCs)

[77] Based on WDI, Dec 2024 data. The discussion is based on updated data from WDI, Dec 2025, which tightens the definition to firms which develop products, process improvement and do R&D.
[78] And also of UK, Japan and USA.

Table 80: Global Innovation Index Ranking, 2025

	GII	Input	Output
Countries	Rank	Sub-Index	
India	38	52	32
Viet Nam	44	50	37
China	10	19	5
Malaysia	34	30	39
Thailand	45	46	43
Indonesia	55	60	59
Mexico	58	81	52

Source: GII Database, WIPO, 2025

13.6 Patent applications & Hi-Tech Exports

We found no relationship between the Patent applications, residents per million, and the per capita GDP of the country. India reports 19 applications per million (Table 81), higher than Vietnam (11), Indonesia (5), Thailand (12), and Mexico (9), but lower than Malaysia (26). China with 1,010 applications per million, is far higher than all other selected countries, except Japan (1,770). The United States (790), Germany (479), France (197), and the UK (173) all report lower patenting levels than China.

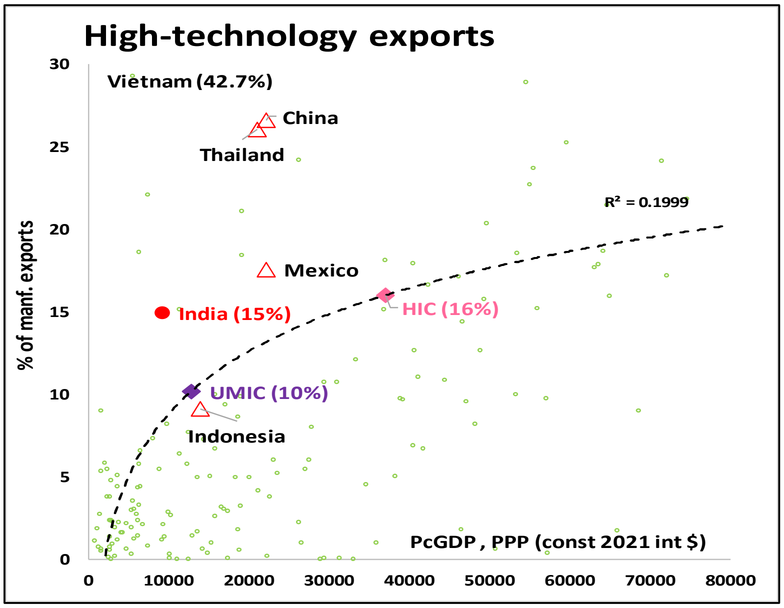
Table 81: Patent applications, Residents /Million population

Country	PcGDP	Patent/Mi
India	$8,050	19
Viet Nam	$12,049	11
Indonesia	$12,757	5
Thailand	$20,245	12
China	$20,407	1010
Mexico	$21,032	9
Malaysia	$29,823	26
Japan	$44,549	1770
UK	$52,872	173
France	$53,901	197
Germany	$62,950	479
United States	$71,318	790

Source: World Development Indicators, December 2024.

India's high-technology exports are 15% (Figure 47) of manufactured exports. The UMIC benchmark for 2030 is 10%, and India is already above this level. The HIC benchmark for 2050 is 16%, which India is close to achieving. India's High technology exports were higher than Indonesia (9%) but lower than Mexico (18%), Thailand (26%) and China (27%). China and Thailand are much higher, with a gap of about (+13%) compared to India.

Figure 47: High-technology exports (% of manufactured exports)



Source: World Development Indicators, December 2024

13.7 Programs and Initiatives

India's research and innovation ecosystem is supported by several national programs designed to strengthen scientific talent, expand research capacity, and promote early-stage innovation. These initiatives focus on nurturing young researchers, supporting institutions, and encouraging industry academia collaboration. Together, they aim to build a pipeline of scientific talent and enhance India's overall R&D performance.

The Institutes of Eminence (IoE) initiative is a Government of India program launched in 2017 to empower select universities and higher education institutions to become **world-class teaching and research hubs**. It grants them greater autonomy, funding (for public institutions), and the ability to collaborate globally, with the goal of placing Indian universities among the top-ranked institutions worldwide. 10 Public and 10 private universities/institutes have been selected, with the public universities receiving a corpus of 1000 crore for the purpose.

As reported on the University of Hyderabad web site under the title, "IoE – Initiatives & Impact, UoH Herald (2018)", the IoE initiative has helped promote an "ecosystem of innovation, entrepreneurship and translational research" through Start-ups and public-private partnerships. Improvements are reflected in research output, with the average number of publications per Univ of Hyderabad faculty increasing from about 1-1.5 to nearly 3 annually, including around 30% of publications in Q1 journals.

Government of India (GOI) has also designated several universities and research institutions as Centers of Excellence (CoEs) in frontier areas of science, technology, and innovation. These centers focus on specialized topics such as **nanotechnology, renewable energy, advanced manufacturing, AI, biotechnology, and energy storage.** They are funded under schemes like the Training and Research in Frontier Areas of Science and Technology (FAST) and the Institutes of Eminence (IoE) initiative.

GOI has also initiated Missions in frontier areas like Quantum and AI. **The National Quantum Mission** (NQM) was approved by the Union Cabinet on 19 April 2023, aims to build national capacity in quantum technologies. The Mission supports research and development in quantum computing, communication, sensing and metrology, and quantum materials and devices. Implementation is through four thematic hubs with support for startups and capacity building. The **National Mission for Artificial Intelligence** (2024) to support the development and deployment of AI applications in priority sectors. The Mission focuses on building research capacity, strengthening academia-industry collaboration, and applying AI in areas such as healthcare, education, agriculture, and urban infrastructure.

INSPIRE-MANAK: Innovation in Science Pursuit for Inspired Research-Million Minds Augmenting National Aspiration and Knowledge (2008), aims to identify and encourage scientific talent among students aged 10-15 (Classes 6-10). The scheme invites around 10 lakh idea submissions each year from over 5 lakh schools, from which 1 lakh ideas receive an INSPIRE Award of ₹10,000. Schools can nominate up to five students annually through an online system, and selections are made based on the originality and quality of ideas. Selected students participate in district, state, and national-level exhibitions, and participants reaching the National Level Exhibition & Competition receive mentorship at leading technical institutions. The top 60 projects are recognized as national winners. The National Innovation Foundation serves as the scheme's resource partner.

Mir (2024) assessment of the INSPIRE-MANAK Scheme in Jammu and Kashmir, uses primary data from district, state, and national level competitions along with secondary sources[79]. Findings show that about 1,000 student entries were submitted at the District Level Exhibition and Project Competition (2021-2022), with 95 advancing to the State Level and 17 reaching the National Level, indicating growing interest and awareness among students and teachers. This aligns with the region's broader performance over the past 14 years, where around 24,906 schools have participated; despite having fewer schools than larger states[80]. Jammu and Kashmir has secured a notable share of National Level Exhibition and Project Competition awards, suggesting effective promotion of scientific temperament and creativity at the school level.

NIDHI's PRAYAS (2016) program supports young innovators in converting their ideas into proof-of-concept prototypes. It provides early-stage assistance that allows innovators to experiment & create a workable product ready for incubation and commercialization. As a pre-incubation initiative, PRAYAS is implemented through a Program Management Unit (PMU), with selected incubators (31) designated as PRAYAS Centers (PCs). 401 innovators have

[79] Official documents, project documentation, and competition reports from SCERT and related nodal officers in Jammu and Kashmir are used in the study. To obtain qualitative information, a few interviews with participants, instructors, and nodal officials were carried out.
[80] Maharashtra (141,763) & Karnataka (185,211)

been supported, of which 306 companies were started in PCs, 214 prototypes were developed, and 173 IPs were filed. 135 innovators raised Rs 78 crore, and 202 innovators generate 911 jobs.

Prime Minister's Research Fellowship (PMRF, 2018) is a flagship initiative designed to attract India's best young talent into doctoral program at IITs, IISc, IISERs, and top Central Universities and NITs. It supports students pursuing cutting-edge research in priority areas of science and technology. Fellows receive one of the highest doctoral stipends in the country ₹70,000 to ₹80,000 per month along with a research grant of ₹2 lakh per year. Candidates are selected through a rigorous process under discipline-wise nodal institutes, with entry allowed through direct admission or lateral entry from ongoing PhD program. PMRF aims to strengthen India's research ecosystem by enabling outstanding students to undertake high-quality, nationally relevant research within leading institutions. Between 2018 and 2024, about 3,688 scholars were admitted state-wide.[81]

Bhatia (2025) analysis shows that PMRF Fellows have published 300+ papers in peer-reviewed international journals and conferences (2022-2024). There were more than 45 patent applications, and several technology-oriented innovations, including three start-ups incubated at leading institutions (IIT Bombay, IIT Delhi and IISc). Fellows have collaborated with ISRO, DRDO, and CSIR labs, to integrate academic with applied research. Remaining challenges include, institutional concentration (80% fellows 8 institutions), Disciplinary gaps(public health education-job skilling, governance) and Post fellowship pathways. Awareness campaigns, mentoring initiatives in tier 2, 3 cities and creation of a PMRF Alumni Council are recommended by the Author.

PRISM, Promoting Innovations in Individuals, Start-ups and MSMEs (2014) supports individuals and enterprises in translating ideas into workable prototypes, processes or technology solutions. It also supports to public-funded autonomous institutions and registered societies engaged in fostering innovation, particularly for developing technologies that benefit MSME clusters. This is implemented through 12 TePP Outreach cum Cluster Innovation Centers (TOCICs)[82]. Priority areas include smart materials, waste-to-wealth solutions, and water and sewage management. DSIR assessed the PRISM scheme through survey & interviews of coordinators and innovators. The centers conducted 571 workshops/outreach activities reaching 17,017 individuals, while 1,082 proposals were received during 2015-2020. Most innovators developed prototypes in clean energy, industrially utilizable materials (40) and affordable healthcare (37). With 83% of innovators had completed the project, 42 patents generated and 38 startups noted. Majority of innovators experienced technical challenges transforming prototypes into (fabricated) products. Marketing challenges are even more daunting.

[81] MoE, 2024-25

[82] Technopreneur Promotion Programme (TePP).

SPARC, Scheme for Promotion of Academic and Research Collaboration (2018) strengthen India's research ecosystem by enabling structured academic and research partnerships between top Indian institutions and globally ranked foreign universities. The scheme supports joint research projects that include mobility of faculty and students, longer-duration visits by international experts, and opportunities for Indian researchers to work in advanced laboratories abroad. SPARC is designed to bring global expertise to address national challenges, deepen bilateral research ties, and enhance the international visibility and ranking of Indian higher education institutions. SPARC approved 284 proposals involving about 100 top international universities, in phase I (2018-20).

According to *Thapar (2025)*, 650 collaborative projects have been supported by SPARC, resulting in almost 1700 research papers, around 80 patents and technology prototypes have been developed and 900 workshops nationwide. Some of articles from SPARC were published in high impact journals ACS Nano, Chemical Engineering journal and Environment international. It has familiarized faculty and scholars in global research culture & methodology. It has also led to an improvement of curriculum and creation of Indo-German and Indo-Australian collaborative networks.

Anusandhan National Research Foundation (ANRF), established under the ANRF Act 2023, serves as the apex body for providing strategic direction to scientific research in line with the National Education Policy. Its mandate is to seed, grow, and strengthen research and innovation across universities, colleges, research institutions, and R&D laboratories in India. With its creation, the Science and Engineering Research Board (SERB) has been subsumed into ANRF. The Foundation is designed to build strong linkages among industry, academia, government departments, and research institutions, and to create mechanisms for participation and support from industry and State governments to advance India's research and development ecosystem.

Atal Innovation Mission (AIM), established by NITI Aayog in 2016, is the Government of India's flagship initiative to promote a culture of innovation and entrepreneurship through a holistic approach spanning schools, universities, research institutions, industry, and the MSME sector. AIM operates its program through real-time MIS systems and third-party reviews to ensure continuous improvement. At the school level, the **Atal Tinkering Lab** (ATL) program. focused on STEM (Science, Technology, Engineering, and Mathematics), sets up dedicated innovation spaces for students from Grades 6 to 12, enabling hands-on learning with technologies such as IoT, 3D printing, robotics, electronics, and rapid prototyping; so far, 10,000 ATLs have been established across 722 districts in India. At the higher-education and enterprise level, AIM supports **Atal Incubation Centers** (AICs) hosted in universities, institutions, and corporates to nurture early-stage startups by providing technical facilities, mentorship, funding access, partnerships, and co-working and lab spaces. AIM has operationalized 72 AICs, which collectively support more than 3,500 startups, have generated over 32,000 jobs, and include around 1,000 women-led enterprises across sectors such as health technology, fintech, ed-tech, space and drone technology, AR/VR, food processing, and tourism.

The *Athena Infonomics (2023)* assessment of Atal Tinkering Labs adopted a mixed-method evaluation, combining secondary analysis of 1,000 ATLs with primary stakeholder data to review program implementation and outcomes. The findings (N=493), indicate positive learning impacts, 68.8% of schools reported improved academic performance, while 60% observed enhancement in scientific temper and 45.4% noted higher achievement in STEM areas. Teaching practices also shifted, with about 71.8% schools reporting better student-teacher engagement and 71.0% integrating technical basics into learning activities. The impact on student mindset was positive towards science and technology in 74.4% schools, with more students pursuing science for higher studies in 69.4%, better learnings among students in 59.6%, enhancement of 21st century skills in 58.2%, better ability to relate to school curriculum in 42.2%, enhanced innovation skills of students in 40.8%, and spirit of entrepreneurship in students witnessed in 23.1%."

Under Digital India Innovation, MeitY key Digital India innovation initiatives include **TIDE 2.0 Scheme**, launched in 2019 to provide financial and technical support (IoT, AI, Robotics, etc.) through 51 incubators using emerging technologies and aimed at supporting about 2,000 tech startups; **Domain-specific Centers of Excellence,** with 26 CoEs established to drive capabilities in emerging technology areas; the **SAMRIDH Scheme**, launched in 2021 to strengthen accelerators and scale software product startups, targeting 300 startups over three years; and the **Next Generation Incubation Scheme (NGIS)** to handhold 300 software product startups in Tier-2/3 cities through 12 locations under NPSP 2019. Additional initiatives include the SIP-EIT Scheme to reimburse international patent-filing costs for startups and MSMEs, and Digital India-**GENESIS**, a national umbrella program to discover, support, and grow startups in smaller cities through collaborative engagement with government and industry.

Startup India, launched in January 2016, aims to build a strong innovation-driven ecosystem by supporting new enterprises through simplified compliance, a single-window portal, fast-track patent processes, relaxed procurement norms, and easier exit.

13.8 Summary

This section focused on the international comparative analyses of Indian R&D. It covered R&D inputs, such as R&D expenditure, researchers & technicians in R&D, adult population with Doctoral degrees, and firms engaged in R&D. It also considered available measures of output such as innovation index, patents, high-technology exports. Programs and initiatives aimed at strengthening the research ecosystem are discussed.

India's R&D expenditure was 0.6% of GDP in 2020, above the benchmark for its level of PCGDP. It is estimated at 0.7% in 2023. India's R&D/expenditure ratio is larger than those of Vietnam, Indonesia, and Mexico. India's R&D expenditure ratio of 0.2% is above its benchmark, as is Thailand's (+0.2%, but China's is above its PCGDP benchmark by 1.5%. India had 0.3

researchers per billion people in 2020 and is estimated at 1.0 per billion in 2023. In terms of the gap from its Per capita GDP benchmark(-0.4/bi) I was better than Vietnam (-0.6/bi), Indonesia (-1.0/bi), and Mexico (-1.8bi), below that of Thailand (-0.4/bi and China(-0.4/bi) had a smaller gap of -0.4/billion but remain above India. India had 0.07 per billion technicians in R&D in 2018, (estimated at 0.3 per billion in 2023), which was below its PCGDP benchmark by (-)0.13/bi. All comparators were even more below the level expected for their PCGDP; Vietnam (-0.24), Indonesia (-0.33), Thailand (-0.24), and Mexico -0.43), than India.

The proportion of Indian adults (25+) who had completed a Doctorate was 0.08% (2023), a rate higher than Vietnam (0.07%) and Indonesia (0.05), but lower than Malaysia (0.10%), China (0.12%), Thailand (0.13%), and Mexico (0.31%). The share of firms engaged in R&D for innovation was 1.4% (2022), was more than Vietnam (0.9%), Indonesia (0.9%), Thailand (0.8%) but lower than Mexico (2.4%) and Malaysia (8.1%). China, at 18.2%, was far ahead of all, indicating a much stronger base of firms engaged in R&D. India ranked 38th in the Global Innovation Index for 2025. India ranked above Vietnam (44), Thailand (41), Indonesia (54), and Mexico (56), but below Malaysia (34) and far behind China (5). India reports 19 Patent applications per million population, higher than Vietnam, Indonesia, Thailand & Mexico, but far below China (1,010). “High-technology” exports were 15% of manufactured exports, higher than Indonesia (11%) but lower than Mexico (18%), Thailand (26%) and China (27%).

India needs to expand its research workforce to keep pace with the projected growth of per capita GDP. This requires an increase of 0.9 researchers per billion to reach 1.5 per billion researchers by 2030, and an increase of 2.3 researchers per billion to reach 2.9 per billion by 2050. The number of technicians needs to be doubled is 0.2 to 0.4 per billion population in five years and quadrupled to 0.8 per billion by 2050. High-technology exports are an area of strength, already above UMIC benchmark and close to HIC benchmark of 16% for 2050.

The central Government has introduced a number of programs to attract scholars into Doctoral programs, increase patenting activity in Central Govt universities, and improve firm participation in university research. The PMRF (Prime Minister’s Research Fellowship) is designed to support research scholars who join doctoral. Initiatives like PRISM, NIDHI-PRAYAS, INSPIRE-MANAK and Atal Innovation Mission (AIM) help innovators and startups develop prototypes and scale ideas. At the institutional level, Institutes of Eminence (IoE) empower select universities to become world-class research hubs, ANRF (Anusandhan National Research Foundation) provides strategic direction to research, and SPARC promotes global academic collaboration. while frontier programs such as the National Quantum Mission (NQM) and National Mission on AI build advanced capacities. Digital India Innovation programs such as TIDE 2.0, SAMRIDH, and NGIS, along with Startup India, build the wider startup ecosystem Together, these initiatives aim to expand India’s research base, strengthen innovation, and align R&D with national development goals. The tax subsystem needs to be modified to increase incentives for deep tech R&D by corporations.

14. Summary and Conclusion

14.1 Summary

The paper started with the analysis of the post-independence structure of education during the first 50 years or so and the legacy it left in the form of adult literacy and education. Partly as the result of the cylindrical structure of education with a narrow base and over emphasis on higher education, adult literacy rate, and the share of adults with primary and secondary education were still below the level appropriate for our per capita GDP. Tertiary education was, in contrast at or above the level expected at our per capita GDP.

Positive adjustment in the education system in the last 15 years or so are reflected in Youth literacy rates, which were 14% higher than the minimum expected at our Per capita GDP level. This in turn reflects the good performance in Pre-primary and primary education enrolment. Primary enrolment and completion rates were significantly above the benchmark rates for our per capita GDP. Somewhat surprisingly the average quality of teaching and learning as measured by minimum reading proficiency was also above the international comparative benchmarks. This has been supported by initiatives such as NIPUN Bharat, to ensure foundational literacy and numeracy by Grade 3, pedagogical platforms like DIKSHA and PM eVidya, which provide curriculum-aligned e-content, QR-coded textbooks, and multi-channel delivery through apps, TV, and radio.

There is however a challenge before us, to raise the minimum learning outcomes to the benchmarks appropriate for the per capita GDP levels which we are aiming to reach by 2047. States like Telangana, Karnataka, Tamil Nadu, Andhra Pradesh, Assam, Tripura and Arunachal, where MRP is below the all-India average, need to pay much more attention to this issue. This challenge is much higher for raising Minimum arithmetic proficiency than for raising Minimum reading proficiency.

The next stage in the education pyramid is the retention rate/drop-out rate of students between primary and secondary education. In international comparative perspective India's retention rates are above the benchmark rates for its per capita GDP. The enrolment rate in secondary school is just above the benchmark rate. State enrolment rates are found to be the only education indicator corelated with PCNSDP, in both lower secondary and upper secondary school. The States and UTs show a negative gap between the secondary enrolment expected at their Per capita NSDP, are Haryana, Karnataka, Sikkim, Arunachal Pradesh, West Bengal and Nagaland. These States will have to step up their enrolment to help meet the National enrolment rates required for achieving the Viksit Bharat. The completion rates in both lower secondary school and upper secondary school are significantly above the benchmark for our per capita GDP. Platforms such as SWAYAM, offering MOOCs across disciplines, and teacher training programs like NISHTHA, have expanded opportunities for both students and educators.

Only a modest effort is needed to achieve the lower secondary completion rates expected for a high-income country, the achievement of benchmark levels for upper secondary completion rates will be more challenging. All India rates would have to rise from the current 63% to 79% in 20 years.

The limited information available on Minimum learning proficiency in Lower secondary school (Std VI to VIII), however, introduces a note of caution. In rural areas, 42% of Std VI, 36% of Std VII and 29% of Std VIII students cannot read a Std II level text. Though we don't have direct data for urban areas we estimate that MRP may be 10%-12%. The States and with MRP below the national average (Andhra Pradesh, Telangana, Karnataka, Tamil Nadu, Assam and J&K) can make a contribution by focusing on improving MRP. The situation is even more challenging with respect to minimum arithmetic proficiency (MAP); 64% of rural students in Std VI, 59% in Std VII and 54% in Std VIII cannot do division. Fourteen States have MAPs below the National average (e.g. Tamil Nadu, Sikkim, Meghalaya, Kerala, Rajasthan, West Bengal) and are best positioned to help raise MAP.

Paper also analyzed some institutional issues like Parent teacher ratios (PTR), Trained Teachers (TT), Gender parity and Digital infrastructure. Available data on enrolment and completion confirms that gender parity has largely been attained in the Indian school system There are still some gaps in minimum learning outcomes between male and female students at certain levels, particularly in minimum Arithmetic proficiency (MAP). The effect of PTR and trained teachers on Minimum learning outcomes (MRP and MAP) was not significant. Digital infrastructure is expanding in Indian schools, but the effect of digital facilities on MRP and Map was insignificant. It is unclear whether, a) The appropriate audio-visual material has been provided for effective teaching and learning, and (b) The information/knowledge of teachers in how to use the digital infrastructure effectively has been suitable enhanced. The Teacher App and AI-based tools such as Eduaide.AI, can support differentiated instruction and pedagogy. Tools such as ST Math and QANDA, can support early mathematics thinking, by providing step-by-step problem solving and adaptive feedback, which teachers can use to guide conceptual discussions in classrooms.

International comparisons of Indian skilling parameters were a lot less encouraging. Th share of secondary students enrolled in Vocational and Technical training was 13% points below the international benchmark for a country at India's per capita GDP. International comparative data on the share of adults who have taken post-secondary training and share of adults who have taken tertiary, short cycle courses show a somewhat better picture. Compared to the benchmarks for its Per capita GDP, India's adult population is only (-) 6% points below the benchmark for post-secondary and (-)3% points below the bench mark for tertiary courses. A number of schemes and portals have been launched in the past ten years to remedy this situation, but raising them to UMIC and HIC benchmarks in five and 25 years respectively, will require a herculean effort.

Firms providing formal training to their employees, is 7.7% in India, 8.7% in Vietnam and 8.4% in Indonesia. This could be partly due to more competitive labor markets for corporate employees. The incentives can be changed by allowing Companies and large firms to use a much greater fraction of their funds to train both employees and to upgrade ITIs and Polytechnics. This will be critical, if we want Indian private sector to compete with Thailand, Malaysia and Mexico, with 18%, 24% and 38% of their firms have employee training programs.

India is comparatively well placed international comparative frame, with respect to tertiary education, but not so well in R&D. India's tertiary enrolment rate is almost at the exact benchmark for its per capita income. Its Adult population with Bachelor's degree is slightly above, and with Master's degree a little below the benchmark for its per capita income. Given its enormous population this makes its total, tertiary educated adult population, the second highest in the World after China.

The R&D picture is however, mixed. India's total expenditure to GDP is above the benchmark for its per capita GDP, the researchers per population and technicians per population are significantly below its international benchmark. Despite these handicaps, its High- tech exports/total exports are close to the benchmark for a threshold high income country.

The share of Indian firms doing R&D for innovation is 1.4%, compared to 0.8-0.9% for Vietnam, Indonesia and Thailand, 2.4% for Mexico and 8.1% for Malaysia and 18.2% for China. Indian patents per population are higher than those of Thailand, Vietnam, Mexico and Indonesia, but lower than those of Malaysia and far below those of China, which is just second to Japan. India also ranks higher than most of these countries in the Global innovation Index; India (38), compared to Vietnam (44), Thailand (45), Indonesia (55) and Mexico (58). Malaysia (34) and China (10) are ranked higher. A number policies and programs have been introduced to reduce the big gap with China, but the tax incentives for private R&D could be improved further.

A critical goal of the education and skilling system is employment. The Global employability Test (GET) is one way to measure its effectiveness. Employability of those trained by this system can be divided into three categories. Those graduating from Vocational institutions (VET) like Industrial Training Institutes (ITI) and Polytechnics have the lowest employability, and those graduating from professional institutions such as Engineering (BE/BTech, Computers (MCA) and Management (MBA), have the highest employability. Graduates of the University-college system (BA, BCom, BSc, MA) fall in middle of the employability spectrum. At the top of the system are the Professional Institutions with employability in the 70-78% range in 2025. Next come the Universities(-colleges), with employability in the 55-58% range. Then come the ITIs at just over 40% and finally the Polytechnics at a little under 30%. The good news is, that Employability has improved across the board during the past six years for which data is available. The simple average increase of employability is 10% points for Polytechnics, 20% points for universities, and 28% points for professional institutions (2019-2025).

The benchmark used in this paper are generally a function of per capita GDP. Absolute numbers of educated and skilled population, labor and work force is relevant when we defining comparative advantage relative to both our comparator countries and vis-à-vis other countries. Even with India's school completion rates lower than higher income comparator countries, the comparative numbers are higher than China's and often exceed it. The number of children completing primary education in India (137 mil) were 1.25 times those in China and more than 2.5 times the combined total of Vietnam, Indonesia, Thailand and Mexico (MIC4). The number of children completing lower secondary school (65 mil) were 1.2 times those of China. The number of children completing upper secondary school (98 mil) were also 1.2 times those China and 3.7 times those of the MIC4 (Vietnam, Indonesia, Thailand & Mexico) combined. The number of students enrolled in tertiary education (52 mil) was more than double those of the four comparators combined.

The above measures are more important for future comparative advantage, than the current stock of adults with different levels of education. Broadly India has a larger number of adults with Tertiary education (Bachelors & Masters) than China, while China has a higher number of adults with primary & secondary education; India's adult population with bachelor's degree was 1.4 times China's, while its adults with secondary education were 0.85 China's. India's stock of adults with primary, lower and upper secondary education was 1.8 to 2 times the corresponding numbers for MIC4 (combined).

14.2 Conclusions

The paper's analysis focused on factors that influence learning outcomes and the institutional conditions needed to translate education into skills and employment. Primary education shows that while enrolment and completion are largely universal, a substantial share of children do not achieve minimum reading and arithmetic proficiency by the end of primary school. Only about 46.3% of Grade 5 students meet minimum reading proficiency. Efforts to improve learning outcomes should focus on teaching practices rather than further expansion of inputs. ASER (2006-2024) shows that learning outcomes stagnated or declined despite rising enrolment, teacher pay, and per capita GDP, indicating that input expansion alone has not improved minimum learning outcomes.

Research evidence from many countries shows that structured pedagogy and Teaching at the Right Level (TaRL) lead to gains in reading and mathematics by grouping children according to their learning level and providing targeted instruction. Studies from India, Kenya, Ghana, and Indonesia show that these approaches work when schools allocate specific time for instruction, provide basic teacher support, and monitor implementation. The evidence suggests that learning outcomes can improve through small, targeted changes in classroom organization and teaching methods, even without large increases in spending.

Learning outcomes also improve when government systems introduce performance-linked incentives, regular monitoring, and contract-based arrangements for teachers. Randomized studies show that teacher incentives raise student achievement more effectively than unconditional spending on school inputs. Technology-based interventions also improve learning only when they are curriculum-linked and supported by teachers or teaching assistants; access to equipment alone does not lead to gains.

The National Education Policy (NEP 2020), which places FLN, competency-based learning, experiential pedagogy, and vocational exposure within schooling at the core of education reform. Recent initiatives such as NIPUN Bharat, DIKSHA, and PM eVidya reflect this shift toward structured pedagogy, teacher support, and system-level monitoring.

At the State level, there is no meaningful correlation between per capita NSDP and learning outcomes, with the correlation between State PCNSDP and Grade 5 minimum reading proficiency at 0.16, and with minimum arithmetic proficiency at -0.08, showing that higher State income does not predict better learning performance.

States such as Uttar Pradesh (+11.7% points) and Odisha (+7.6% points) improvements in reading outcomes from 2014 to 2024 despite lower income levels, while some higher-income states show decline such as (Kerala (-0.8%), Haryana (-4.6%), Punjab (-5.5%), and Himachal Pradesh (-8.4%)). Pratham developed, “Teaching at the Right Level (TaRL)” method, has been used successfully in UP and Haryana. It begins instruction at the child’s actual learning level, not grade. Children are grouped by ability, and teachers use simple, engaging activities to build foundational reading and arithmetic skills. Regular assessments track progress, and children are regrouped as they advance. This method helps children catch up quickly and lays the foundation for future learning. Continuous monitoring and support ensure effectiveness.

Survey comparisons across ASER, NAS, and FLS show that benchmarks for minimum reading proficiency are broadly comparable, while benchmarks for minimum arithmetic proficiency vary, especially at std III. As MAP is structurally weaker than MRP, Cohort analysis shows that gaps between arithmetic and reading widen with grade progression, indicating weak numeracy foundations. Mathematics learning therefore requires targeted and structured support, particularly in the early grades. Evidence from the Mindspark program in Delhi shows that technology-aided instruction, particularly in mathematics, improves student performance across multiple math competencies and leads to larger learning gains in math than in language. The gains are highest among weaker students when technology is combined with small-group support from teaching assistants.

To reduce the gap between credentials and learning, education systems should strengthen assessment integrity and reduce excessive reliance on exam-based credentials. Evidence shows that learning outcomes with limited comparability across surveys and over time, weakens accountability and inter-state comparison. State-level rankings differ substantially, with cross-survey correlations for minimum reading proficiency ranging from 0.18 to 0.44, reflecting differences in test design and proficiency thresholds. Decades old evidence from Indian states showed that test scores may be inflated due to cheating and weak monitoring, while reforms such as external grading, multiple test booklets, and technology-based assessments reduce manipulation and better reflect actual learning. At the same time, governments can reduce incentives for credential inflation by placing less weight on formal qualifications in public-sector recruitment and instead defining job-specific skill requirements and assessing candidates directly on these skills.

Weak foundational learning also affects skill development. While vocational education improves employment outcomes in advanced economies, similar benefits are limited in developing countries due to weak linked training institutions, skill mismatch and poor links with industry. The framework in Section 3 views education, skills, and employment as linked systems. Productive employment requires alignment between education levels, type of skills acquired, and the structure of jobs available. In India, weak coordination across these systems has created a disconnect between schooling, skills, and employability. Real wage growth within each layer depends on on-the-job training and learning by doing, while movement across layers requires upskilling and re-education. The importance of skill development has still not been fully appreciated by most stakeholders in India. Formal recognition of skilling and job placement as a critical service, the development of skill development councils at the national and State level, and representation of exporters and relatively faster growing MSME on local education and skilling intuitions and Government tripartite bodies, can help change perceptions.

There is a need for greater use of audio-visual material from musical recording, through how to videos (of instruments, equipment & machinery), to scientific experiments for stimulating interest, thinking and innovation. These are not just for students, but also teacher and trainers, across the entire spectrum from pre-primary, through primary, secondary school and skilling from upper secondary to tertiary levels. We also need more effective use of Expert systems, the precursors to modern AI, to improve the quality of teaching, training, learning, and to match the demand for skills by employers with the supply of skills acquired by individuals. Expert systems and AI can also transform the output quality and incomes of the self-employed, who constitute more than half the total Indian workforce (in agriculture, industry and services).

15. Appendix: Legacy Issues in Literature

In the early 1950s India and China started with similar goals for education, but China moved faster by focusing on improving the quality of schooling early on. India focused more on increasing access, which led to poor learning levels in schools. China started improving school quality 20 years before India. In 2001, China changed its curriculum to reduce rote learning and improve teaching. Teachers were trained with new methods and given incentives to work in rural schools. Digital tools were used to improve access in remote areas. A clear national plan and regular inspections helped keep track of progress. India can learn from the experience of both market and non-market economies [*Kumar and Varghese (2022)].*

Kingdon and Muzammil (2003), found that the effect of anti-cheating measures taken in UP in 1992, was to reduce the pass rate in the high school exam from 57% in 1991 to 14.7% in 1992. It declined to 17% among regular candidates and 9% among Private candidates.

The PROBE report (1999), based on a 1996 survey. found widespread inactivity or negligence. In half the schools surveyed, no teaching was taking place. Teachers were often seen drinking tea, reading comics, or simply doing nothing. This was not an exception but had become the norm.

Kremer et al (2005) used nationwide data collected in 2003, through three unannounced visits to over 3,700 government primary schools across 20 Indian states, covering 98% of India's population. They found that *25% of teachers were absent* on any given day, and *only about half were teaching*. There was wide state-level variation from 15% absence in Maharashtra to 42% in Jharkhand. The study found no link between higher salaries and lower absence; in fact, older, better-paid, and more educated teachers were often more absent. In contrast, contract teachers, despite earning less, had similar or slightly better attendance. Daily incentives, such as school inspections, better infrastructure, and location near roads, were more effective in lowering absence. The existence of a Parent-Teacher Association (PTA) or hiring local teachers did not reduce absence. The authors highlight the need for reforms focused on monitoring, accountability, and contract-based models, rather than simply increasing inputs like salary.

Kingdon (2007) found that, "the bar for passing is set very low, i.e., a student only needs on average 33% marks in their various subjects in order to pass high school." "Moreover, students rely on 'guess papers' which are sold a few weeks before the exams, and that try to predict exam questions which are often remarkably close to the actual paper. There is frequent leaking of papers in advance of examinations".

Muralidharan and Sundararaman (2011) conducted a randomized controlled trial in rural government schools in Andhra Pradesh from 2005 to 2007 to test whether teacher incentives could improve learning outcomes. In incentive schools, teachers received performance pay in the form of annual bonuses based on the average improvement in their students' test scores in math and language. In contrast, control schools received additional spending on school inputs like teaching materials, but no performance pay. The study found that students in incentive schools performed significantly better than those in control schools, and gains were sustained in both incentivized and non-incentivized subjects. The intervention was also shown to be more cost-effective than simply providing more inputs. The findings suggest that well-designed teacher incentives through performance pay can be a scalable way to raise test scores and learning outcomes in the public education system.

Singh (2015) compared learning outcomes in Ethiopia, India (Andhra Pradesh), Peru, and Vietnam. He found that cross-country gaps in test scores appear by age 5 and widen significantly by age 8. The main reason is school-year productivity (defined as the learning gains per grade completed) is much higher in Vietnam compared to countries like Peru and India.

Muralidharan et al. (2017) examined the issue of teacher absence in India using a nationally representative panel dataset from 2003 and 2010, based on unannounced visits to schools. They found teacher absence was 26.2% (2003) and 23.6% (2010). Thus, the problem remained widespread despite improvements in input-based interventions like school infrastructure, teacher qualifications, and student-teacher ratios. Surprisingly, schools with lower student-teacher ratios had higher teacher absence, suggesting inefficiency in simply adding more teachers. In contrast, schools that were visited more frequently by officials had significantly lower absence, highlighting the importance of school monitoring. The authors estimated that this weak governance leads to a fiscal loss of over $1.5 billion annually, and argued that increasing administrative monitoring would be much more cost-effective than continuing to expand inputs alone.

Banerjee et al. (2017) also compared Pratham's experience in Bihar & Uttarakhand (2008-10) Haryana(2012-13), and Uttar Pradesh (2013-14). the team developed two versions that worked even in regular government settings. Their paper highlighted six main challenges when scaling up: market effects, spillovers, politics, context differences, selection bias, and difficulty in implementation. In TARL the biggest barrier was making the program fit within the government system. Success came only when schools changed how they *grouped and taught students* and ensured time and staff for the program. The authors suggest that scaling up needs more than just good results in small pilots. It requires repeated *testing*, strong local partnerships, and understanding how the implementing organization works. In short, scaling up a policy is not just about proof of scalability, but about making the system ready for change.

Muralidharan and Singh (2020) evaluated the large-scale MP Shaala Gunvatta program, implemented across 1,774 schools in Madhya Pradesh (2014-16), to improve management quality using global best practices such as assessments, ratings, and planning. Their RCT study found that the "intervention had no impact on either school functioning or student outcomes". Authors concluded that results illustrate that "well-designed programs, that appear effective based on administrative measures of compliance, may be ineffective in practice."

Singh (2020) investigated the reliability of administrative data in India's education sector, using data available from Madhya Pradesh and Andhra Pradesh. In 2016/17 MP govt had introduced 'multiple test' booklets in grades 3,5 & 8 and asked for grade 8 answer scripts to be sent to a different school for grading, to counter test score manipulation. Using direct audit of this experiment by the MP govt in 2017, he concluded that results were "severely inflated due to cheating, particularly severe for low-performing students". He found that the proportion of correct responses to the same multiple-choice questions was, on average, 38.9 % point (pp) higher in Math and 33.8 pp higher in Hindi in the official test, from a base of 25.1% and 37.9% correct responses in the retest in the two subjects respectively. He also found that "the difference between the proportion of correct responses as reported in the official data and the retest, was present across the full distribution. The regression equation, showed that, student-level average test scores, on the same multiple-choice questions, are higher by ~54% points in Math in Grade 7 on the official assessment than the retest, but this discrepancy is reduced by 50% in Grade 8. In Hindi, the mismatch is ~ 36% points in Grades 6 and 7, but is reduced by 27 percentage points in Grade 8. He concluded that "Mandated multiple booklets and external grading sharply cut the discrepancy, indicating that cheating (copying) by students and teacher assisted manipulation of scores accounts for much of the gap".

In Andhra Pradesh, *Singh (2020)* "did not find any such distortions in tablet-based testing, with only 2-5% students flagged as cheating." This study was an RCT of grade 4 students in 2400 AP schools, with 768 schools assigned to a benchmark official grading, and 1694 schools in which students took the same tests administered on tablets. Using the Angrist, Battistin and Vuri (2017) procedure, 38-43% of classrooms in the paper-based testing arm are flagged for cheating. Students tested on paper, score higher, by ~28% points in mathematics, ~26% points in English and 21% points in Telugu, than students who tested on tablets. In the retest audit, students score 16-20 percentage points higher (on average) in the teacher-administered tests than in the independently-proctored retest. The magnitude of this distortion is comparable to the analogous sample from M.P. in Grade 8.

Further, in government schools, students perform "18-24 percentage points worse on tablets than on paper", compared to 3-8 percentage points in private schools." The difference between tablet and paper assessments is lower with higher proportion of girls in the classroom: a classroom with only boys is predicted to have 32 percentage points lower scores on tablets, but by 11-12 percentage points in a girls-only classroom in math and Telugu. The coefficient is small and statistically insignificant in English. "In 2016-17 and 2017-18, *Singh (2019)* also conducted observations of the test administration in 52 classrooms across 17 schools in four districts." In these visits, "in 40% of classrooms, the teacher left the classroom for at least part of the test leaving students unsupervised, teachers commonly providing the correct answers, & helped erase & correct them." External monitors were rarely present during assessment."

16. References

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Sl. No.	Subject	Month of Publication	Link
1	Gondwana: Economic Integration of Indian Ocean Region	Dec, 2025	https://niti.gov.in/sites/default/files/2026-02/Gondwana-Economic-Integration-of-Indian-Ocean-Region.pdf
2	Child Malnutrition & Mortality: Role of Sanitation & Sewage Systems prepared	Nov, 2024	https://niti.gov.in/sites/default/files/2024-12/Revised%20NITI%20Working%20Paper_1.pdf
3	Viksit Bharat: Unshackling job creators, empowering growth drivers	July, 2024	https://niti.gov.in/sites/default/files/2024-08/WP_Viksit_Bharat_2024-July-31_chk%20with%20cover%20V2.pdf
4	Bharatiya Model of Inclusive Development	May, 2023	https://niti.gov.in/sites/default/files/2023-06/NITI_policy-paper_BMID_2023-May.pdf
5	NITI Working Paper on 'Bharatiya Model of Inclusive Growth: Sabka Sath Sabka Vikas'	Dec, 2023	https://niti.gov.in/sites/default/files/2024-02/NITI%20WORKING%20PAPER_Report_0.pdf