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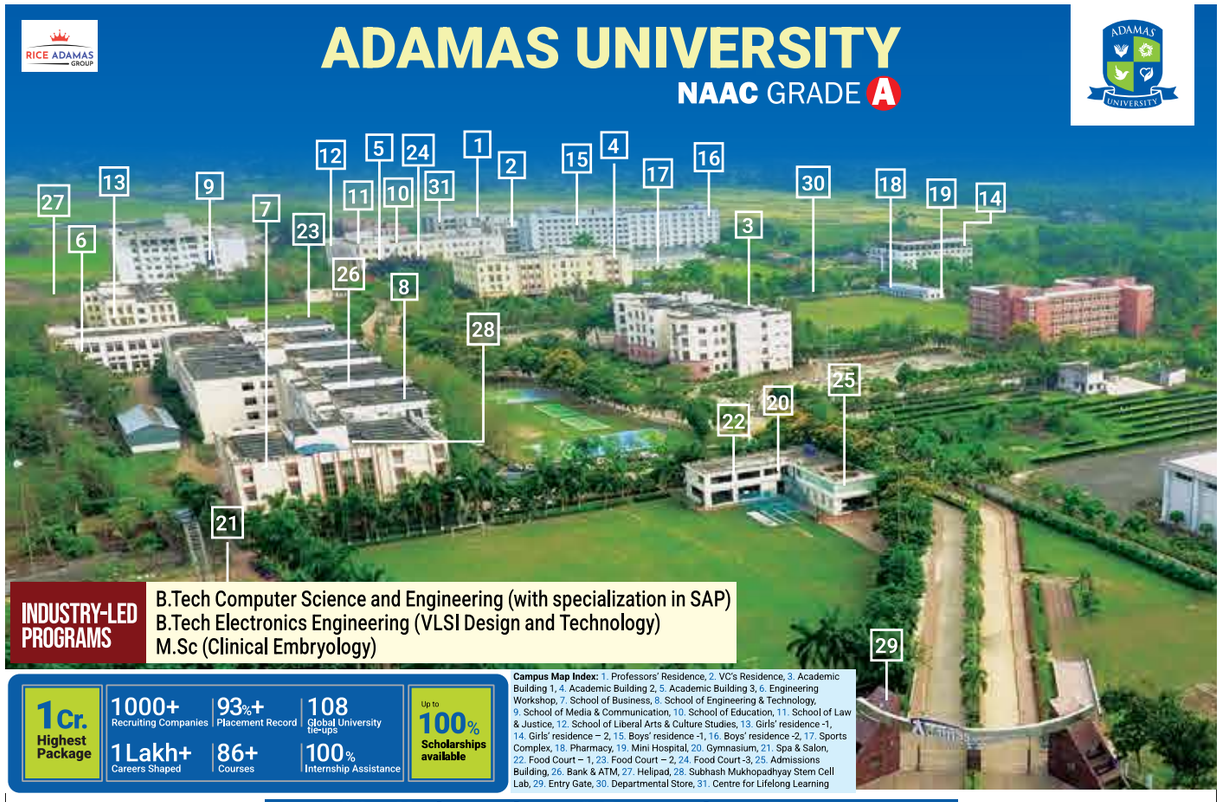
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THE REFORM
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There is a curious habit in Indian education policy: we tend to celebrate reform at the moment it is announced.

A new framework is released. A new scheme is launched. A new curriculum is approved. The language changes quickly i.e, competency, multidisciplinary learning, artificial intelligence, experiential education, research and employability. The documents become more ambitious.

The classroom, however, moves at a different speed. That is the question the education sector needs to confront now: what happens after the announcement?

India is well into the implementation of the National Education Policy 2020. The policy has opened the door to changes that were overdue greater flexibility in higher education, multidisciplinary learning, vocational exposure, technology-enabled education, and a stronger emphasis on inquiry and skills. The government has also pushed emerging technologies into technical education, with artificial intelligence, data science, machine learning, robotics and quantum computing finding space in revised curricula.

But reform is not measured by the vocabulary of a policy document. It is measured by whether a teacher has the material to teach from on Monday morning.

This year, reports of delays in the availability of prescribed NCERT textbooks have exposed an uncomfortable fault line. In some schools, teachers and students have had to fall back on notes, worksheets and digital material while formal learning resources caught up with the academic calendar. The problem is larger than a delayed shipment of books. Curriculum, textbooks, teacher preparation and examinations are parts of the same machinery. When one part slows down, the classroom absorbs the shock.

There is another set of numbers that deserves far more attention. Parliamentary findings cited in this issue show that 1,596 of NCERT 2,844 sanctioned posts were vacant, while CBSE had 933 vacancies out of 2,117 approved posts. Recruitment may be underway, but recruitment is not the same thing as institutional capacity. A reform that depends on capable institutions cannot be delivered indefinitely by institutions operating with such large staffing gaps.

This is not an argument against reform. Quite the opposite. It is an argument for taking reform seriously.

India is attempting something unusually difficult: changing what children learn, how they learn it, how universities structure degrees, how students move between programmes, and how education connects with a labour market being altered by technology. At the same time, the country is trying to strengthen research, attract international universities and make its graduates more competitive globally. By August 2026, the UGC had issued 16 Letters of Intent to 15 foreign higher education institutions seeking to establish campuses in India.

The ambition is unmistakable. But ambition has a cost. It requires teachers trained for the new curriculum, administrators who can execute it, institutions that can absorb technology without mistaking it for pedagogy, and universities willing to be judged by the quality of their research and graduates rather than by the number of programmes they offer.

The same discipline is needed in our approach to artificial intelligence: adoption must be matched by teacher capacity, assessment reform and a clear understanding of what learning should mean in an AI-enabled world.

There is also a danger in our growing fascination with artificial intelligence. AI can write, code, summarise and increasingly reason alongside students. That makes the old examination question What did you memorise less useful than it once was. The harder question is whether a student understands what they are doing, can defend an argument, identify a weak answer and make a judgement when the machine is wrong.

That is where education still has an advantage over technology. A serious education system should produce people who do not merely retrieve information, but interrogate it.

The next chapter of Indian education, therefore, should be less about announcing transformation and more about examining its delivery. We need to ask where reforms are working, where they are stalling, and who is paying the price when they do. Because students do not experience education policy as a government notification.

They experience it as a classroom, a teacher, a textbook, an examination, a laboratory, a fee bill and, eventually, a job.

That is where reform must finally prove itself.

Penned from the Chief Editor

Shiv Shankar Sharma
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WE SHOULD NOT THINK ONLY OF ‘MAKE IN INDIA’; WE SHOULD ALSO THINK OF ‘DISCOVER IN INDIA’

Prof. Ranjit Thapa
Dean – Research, SRM University-AP

As India looks to establish itself as a global technology and innovation leader, the next challenge is no longer simply producing skilled graduates or adopting emerging technologies, but building the capacity to discover and create them. In this cover interview, **Prof. Ranjit Thapa,** *Professor and Dean–Research, SRM University–AP (Amaravati),* tells Education Post’s **Prabhav Anand,** what it will take for Indian research and higher education to make that transition. A physicist and computational materials scientist, Prof. Thapa’s work spans quantum mechanics, machine learning, catalyst design, clean energy and AI-powered materials discovery. He has authored more than 140 research papers and has worked extensively on computational approaches to energy and environmental challenges.

The conversation goes beyond his own research to examine the larger transformation underway in scientific research. Prof. Thapa discusses how AI could reshape materials discovery, why India needs stronger indigenous capabilities in advanced materials and clean technologies, and how quantum technology could become a major strategic opportunity over the next 15 years. He also addresses the gaps in India’s research ecosystem—from funding and infrastructure to PhD training, technology transfer and industry-academia collaboration. At the heart of the discussion is a compelling proposition: India must move beyond being a consumer and manufacturer of technology to becoming a c**reator of knowledge, intellectual property and breakthrough technologies.** As Prof. Thapa puts it, the future must be about not just “Make in India”, but **“Discover in India.”**

Artificial Intelligence is now accelerating scientific discovery, particularly in materials science. From your experience of integrating AI with quantum mechanical simulations, how do you see this changing the traditional research process? Can AI genuinely replace years of laboratory experimentation, or will it always remain a tool that complements human scientific intuition?

Let us first understand the paradigm of research and innovation. In principle, the evolution of research and innovation can be divided into four major paradigms: (i) Experiment (ii) Theory (iii) Computation and (iv) Data Science or Artificial Intelligence (AI).



The first paradigm is Experiment, which began with the earliest stages of human evolution from the discovery and use of fire to the development of metals, tools, medicines, and countless other innovations. Experimentation has continued to be the foundation of scientific discovery.

The second paradigm is Theory. Humans began to search for the reasons behind observed experimental phenomena and developed new ideas in the form of laws, hypotheses, theorems, and mathematical principles. Theory provided a systematic framework for understanding nature and, in many cases, predicting phenomena that had not yet been experimentally observed.

The third paradigm emerged with the birth of computers. Computers enabled scientists to solve numerical problems and complex equations much faster than was possible through analytical methods alone. With the development of quantum mechanics and many other advanced fields, analytical approaches became insufficient for solving even relatively small and complex phenomena. There was always a vision that theory could be developed first and experiments could then be performed to validate it.

The development of computers provided a major opportunity to realize this vision to perform theoretical calculations on computers, including supercomputers, and then move to the laboratory for experimental validation and discovery. To some extent, this approach has been successful, particularly in areas such as drug discovery and the prediction of new materials in few areas. However, even today, we have achieved only a small fraction of the original vision. Computational techniques are still used largely to support and explain experimental phenomena rather than to independently drive discovery.

This raises an important question: Can we perform the discovery process first on a computer and then validate it experimentally?

The answer may lie in the rapid rise of the fourth paradigm: Artificial Intelligence and Data Science.

AI provides an excellent opportunity to create sophisticated workflows that combine quantum-mechanical simulations with AI/ML models, enabling us to predict, screen, and design materials before going to the laboratory for experimental validation.

There are, of course, significant challenges, and scientists across the world are actively addressing them. Nevertheless, we are moving toward a future in which AI-based simulations can be performed first, followed by targeted experiments. This approach can significantly accelerate materials discovery while reducing both time and cost.

Some important challenges include discovering suitable catalysts for converting CO_2 into C_2 products, identifying materials that can perform like rare-earth elements to reduce dependence on scarce resources, and developing catalysts for converting N_2 and CO_2 into urea. AI is not merely a tool, nor is it a replacement for experiment. AI represents a new research paradigm that has the potential to transform almost every sector of science, technology, and innovation.

Therefore, SRM University–AP (Amaravati) is taking AI very seriously and is working toward creating an AI-ready campus, preparing our researchers, infrastructure, and academic ecosystem for the next generation of research and innovation.

India has announced ambitious goals in green hydrogen, electric mobility and net-zero emissions. However, many of these ambitions depend on breakthroughs in catalysts, batteries and advanced materials. How close is India, scientifically, to developing indigenous technologies that can compete with global leaders rather than relying on imported innovations?

Over the past two decades, India has emerged as a strong competitor in the global technology and innovation landscape. The country is steadily moving from being



Dr Mahesh Kumar Ravva
Assistant Dean - Research



Dr P Rajapandiyan
Coordinator - IPR

primarily a technology- consuming nation toward becoming a developer, adopter, and exporter of indigenous technologies. India is making significant efforts to position itself among the top 10 countries globally in research, technology, and innovation, with a strong emphasis on self-reliance and indigenous capabilities.

One of the most remarkable achievements has been the development of UPI-based digital payment technology, which has transformed India's financial ecosystem and demonstrated the country's ability to build large-scale, secure, and accessible digital infrastructure. India has also made substantial progress in defence technology, with increasing capabilities in indigenous design, advanced materials, electronics, aerospace systems, and strategic technologies.

In medical technology and healthcare, India has developed affordable pharmaceuticals, vaccines, diagnostic technologies, medical devices, and digital healthcare solutions, demonstrating its ability to deliver high-impact technologies at scale.

Space technology is another area where India has established strong global recognition through cost-effective and increasingly sophisticated space missions, satellite technologies, and launch systems. India is also rapidly developing capabilities in electric mobility, including electric vehicles, batteries, charging infrastructure, and power electronics.

At the same time, hydrogen technology, particularly green hydrogen and electrolyser technologies, is emerging as a strategic area for India's future energy security and low-carbon development. These achievements reflect a broader transition toward technological self-reliance. However, the next challenge is to convert these capabilities into globally competitive intellectual property, products, companies, and technologies.

This requires stronger integration of fundamental research, computational science, artificial intelligence, experimentation, engineering, manufacturing, and technology transfer. India now has an unprecedented opportunity to leverage its scientific talent, digital infrastructure, entrepreneurial ecosystem, and manufacturing capabilities. The objective should not merely be to become a top-10 technology nation, but to build an ecosystem where Indian research and indigenous innovation create globally relevant technologies and solutions for humanity.

India faces a major challenge in realizing green hydrogen and smart mobility because it lacks sufficient indigenous raw materials and patents, which are critical for making these technologies truly self-reliant and cost-effective. Therefore, fundamental research to discover new materials based on resources available in Indian mines and to develop and patent indigenous technologies is extremely important.

We should not think only of “Make in India”; we should also think of “Discover in India” to build a stronger and more sustainable India. The Government of India needs to invest more in research through funding that is open to all and focused on specific, target-oriented outcomes. An important policy change should be to integrate research centres and institutes with university campuses, without separate boundaries, enabling talented young students to innovate and discover using high-end research facilities.

Your research has extensively focused on catalyst design for hydrogen evolution, oxygen reduction and carbon dioxide conversion. For an ordinary reader, why should research on catalysts matter? How can these microscopic discoveries eventually influence electricity prices, transportation, clean industries and everyday life?

Regarding my research, our group is focusing on developing a DFT/AI-powered materials discovery package known as “Padarth Khoj” (https://doi.org/10.1021/acs.chemmater.5c03142) for discovering advanced catalysts for applications in



Dr Sabyasachi Mukhopadhyay
Coordinator - CRF & iSTEM



energy conversion. In simple terms, catalysts are at the heart of the energy and chemical industries. To understand their importance, we can take an example from the human body. The heart pumps blood throughout the body, while the blood contains hemoglobin, whose iron centre binds oxygen and enables its transport to different parts of the body.

In this sense, iron acts as a critical active centre for oxygen binding and transport. Similarly, catalysts contain active sites that selectively interact with molecules and help chemical reactions occur efficiently. Catalysts are therefore present everywhere and play a critical role in producing new compounds and enabling chemical transformations. They can help break down molecules, build new molecules, convert one form of energy into another, or make industrial processes faster and more efficient. The major challenge is to discover the right catalyst for a specific reaction.

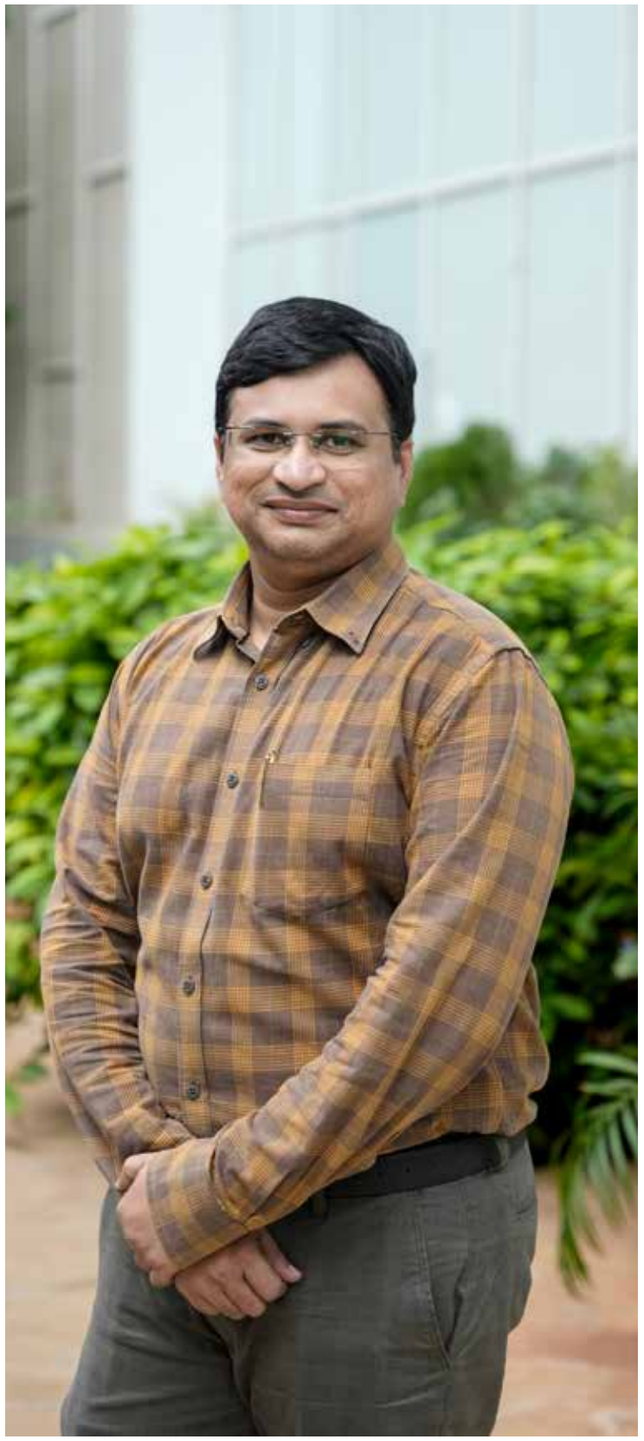
Traditionally, this requires extensive experimental trial and error, which can be expensive and time-consuming. Padarth Khoj aims to change this approach by combining quantum-mechanical calculations based on DFT with artificial intelligence and machine learning. The objective is to computationally screen and design thousands of materials, identify promising catalytic candidates, and then validate the most promising materials experimentally. In this way, Padarth Khoj aims to accelerate catalyst discovery, reduce experimental costs, and contribute to the development of sustainable technologies for future energy and chemical industries. This is precisely the philosophy we drive at SRM University-AP. Through our dedicated computational chemistry and computational materials facilities, our research team is utilizing 'Padarth Khoj' to model and predict novel catalysts that directly bridge the gap between high-level quantum calculations and practical, industrial energy applications.

According to the Government of India, green hydrogen currently costs approximately ₹439–₹477 per kg to produce without incentives, of which electricity alone contributes about ₹325–₹335 per kg. If our AI/DFT-designed catalyst improves electrolyser efficiency by just 20%, and this translates into a proportional reduction in electricity consumption, the electricity component could decrease from about ₹330 to ₹264 per kg, potentially reducing the total production cost by around ₹66 per kg, from approximately ₹450 to ₹384 per kg. At 1,000 tonnes of hydrogen production, this represents a potential saving of about ₹6.6 crore per year. Thus, an atomic-level catalyst discovery can ultimately influence industrial costs, transportation, energy prices, and everyday life.

Despite producing a large number of engineering and science graduates every year, India still contributes a relatively modest share of globally transformative scientific discoveries. In your opinion, is the challenge primarily about funding, infrastructure, institutional culture, or our approach towards research education?

The number of graduates is one of India's greatest strengths, but at the same time, it presents a major challenge: how do we mobilize this enormous human potential and provide the right direction and opportunities to our students? India has already made a significant contribution to global research and innovation. However, scientific leadership is a global effort, and intellectual contributions frequently originate outside India.

If India wants to become one of the world's leading nations in research and innovation, we must build a highly competitive and performance-driven higher education and research ecosystem. The most important step is to create globally competitive universities and provide them with research funding comparable to the leading universities around the world. Universities should be given greater autonomy, resources, and responsibility, while their performance should be evaluated based on measurable outcomes in research, innovation, patents, technology transfer, entrepreneurship, and societal impact. We also need to rethink the concept of a permanent academic position. Academic freedom and stability are important, but continued academic positions should also be associated with continued contribution. If a professor chooses not to engage in research,



Dr Sujith Kalluri
Coordinator - UG/PG Cell



Dr Partha Bhattacharjee
Coordinator - Publications

innovation, mentoring, or other meaningful academic contributions, the system should have mechanisms for performance review and career progression rather than treating a permanent position as an entitlement irrespective of performance.

India should also significantly increase the number of PhD students, particularly in strategic areas such as artificial intelligence, advanced materials, energy, biotechnology, semiconductors, quantum technology, and computational science. PhD students are the engine of research and innovation, and universities must provide them with world-class facilities, mentorship, and opportunities.

At the same time, every major research institution should have a strong and professionally managed Technology Transfer Cell, supported by substantial funding. Discoveries should not remain as research papers. They should be converted into patents, prototypes, start-ups, licenses, and commercial technologies. Another important area is the use of CSR funding. A greater proportion of CSR investment should be directed toward fundamental and applied research rather than being limited primarily to infrastructure such as hostels and roads.

Research can create technologies with long-term economic and social impact. Finally, India should create stronger incentives for industries that develop, commercialize, and manufacture indigenous technologies. Tax policies should reward genuine innovation, research investment, technology development, and commercialization. If we can combine India's enormous human capital with competitive universities, performance-based research, strong funding, PhD-driven innovation, effective technology transfer, and industry incentives, India can move decisively from being a large global market to becoming a global leader in research, innovation, and technology creation.

Machine learning has significantly reduced the time required to identify promising materials for batteries and clean energy technologies. As someone leading AI-powered materials research, what are the biggest scientific limitations that AI still struggles to overcome, and where does human creativity continue to remain indispensable?



Prof. G S VinodKumar
Associate Dean - TTC

To understand this question, let us go to a slightly deeper level. I always emphasize that AI/ML is very general and has no fixed boundary. It can be applied across almost every field, and many different approaches are available, with many more likely to emerge in the future. However, the major scientific challenge is that different scientific properties and phenomena often require different AI-based models, equations, representations, and approaches. Let us take a simple example from classical mechanics. Newton's laws are fundamental and general. The same laws can be applied to understand the motion of a car, the flight of a kite, or a person riding a bicycle.

The underlying physical principles remain the same, even though the applications are completely different. AI is currently not always able to operate at this level of scientific generality. An AI model developed to predict one material property may not automatically predict another property with the same accuracy. A model trained for battery materials may not necessarily work for catalysts, semiconductors, or biological systems. Even within the same field, different properties may require different datasets, architectures, descriptors, physical constraints, and training strategies.

This is one of the major scientific limitations of AI in materials discovery: how do we develop AI systems that can understand general scientific principles rather than simply learn patterns from specific datasets? This is also where human creativity remains indispensable. Scientists understand physical principles, identify meaningful questions, recognize unexpected results, design new hypotheses, and decide what is scientifically important.

AI can explore enormous spaces much faster than humans, but deciding which space to explore and why still requires scientific intuition. Therefore, I believe AI will struggle with this challenge for some more years. However, this is not a permanent limitation. Scientists are already developing new generations of AI that incorporate physics, chemistry, scientific laws, causality, and human knowledge. Ultimately, the future will not be AI versus human creativity. It will be AI plus human creativity where AI provides extraordinary computational power and exploration capability, while humans provide curiosity, intuition, imagination, and scientific judgment. That combination will define the



next generation of materials discovery.

One of your ongoing research directions involves converting carbon dioxide into useful chemicals and fuels. At a time when climate change dominates global discussions, do you believe carbon capture and utilisation technologies can realistically become commercially viable in the next decade, or are they still largely confined to laboratory success stories?

CO_2 conversion into value-added products is a long-standing research problem, but it is important to recognize that CO_2 utilization is already moving beyond the laboratory. Globally, around 45 commercial carbon-capture facilities are currently operating, capturing more than 50 million tonnes of CO_2 per year. The real challenge now is to make CO_2 conversion sufficiently efficient, selective, stable, and economical for large-scale deployment. Our focus is therefore not simply to convert CO_2, but to convert it into higher-value and higher-energy-density products, particularly C_2 and C_3 chemicals and fuels.

Our group is working on advanced catalysts, especially single-atom catalysts (SACs) and dual-atom catalysts (DACs), for converting CO_2 into products such as ethanol and ethane. Why single-atom catalysts? In conventional nanoparticles, a significant fraction of metal atoms may not participate directly as active surface sites. In SACs, individual metal atoms can be exposed as highly defined active centres, offering potentially near 100% atomic utilisation.

This is particularly important when expensive or scarce metals are involved because reducing metal loading can substantially reduce the material cost. The second advantage is the enormous design space. We can change the metal, coordination environment, support, distance between active sites, and electronic structure. With dual-atom catalysts, we can additionally exploit the interaction between two neighbouring metal centres.

Recent research specifically identifies dual-atom synergy and machine-learning-guided catalyst design as promising directions for CO_2 reduction. However, the major challenge remains achieving high selectivity, current density, energy efficiency, and long-term stability, particularly for multi-electron products such as



ethanol and ethane. This is where our DFT/AI-powered "Padarth Khoj" platform becomes important. Instead of experimentally testing thousands of catalysts, we can computationally screen a very large design space, identify the most promising candidates, and then experimentally validate only the best ones. So, I believe CO_2 utilisation can become commercially important within the next decade but the transition will depend on moving from excellent laboratory catalysts to catalysts that are economically competitive at industrial scale.

India has made substantial investments in semiconductor manufacturing, quantum technologies and advanced computing. From a research ecosystem perspective, which of these sectors do you believe holds the greatest potential for India to emerge as a global scientific leader over the next 15 years, and why?

India has always had a clear strategic objective: to make the country more secure and increasingly self-reliant in critical technologies, particularly in areas related to energy, national security, and strategic autonomy. This is one of the reasons India invested seriously in nuclear energy. As a result, India has developed significant capabilities in nuclear science and technology and has established itself as an important country in the global nuclear ecosystem, giving India a stronger voice in international strategic and scientific discussions. India has also built strong capabilities in areas such as medical technology, pharmaceuticals, space technology, and communication technology. At the same time, we have missed opportunities in some transformative technologies, particularly semiconductor manufacturing and, historically, software technology.

The lesson from history is that we cannot afford to miss the nextmiss next major technological revolution. Among semiconductor technology, quantum technology, and advanced computing, I believe quantum technology offers India perhaps the greatest opportunity to emerge as a global scientific leader over the next 15 years.

Quantum technology is not simply another emerging technology. It is a deep technology with strategic importance for computing, communication, sensing, materials science, drug discovery, defence, and cybersecurity. If India can build indigenous capabilities early, particularly in quantum materials, qubits, control



systems, cryogenic technologies, quantum sensors, algorithms, and supporting electronics we can create an ecosystem rather than becoming dependent on imported components.

Scientific research is often measured through publications, citations and patents. However, taxpayers ultimately expect research to solve real societal problems. As Dean–Research, how do you balance academic excellence with the need to produce innovations that directly benefit industry, healthcare, sustainability and national development?

Yes, research metrics such as publications, citations, and patents were introduced for a good reason. They provide a structured way to evaluate research performance and help everyone from researchers and university administrators to policymakers and the public understand and quantify research outcomes.



However, research itself is much more versatile than these metrics suggest. When public or taxpayer money is invested in research, we have a responsibility to use it to address current problems, benefit society, strengthen industry, support national development, and ultimately contribute to global challenges. At the same time, we cannot draw a simple line and say that all research must produce an immediate benefit to the taxpayer or industry.

If we focus only on today's problems, we may fail to prepare the country for tomorrow. Some of the most transformative technologies of our time originated from fundamental research whose applications were not visible when research was initially conducted. Therefore, I believe we need to maintain a balance between immediate impact and long-term vision.

On one side, research should address real and urgent challenges in areas such as healthcare, energy, sustainability, agriculture, climate change, advanced manufacturing, and national security. We should actively encourage researchers to work with industry, develop prototypes, generate intellectual property, and translate discoveries into technologies and products. On the other side, we must strongly support fundamental and futuristic research. A country's future security, technological independence, and economic strength cannot depend only on solving today's problems. We must also ask: What will the world need 10, 20, or 30 years from now?

This is particularly important in areas such as quantum technology, artificial intelligence, advanced materials, semiconductors, biotechnology, clean energy, and space technology. As Dean–Research, my approach is therefore not to choose between academic excellence and societal impact, but to connect the two. We need excellent publications because they create knowledge. We need citations because they demonstrate influence. We need patents because they protect innovation. But ultimately, we should also ask: What problem did we solve? What



technology did we create? What value did we generate? And what difference did our research make to society and the future of the country? That, for me, is the true measure of research excellence.

Many young researchers feel that India's academic ecosystem sometimes rewards safe and incremental research rather than high-risk, breakthrough ideas. Having mentored researchers and led multiple funded projects, do you think this perception is valid? What reforms are needed to encourage truly disruptive scientific innovation?

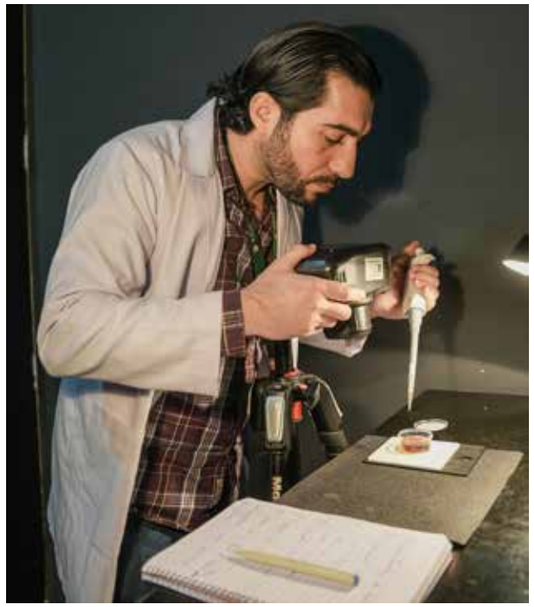
Yes, I believe high-risk research is now increasingly feasible in India. One of the reasons is the rapid growth of the startup and entrepreneurship ecosystem. Startups inherently involve risk: there is no guarantee that an idea, technology, or business model will succeed. Yet India has increasingly created an environment where young entrepreneurs are willing to take these risks, experiment, fail, learn, and try again.

We should bring the same culture into academic research. I believe India should create a specific category of high-risk, high-reward research, particularly in strategically important and priority areas. Such projects should receive substantial funding, greater flexibility, and institutional support, with the understanding that failure is an acceptable outcome when the research is genuinely high-risk and scientifically ambitious. These projects should not all follow the same funding model. Some may require relatively short periods to test a bold hypothesis, while others may need five, ten, or even more years to achieve meaningful outcomes. Funding mechanisms should therefore support both short-term exploratory projects and long-term transformational research.

However, high-risk research is different from a startup. In a startup, if one business idea fails, the entrepreneur can potentially move to another business. In fundamental research, failure itself can generate valuable scientific knowledge. Therefore, we need a model that combines the risk-taking culture of startups with the scientific depth and long-term vision of research. I would propose something like"BiResearch"—Business-oriented Research", or more broadly, a research model where researchers are encouraged to think simultaneously as scientists and technology creators.

The objective would be to take a high-risk scientific idea, develop the fundamental science, build a prototype, protect the intellectual property, and eventually create a technology or enterprise around it. Such





a system should provide researchers with funding, infrastructure, mentorship, technology-transfer support, intellectual-property assistance, and freedom to change direction when the original hypothesis does not work. If India wants breakthrough technologies rather than incremental publications, we must create an environment where a researcher can say: “I have a high-risk idea. I may fail but if I succeed, it could change the field.” That is the culture we need to build for the next generation of Indian science and innovation.

Quantum computing is frequently described as the next technological revolution. Yet, much of the public conversation remains highly theoretical. From the perspective of computational materials science, what practical breakthroughs do you expect quantum computing to enable within the next decade that today's classical computing simply cannot achieve?

Quantum technology is often described as the next technological revolution, but I would like to make one point very clear: quantum computing is not merely a theory of the future; the underlying science was developed almost a century ago, and quantum computers are already becoming a technological reality.

Quantum bits, or qubits, quantum computing, quantum communication, and even concepts such as quantum teleportation have their foundations in the development of quantum mechanics nearly 100 years ago. Today, quantum computers are already available, although their capabilities are still far below what we ultimately expect them to achieve.

What makes quantum computing particularly exciting is that it is a rapidly developing deep technology. We are seeing progress in several platforms, including superconducting qubits, trapped-ion systems, diamond-based qubits, and topological approaches. Each has its own advantages and challenges, and it is still too early to say which architecture will ultimately dominate. I would compare the current stage of quantum computing with the development of GPUs. Ten or fifteen years ago, GPUs were primarily associated with graphics and specialized computing. Today, it is almost impossible to imagine modern AI and high-performance computing without them. I believe quantum processing units, or QPUs, could follow a similar trajectory.

Over the next decade, I expect QPUs to become increasingly accessible to universities, research laboratories, and technology companies. Their most important impact may initially be in areas where quantum systems have a natural computational advantage, such as cryptography, optimization, drug discovery, materials science, chemistry, finance, and complex simulations. From my perspective as a computational materials scientist, one of the most exciting possibilities is the combination of quantum computing, AI, and quantum-mechanical simulations to discover new materials and catalysts that are extremely difficult to model using classical computers. My personal prediction is that the financial and banking sector could be among the earliest major industries to adopt quantum computing, particularly for optimization, risk modelling, and cryptography-related applications.



I would expect significant developments in this direction within the next five years, although the exact timeline remains uncertain. The key message is simple: quantum computing is not replacing classical computing tomorrow. It is becoming a new layer of computing alongside CPU and GPU technologies. The organizations that begin building quantum capabilities today will be much better prepared for the technological landscape of the next decade.

Research today increasingly demands collaboration between physicists, chemists, computer scientists, engineers and data scientists. How should universities redesign their academic structure to encourage interdisciplinary research instead of continuing with rigid departmental boundaries that often limit innovation?

Universities should move from a department-centric model to a problem-centric research model.



Major societal and technological challenges do not belong to a single discipline; they require physicists, chemists, engineers, computer scientists, data scientists, and other experts to work together.

Instead of traditional isolated departments, we need problem-centric research ecosystems. At SRM University-AP, for instance, we have actively fostered interdisciplinary research setups where physicists, chemists, data scientists, and engineers work side-by-side on common challenges—such as energy storage, clean hydrogen, and quantum materials. Giving researchers shared high-end facilities and rewarding cross-departmental patents and publications ensures that ideas, rather than departmental boundaries, drive true innovation.

Students should have the flexibility to take courses and conduct research across departments. This will create an ecosystem where ideas, rather than departmental boundaries, drive innovation.



Countries leading scientific innovation have built strong partnerships between academia, government and industry. In India, these collaborations often remain fragmented. What institutional changes would you recommend to ensure that university research moves faster from laboratory prototypes



to commercially scalable technologies?

The first change should be to remove unnecessary boundaries between research sectors and disciplines. Any researcher with a strong idea capable of becoming a market-ready technology should receive equal opportunity and support. We need Centres of Excellence within universities that bring together academia, government, industry, startups, and investors to move ideas from research to prototypes, patents, and commercialization.

High-end research facilities should be integrated with university campuses rather than operating as isolated institutions. Industry and CSR funding should be strongly encouraged toward research, innovation, and technology development, rather than conventional infrastructure. Finally, every university needs a strong technology-transfer mechanism to convert discoveries into patents, products, startups, and societal impact.

Looking ahead to 2047, when India aims to become a developed nation, what scientific capability do you believe the country must build urgently to become globally respected not just as a consumer of technology, but as a creator of breakthrough knowledge? And what role should research universities play in achieving that vision?

Looking toward 2047, I believe India's most urgent requirement is to build the capability to discover and create deep technologies, rather than remaining primarily a consumer of technologies developed elsewhere. We need strong capabilities in fundamental science, advanced materials, AI for science, quantum technology, semiconductors, biotechnology, clean energy, and advanced computing. But technology alone is not enough. We need the ability to convert fundamental discoveries into intellectual property, prototypes, products, and globally competitive industries. Research- based universities will play the most important role in this transformation. Universities should become engines of discovery, where students and faculty have access to world-class infrastructure, interdisciplinary Centres of Excellence, high-end computing, and strong industry partnerships. India has talent and numbers; our challenge is to provide the right funding, freedom, infrastructure, and direction. By 2047, our ambition should be not only to "Make in India," but to "Discover in India." The ultimate measure of a developed India should be whether the world looks to India not only for its market and workforce, but also for its scientific discoveries, intellectual property, breakthrough technologies, and solutions to global challenges.

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A STUDENT'S POSTCODE SHOULDN'T DECIDE THE CEILING OF THEIR AMBITION



Gaurav Goel
Co-founder & CEO, Toprankers

For years, India's education system has treated engineering and medicine as default destinations, often before students have had the opportunity to understand what else is possible. In this conversation, ***Gaurav Goel,*** *Co-founder & CEO, Toprankers, examines the gap between academic performance and informed career choice, and why that gap continues to shape the decisions of students and parents.*

In this interview with Education Post's ***Prabhav Anand,*** *Goel traces Toprankers' evolution from a coaching marketplace into a broader career-focused platform spanning law, judiciary, management, design and school-level counselling. He discusses the growing visibility of alternative career pathways, the changing expectations of parents, and the need for schools to introduce career conversations much earlier. The conversation also looks at how technology and AI can make personalised learning more precise without replacing human mentorship, and why outcomes, rather than sign-ups or scale alone, must define the next phase of EdTech.*

Looking ahead, Goel identifies timing, geography, evaluation and parental awareness as the key gaps India's career-preparation ecosystem must address. At the heart of his argument is a simple proposition: a student's postcode, academic marks or lack of exposure should not determine the limits of their ambition.

To begin, could you briefly introduce your vision for Toprankers and the gap in India's education ecosystem you set out to address?

I became an engineer because I didn't know I could become anything else. I grew up in Muzaffarnagar, in western Uttar Pradesh, where the careers people around me could describe came down to exactly two: engineering and medicine. I graduated in 2008 and only then began working out what I actually wanted to do with my life. That sequence is backwards, and it is still the default for lakhs of students in this country. They don't choose engineering; they arrive at it, because nobody told them what else existed.

Toprankers began in 2016, in Bangalore, as a marketplace connecting students to coaching institutes. Four years of that taught me what actually needed to be built: there was no single platform covering careers beyond engineering and medicine — one that took a student through discovery, counselling and preparation. So, in 2020, Karan, Harsh and I came together to build it ourselves and moved the company to Bhopal. That choice gets questioned often — an edtech company headquartered in a Tier 2 city rather than Bangalore or Gurgaon. But that is where our students are. Building where they are was never a compromise.

Everyone else in the market picked a student up only after the decision had been made: you had decided to study law, so somebody would coach you for CLAT. Nobody was working on what comes before that — the discovery and the honest conversation about which career actually suits a particular student. We chose to begin there and to carry the student through the entrance and into the right college, with the same quality whether they walk into one of our classrooms or log in from a town of 50,000 people.

Six years on, that has become our House of Brands — LegalEdge and LegalEdge After College for law, Judiciary Gold for judiciary services, SuperGrads for management entrances, CreativeEdge for design and architecture, and Udaan for school-level career counselling. Between them, we've worked with over 3 lakh students through 60+ centres across 35 cities, with a full-time team of over 600. All of it rests on one belief: a student's postcode shouldn't decide the ceiling of their ambition.

India is witnessing growing interest in careers beyond engineering and medicine. What is driving this shift among students and parents?

There are three things.

First, the success stories are now visible and repeatable. A student clears a state judiciary exam and becomes a judge in their twenties. Another cracks IPMAT and enters an IIM several years earlier than through the conventional CAT route. These are no longer stories a family hears second-hand — they're happening at scale, and social media has made them visible in a way they weren't a decade ago. In law and management, where we have been active the longest, LegalEdge and SuperGrads account for the highest number of verified selections of any brand in the country across CLAT UG, CLAT PG and management undergraduate entrance exams; CreativeEdge and Judiciary Gold are on the same trajectory in design, architecture and state judiciary exams. And when younger students see what happened to someone from their own school, an entire school's sense of what is possible changes in a single year.

Second, parents have re-priced these careers. Law, judiciary, management and design are now understood to offer both stability and standing, which is what most Indian parents are optimising for. That shift has been the single biggest unlock.

Third, access has caught up with aspiration. Five years ago, a student in a Tier 3 city may not have known what CLAT or IPMAT was, let alone had a serious way to prepare for it. Today, around 60% of our students come from outside the top eight cities.

How can schools and educators better prepare students to make informed career choices beyond conventional pathways?

Four things, none of which cost very much.

Assess aptitude, not just academics. A student with strong verbal reasoning and an instinct for argument may be far better suited to law than to engineering, and marks will never surface that.

Invest in the counsellor, not just the counselling. Most schools have one counsellor for several hundred students, and that person has rarely been trained on what a career in judicial services or industrial design actually involves — the entrance, the timeline, the earnings curve.

Bring alumni back. Nothing moves a Class 9 student like meeting someone from their own school who is now at an NLU or a design studio.

And bring parents in early, because in India, the career decision is a household decision.

We built Udaan for exactly this — career counselling from Class 8 onward, now delivered to over 75,000 students across 24 states, much of it through CSR partnerships that reach schools where no career guidance existed at all. The goal at that age isn't to force a decision. It's exposure first; the decision comes later, and comes better.

You have earlier highlighted technology's role in making learning more accessible and engaging. What should the next phase of education technology focus on?

Phase one of Indian EdTech was about access. Phase two has to be about precision.

Delivering content is a solved problem — anyone can put a video online. The harder problem is understanding a student well enough to tell them exactly what to do next: which topic to revise this week, where they are leaking marks relative to someone who converted last year, whether their preparation curve is actually tracking towards a selection. That is a fundamentally different promise from "watch this lecture." It also means simulating the exam rather than only teaching the syllabus — realistic mocks, answer-writing evaluation for judiciary aspirants, portfolio review that mirrors how a design school actually assesses a candidate.

But the point I'd stress most: technology should make human mentorship sharper, not replace it. In our Lighthouse programme, AI gives a mentor a detailed picture of a student before the conversation begins — so the twenty minutes they spend together is spent on the right thing. If phase one was reach, phase two is relevance.

Personalised learning is increasingly being seen as the future of EdTech. How can technology make personalisation meaningful rather than simply data-driven?

Data tells you what a student got wrong. It takes something more to tell you why.

Take two students with the same score on the same mock. One has a conceptual gap in a specific topic. The other knows the concept perfectly but panics in the last fifteen minutes and rushes a whole section. Identical scores, completely different problems. Send both the same revision module and you've helped neither — one needs teaching, the other needs a change in exam strategy and, honestly, some reassurance.

That's why our model pairs analytics with a human mentor and a monthly conversation with the parent. A student's aptitude, anxiety, pace and confidence matter as much as their accuracy percentage. Personalisation becomes meaningful the moment it stops recommending content and starts understanding a student well enough to know what they need to hear next.

The EdTech sector has moved beyond its pandemic-era boom. What do you believe will separate sustainable education platforms from those focused primarily on rapid growth?

The three of us came together in 2020 — precisely when the tailwind arrived. The easy thing then was to chase online sign-ups, raise on those numbers and worry about economics later. We put the money into faculty and physical centres instead, which looked slow at the time and looks rather different now.

That discipline shows up in the numbers. Toprankers crossed ₹100 crore in revenue in FY26 while staying EBITDA-positive, as we were in FY25 — a second consecutive year of profitable growth rather than a one-off. In Indian EdTech that combination is still unusual. Much of the sector grew by spending ahead of revenue, and the correction of the last few years was, at its heart, a correction of that model.

The second differentiator is depth over breadth. We deliberately do not teach JEE or NEET. We would rather be the most credible name in law, judiciary, management and design than the twentieth name in engineering.

The third is where growth comes from. A large share of our enrolments come from students and parents referred by someone who studied with us — a student gets the rank they were working towards, and their cousin, their neighbour and their school follow. That keeps our acquisition costs far below what a discovery-led model requires, and it means our growth is a lagging indicator of our results rather than of our ad budget.

Sign-ups were the metric of the boom years. Selections are the metric now.

Looking ahead, what are the biggest gaps in India's career-preparation ecosystem that the education sector must address to become more outcome-oriented?

Four, and they compound.

Timing. Most students decide their stream in Class 9 or 10 with almost no visibility into law, judiciary, design or management, because structured guidance in schools begins too late, if at all. This isn't about adding more options at Class 12; it's about starting the conversation three years earlier.

Geography. Quality preparation for these careers has historically sat in a handful of metros. That's why we run a hybrid model — 60+ company-owned and franchised centres across 35 cities, with the same faculty standards and material as our metro classrooms. A student's postcode still plays far too large a role in determining their opportunity.

Evaluation. Academic performance alone tells you very little about whether a particular career suits a student. Aptitude, temperament and interest matter just as much, and most of the ecosystem isn't built to assess them early.

Parents. Career decisions here are made jointly with parents. If a parent doesn't understand how these paths play out — the timelines, the outcomes, the stability — the student defaults back to the familiar choice regardless of their own aptitude. Parents aren't an obstacle; they're the most under-served stakeholder in the system.

That's also where we're taking Toprankers next. We began in test preparation and we're becoming a career management company — from Class 8 discovery and counselling, through entrance preparation and college, and up to the first job. Preparation is one chapter of that journey. It was never meant to be the whole book.

And this is still personal. The seventeen-year-old I was had nobody to tell him what else existed, and defaulted into a career the way most students in small towns still do. That's the gap, and closing it is the only thing this company has ever been trying to do.





MOVE FINANCIAL EDUCATION FROM KNOWLEDGE-BASED LEARNING TO DECISION-BASED LEARNING

Himanshu Vyapak
MD & CEO, FinX

As financial products become increasingly accessible to young Indians, the bigger challenge is ensuring they understand the decisions behind them. In this interview with Education Post's **Prabhav Anand**, **Himanshu Vyapak**, MD & CEO, FinX, examines the widening gap between financial access and financial understanding. He makes a case for moving financial education beyond terminology and theory towards practical, decision-based learning. From budgeting, credit and investment risk to navigating financial influencers and misinformation, Vyapak outlines what students need to learn before making real-world financial choices. He also discusses how universities and industry can collaborate through simulations, competitions, case studies and experiential learning to build financially responsible young adults.

Young Indians today have unprecedented access to digital banking, credit and investment platforms. How can education ensure that this access is matched by adequate financial understanding?

Access and understanding have to grow together. Technology has made financial products considerably easier to access, but an easier interface does not necessarily make a financial decision easier to understand.

This is where education has an important role. Students should not only learn what a financial product is, but also how to evaluate it — what the associated risks are, what the costs are, what the time horizon is and whether it is appropriate for a particular financial objective.

SEBI's Investor Survey 2025 highlights the gap quite clearly. While 63% of households reported awareness of at least one securities-market product, only 9.5% participated in the securities market. The survey also found that only 36% of current investors demonstrated moderate or high knowledge of securities markets.

That tells us that awareness is only the starting point. Education needs to move towards application and decision-making. Students should be given opportunities to work through practical situations involving savings, borrowing, investing, risk and financial planning.

The objective should not be to create young investors simply because investment platforms are accessible. It should be to create young people who are capable of making informed financial choices when they do encounter these products.

You have advocated making financial literacy a part of college education. What should a basic financial-literacy curriculum for undergraduate students include?

At the undergraduate level, financial literacy should be treated as a life skill rather than a specialised finance subject.

A basic curriculum should cover personal budgeting and cash-flow management, saving, banking, credit and responsible borrowing, insurance, taxation, inflation, compounding, investing, risk-return relationships, mutual funds and basic capital-market concepts. It should also include digital financial safety, fraud awareness and the ability to distinguish credible financial information from promotional or misleading content.

The other important element is decision-making. Students should be presented with situations they are likely to encounter — taking an education or personal loan, managing their first salary, choosing between saving and investing, understanding a financial product or evaluating a claim about returns.

There is also a strong case for introducing students to the idea of financial goals. The right financial decision is not the same for everyone. A student saving for a near-term requirement should approach money differently from someone planning for a long-term goal.

The curriculum therefore needs to answer a simple question: not just "What is this financial product?", but "How do I decide whether this is appropriate for me?"

Through FinX's National Mutual Fund Olympiad, you have interacted with thousands of students. What have these interactions revealed about the gap between students' financial knowledge and their actual understanding of investment decisions?

One of the clearest lessons for us has been that knowing a financial term and being able to apply that knowledge are two different things.

The first edition of the Franklin Templeton National Mutual Fund Olympiad brought together more than 10,000 students from 400+ colleges across India. The programme was designed around financial-market fundamentals, mutual funds, asset allocation and practical decision-making rather than only textbook-based knowledge.

What that experience reinforced for us is that students are curious about financial markets, but curiosity does not automatically translate into financial understanding. A student may know what a mutual fund is, for example, but still need to understand how risk, time horizon, diversification and investment objectives influence a decision.

This is consistent with the broader picture emerging from SEBI's Investor Survey 2025. The survey found that only 36% of current investors possessed

moderate or high knowledge of securities markets, despite 63% of households being aware of at least one securities-market product.

That gap is precisely why experiential financial education matters. The objective should be to move students from recognising financial terminology to being able to reason through a financial decisio

Social media and financial influencers are increasingly shaping how young people learn about money. Should colleges also teach students how to assess financial information and identify misinformation?

Absolutely. Financial literacy today has to include information literacy.

Students are consuming financial information from a much wider range of sources than previous generations. The challenge is no longer only whether information is available; it is whether a young person can assess its credibility, understand its context and recognise when education crosses into advice or promotion.

SEBI's Investor Survey 2025 found that 62% of investors rely on recommendations from friends, family or social media instead of registered intermediaries. SEBI has also highlighted misleading advice from unregistered finfluencers as an investor-protection concern.

Colleges can therefore teach students some basic questions to ask before acting on financial information: Who is providing this information? Are they qualified or regulated? Is the claim supported by evidence? Is risk being discussed alongside potential returns? Is there a commercial interest involved?

I don't think the answer is to tell students to avoid social media. That is unrealistic. The more useful approach is to teach them how to navigate it responsibly.

In a digital financial environment, knowing how to question information is becoming as important as knowing the information itself.

FinX focuses on bridging the gap between academia and the financial industry. How can industry and universities work together to make financial education more practical and relevant for students?

The relationship needs to move beyond guest lectures and occasional campus events.

Universities bring the academic environment and access to students, while the industry brings current knowledge of products, customer behaviour, technology, regulation and the skills required in the workplace. Bringing those strengths together can make learning much more relevant.

This can happen through industry-designed case studies, simulations, internships, practitioner-led sessions, competitions, live projects and curriculum inputs. Students should get opportunities to work through situations that resemble the decisions and problems they will encounter outside the classroom.

FinX's approach has been built around this connection between academia and industry. Our programmes bring together education, skilling and employability, while our partnerships with institutions help take industry-oriented BFSI learning to students. The recent launch of our Kolkata campus is also part of this effort to strengthen the connection between academia and the financial-services industry.

The larger objective should be to ensure that students don't have to wait until their first job to understand how the industry actually works.

You have previously emphasised that financial literacy is most effective when students "learn by doing." Which experiential approaches—simulations, competitions or industry interactions—do you believe have the strongest impact on students?

I don't think there is one format that works



for every student. What matters is whether the experience requires the student to apply knowledge rather than simply recall it.

Simulations can help students understand how decisions change outcomes. Competitions can create engagement and encourage students to prepare. Industry interactions can provide context that a textbook cannot. Case studies and projects can bring all of these elements together.

Our experience with the National Mutual Fund Olympiad has particularly reinforced the value of competition as an entry point. The first edition brought together more than 10,000 students across 400+ colleges and used an interactive format to take financial-market concepts beyond conventional classroom learning.

But the competition itself is not the end objective. The real value comes when the competition becomes a gateway to further learning.

For financial education, I would therefore favour a combination: learn the concept, apply it in a simulated or practical situation, discuss it with practitioners and then reflect on the decision. That is much more likely to create lasting understanding than a purely theoretical approach.

Young investors are increasingly exposed to equities, mutual funds and other complex financial products. How should educators teach investment risk without encouraging speculative behaviour among students?

The first principle should be that financial education should not be confused with encouraging investment.

A student can learn about equities, derivatives or mutual funds without being encouraged to invest in them. In fact, understanding a product properly should make a person more conscious of the risks involved.

The starting point should therefore be risk itself — volatility, time horizon, diversification, liquidity, potential loss and the relationship between risk and expected return. Students should also understand the difference between investing for a financial goal and taking a short-term position based on a market movement.

SEBI's Investor Survey 2025 found that fear of financial losses, lack of knowledge and perceived complexity are among the barriers to securities-market participation.

That makes the role of educators particularly important. We should not frame financial markets as a quick route to wealth. Equally, we should not make them appear so complicated that students disengage altogether.

The right message is simple: understand the product, understand the risk and understand why you are considering it before making a decision.

What is the most important change India's education system needs to make to create a generation that is not just financially literate, but capable of making responsible financial decisions?

I would make one fundamental shift: move financial education from knowledge-based learning to decision-based learning.

India does not have an information shortage. Young people today can find explanations of almost any financial product within seconds. The bigger challenge is helping them determine what information is credible, understand the risks and apply it to their own circumstances.

Education therefore needs to give students opportunities to practise financial decisions before they have to make them with their own money.

A student should be able to create a budget, evaluate a loan, understand the impact of interest and inflation, compare financial products, assess investment risk and identify misleading financial information.

If we can make that kind of practical financial decision-making a normal part of education, we will move from producing students who know financial terminology to young adults who can use financial knowledge responsibly.

That, ultimately, is what financial literacy should mean.





SCHOOLS CANNOT PREPARE STUDENTS FOR EVERY FUTURE JOB; THEY CAN PREPARE THEM TO REMAIN CAPABLE LEARNERS

Vivek Prakash
Co-founder & CEO, Codingal

As artificial intelligence reshapes education, **Vivek Prakash,** Co-founder & CEO of Codingal, discusses how schools can move beyond teaching technology as a standalone skill and instead use it to build problem-solving and computational thinking. In this interview with Education Post's **Prabhav Anand,** he explores integrating coding across subjects, making project-based learning more experiential, and using AI as a thinking partner rather than an answer machine. He also highlights the gaps in implementing NEP 2020, particularly around teacher preparedness, curriculum integration and access. Looking beyond coding and AI, Prakash emphasises communication, curiosity, creativity, collaboration, critical thinking and continuous learning as essential to preparing students for an uncertain future.

You have argued that coding should be embedded into existing school subjects rather than treated as an additional burden. What would it take for Indian schools to make this approach work at scale?

Coding at scale will work when schools stop treating it as a separate subject. AI can be used across the curriculum as a facilitator. For mathematics, coding can be used to explore patterns. Experiments can be modelled for science. Data-driven projects can be made more engaging for social science. All this can be attained through age-appropriate curricula, teacher training, accessible devices, and practical resources. Schools should begin incrementally rather than wait for perfect infrastructure. Ultimately, the goal is not to make every child a programmer, but a confident problem-solver and creator.

In our previous conversation, you described coding as a "superpower" in the AI age. As AI becomes more accessible, how should schools redefine what students actually need to learn about technology?

Today, when both technology and information are available in abundance, schools need to shift their focus from teaching students the basic know-how of the technology to helping them understand how it works. Working with Artificial Intelligence is not satisfactory; students need to understand it well enough to question it, and dictate it, and create in tandem with it. This is where programming proves to be a meaningful contributor with logical thinking and system operations at its core, helping students to assess AI-generated codes to observe where they fail and deciding whether an output is reliable and worth building on.

You have emphasised moving students from passive consumption to active creation. How can this shift reshape the way schools approach project-based and experiential learning?

Moving from consumption to creation helps make project-based learning more central to the learning process. Additionally, it enables the students to discover, test, and apply new ideas instead of simply demonstrating pre-learnt concepts. Coding provides students with a platform to convert ideas into testable actions through building apps, debugging, feedback, and iteration exercises. Throughout these exercises, students also learn to persevere and learn how failure is not an endpoint, but another data point to arrive at a better solution. Teachers can assess the reasoning, collaboration and persistence behind a project, not simply the final product. This creates a more meaningful measure of learning, where the process of thinking and building becomes as important as what a student ultimately produces.

Codingal uses live instruction, projects, competitions and hackathons to engage learners. What does this model reveal about the limitations of conventional classroom-based learning?

Our experience shows that conventional classrooms can deliver concepts effectively, but students also need opportunities to apply them in unfamiliar situations. Live instruction provides interaction and immediate feedback, while projects give concepts a practical purpose. Competitions and hackathons add constraints, deadlines and independent decision-making. These experiences complement classroom teaching rather than replace it. When students build an app or game, they encounter problems that cannot always be solved through memorisation. That is where creativity, confidence and problem-solving become visible.

With AI increasingly capable of writing code and solving routine problems, should computational thinking now take greater priority than simply teaching students programming languages?

Yes, computational thinking deserves greater priority, but it should complement

programming rather than replace it. Programming is an effective way to practise decomposition, pattern recognition, sequencing and testing. In an AI-enabled world, however, knowing a programming language is not enough. Students must frame problems, evaluate outputs, debug solutions and recognise when automated results are flawed. As AI handles more routine coding, the ability to define the right problem and judge the quality of a solution becomes even more important.

NEP 2020 has brought computational thinking and skill-based learning into sharper focus. What gaps still need to be addressed for these ideas to translate into everyday classroom practice?

NEP 2020 has created momentum, but policy intent must translate into everyday classroom practice. Key gaps include teacher preparedness, curriculum integration, assessment and access to appropriate infrastructure and resources. Computational thinking should not remain confined to computer labs. Teachers need practical training and subject-linked resources showing how these skills can fit existing lessons. Assessments must reward reasoning, experimentation and application rather than recall alone. Sustained teacher support and collaboration among policymakers, schools and education providers will be essential for meaningful implementation.

As students increasingly use AI tools for learning, how can educators ensure that technology strengthens critical thinking and creativity rather than encouraging dependence on ready-made answers?

AI should become a thinking partner rather than an answer machine. Students can first attempt a problem independently, explain their reasoning and then use AI to challenge or improve their approach. Teachers can ask students to verify AI-generated answers, identify errors, compare solutions and explain their choices. Assignments should include reflection, discussion and original application, where simply reproducing AI output is insufficient. The goal is not to prevent AI use, but to teach students how to question, evaluate and use it intelligently.

India is preparing students for jobs that may not exist yet. Beyond coding and AI, which foundational skills should schools prioritise to make students adaptable to a rapidly changing world?

Beyond coding and AI, schools should prioritise communication, curiosity, collaboration, creativity, critical thinking and continuous learning. Adaptability comes from being comfortable with unfamiliar problems rather than relying only on fixed technical skills. Students should learn to ask better questions, communicate clearly, collaborate effectively and respond constructively to failure. Ethical judgement will also matter as emerging technologies create new choices and challenges. If schools build curious, resilient learners who can independently acquire new skills, students will be better prepared for careers that are difficult to predict today. Ultimately, schools cannot prepare students for every job that the future may create. They can, however, prepare them to remain capable learners when the skills those jobs require inevitably change. EP





APAAR ID
IS IT BENEFICIAL TO STUDENTS?

Siddharth Verma

The Indian educational ecosystem has historically struggled with structural fragmentation across dozens of autonomous secondary school examination boards, over a thousand universities, and millions of vocational and primary schooling centers. To overcome administrative friction, forged credentials, and fragmented records, the Ministry of Education, in alignment with the National Education Policy (NEP) 2020, launched the Automated Permanent Academic Account Registry, universally known as the APAAR ID. Operationalized under the national mandate of "One Nation, One Student ID," APAAR establishes a foundational Digital Public Infrastructure (DPI) for Indian education, creating a lifelong digital academic identity for every learner from foundational schooling to higher research. Official data reflects wide adoption, recording over 33.74 crore student registrations and more than 26.35 crore verified digital accounts.

Structural Features and Identifier Taxonomy

The APAAR ID is a unique, random 12-digit numeric identifier generated for students across all recognized educational institutions in India. Designed with an algorithmic checksum verification to prevent input errors, the identifier carries lifetime validity. It remains attached to an individual from pre-primary education through primary, secondary, undergraduate, postgraduate, and doctoral studies, as well as lifelong professional upskilling.

To avoid administrative confusion, the APAAR ID must be distinguished from adjacent educational registries:

Identifier	Format	Target Entity	Core Function
UDISE+ School Code	11-digit numeric	Educational Institution	Geographically decodable code identifying the physical school campus, district, and state.
Permanent Education Number (PEN)	11-digit numeric	K-12 Student	System-generated tracking number in UDISE+ used to track retention, migrations, and dropouts.
Academic Bank of Credits (ABC) ID	12-digit numeric	Higher Education Student	Virtual credit repository for tertiary education, now unified directly under the APAAR identifier.
APAAR ID	12-digit numeric	Lifelong Learner	Sovereign academic identity consolidating school records (PEN), tertiary credits (ABC), and credentials (NAD).

Operationally, the PEN acts as an internal school-level administrative prerequisite: an APAAR ID cannot be generated without an existing PEN, but while the PEN remains largely restricted to institutional databases, APAAR interfaces outward with testing agencies, admissions portals, and employers.

The Digital Public Infrastructure Integration Stack

APAAR does not function as an isolated document repository. Rather, it acts as a federated data-exchange fabric linking three major pillars of India's digital ecosystem:

National Academic Depository (NAD): A 24/7 digital storehouse where accredited universities, open schools, and examination boards publish authenticated, digitally signed academic certificates, degrees, and mark sheets.

Academic Bank of Credits (ABC): Developed by the Digital India Corporation under MeitY and regulated by the University Grants Commission (UGC), ABC is the accounting ledger that manages, verifies, and transfers academic credits earned by learners. APAAR serves as the persistent account key that anchors this ledger across different institutions.

DigiLocker: The primary citizen-facing interface and presentation layer. Operating through Aadhaar-linked multi-factor authentication, DigiLocker allows students to store, view, and share their verifiable virtual APAAR identity card alongside certified educational documents.

At the institutional governance level, APAAR synchronizes with the Vidya Samiksha Kendra (VSK) command framework. VSK aggregates student-level telemetry from school systems, giving policymakers longitudinal visibility over learning metrics, mid-day meal distributions, and regional attendance trends.

Operationalizing the National Credit Framework (NCrF)

A core functional role of APAAR is driving the National Credit Framework (NCrF), notified jointly by the UGC, AICTE, NCVET, CBSE, and NIOS. The NCrF establishes credit parity across general academics, technical courses, vocational training, and experiential learning across Levels 1.0 through 8.0.

Under NCrF regulations, 30 notional learning hours yield 1 academic credit, with an annualized expectation of 1,200 learning hours yielding 40 credits. Academic weighting is calculated as:

Credit Points = Credits Earned * NCrF Level

Banked credits deposited under an APAAR profile carry a regulatory shelf life of up to seven years, within which they can be redeemed toward a degree, diploma, or certificate. This infrastructure enables the Multiple Entry and Multiple Exit (MEME) framework in higher education:

Year 1 Exit (40 credits + vocational component): Awards an Undergraduate Certificate.

Year 2 Exit (80 credits): Awards an Undergraduate Diploma.

Year 3 Exit (120 credits): Confers a Bachelor's Degree.

Year 4 Exit (160 credits): Awards a Bachelor's Degree with Honours or Research.

Because banked credits remain stored in the student's ABC account under their APAAR ID, learners experiencing personal or financial disruptions can exit their studies and re-enter at a later date or at a different university without academic loss.

Transformative Stakeholder Benefits

For Students:

APAAR eliminates the vulnerability of losing physical certificates. It enables frictionless inter-state and inter-board school migrations by ensuring new institutions can instantly fetch authenticated transfer certificates and records. It also streamlines registration for national entrance exams like JEE Main, NEET UG, and CUET by auto-populating verified academic transcripts without requiring manual uploads.

For Schools and Administrators:

By linking records to Aadhaar and PEN, APAAR eliminates duplicate and ghost enrollments. Automated data heuristics via VSK track students who complete Grade 8 but fail to enroll in Grade 9, generating immediate Out-of-School Children (OoSC) alerts that enable targeted welfare and re-enrollment drives under Samagra Shiksha.

For Employers and Higher Education:

Credential verification, which historically required weeks of manual correspondence with university registrars, is reduced to an instantaneous, tamper-proof check. Employers can verify candidate achievements directly against authentic records hosted on the National Academic Depository via consent-governed digital channels.

Step-by-Step Registration Workflow

APAAR enrollment is conducted through school and college administrations at zero cost to the student:

Institutional Audit: School authorities access the UDISE+ portal, pull up the student's PEN record, and verify primary identity details against admission logs.

Parental Consent: For minors below 18 years of age, physical or digital consent forms are collected from parents or guardians.

Aadhaar e-KYC Verification: The institution transmits demographic data to the UIDAI gateway via secure APIs to confirm cryptographic matching of name, gender, and date of birth.

Registry Generation: Following successful authentication, the UDISE+ system issues the 12-digit APAAR ID, binding it to the student's PEN and UIDAI verification token.

DigiLocker Issuance: The APAAR ID is transmitted directly into the student's DigiLocker account under "Issued Documents" for real-time digital access.

Where demographic discrepancies arise between school registers and UIDAI records, the enrollment module halts until demographic corrections are processed either in UDISE+ or at a physical Aadhaar center. In rural and remote locations, Common Service Centres (CSCs) provide assisted enrollment and e-KYC support.

Judicial Interventions and Data Privacy Safeguards

The rapid push toward institutional saturation initially sparked legal challenges regarding data privacy, potential student profiling, and backdoor Aadhaar mandates. In response to coercive administrative circulars, the Orissa High Court in Rohit Anand Das v. State of Odisha (2025) and the Supreme Court of India in Abhishek Baxi v. Union of India (2026) intervened to establish vital constitutional protections:

Mandatory Opt-Out Provisions: The Supreme Court ordered educational authorities to include explicit upfront opt-out checkboxes on consent forms, ensuring participation is genuinely voluntary.

Protection from Academic Detriment: The Court ruled that students who decline to enroll in APAAR cannot be denied school admission, examination hall tickets, board exam registration, or academic certificates.

DPDP Act, 2023 Compliance: All APAAR data handling must strictly adhere to the Digital Personal Data Protection Act, 2023. Under Section 9, data fiduciaries are prohibited from engaging in tracking, behavioral monitoring, or targeted commercial advertising of minors. Section 12 guarantees rights to data correction and erasure upon consent withdrawal.

Bar on Commercial Sharing: The judiciary strictly prohibited the disclosure, sale, or sharing of student records with private third parties or ed-tech firms without explicit statutory authority.

The APAAR ID provides a modern foundation for Indian education. By linking the National Academic Depository, DigiLocker, and the Academic Bank of Credits into a unified ecosystem, it eliminates administrative friction and empowers students with academic mobility. When balanced with strict statutory compliance under the DPDP Act and voluntary consent safeguards, APAAR stands as an indispensable digital asset for India's evolving knowledge economy.

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WHEN GLOBAL EDUCATION MEETS THE INDIAN WORKPLACE: WHAT HAPPENS AFTER STUDENTS RETURN?



Mr. Aritra Ghosal
Founder & CEO, OneStep Global

For a long time, studying abroad was understood as a largely one-directional journey. Students left India to pursue an international degree, entered the workforce in the destination country and, for many, eventually considered building a life there. Returning to India was often viewed as a change in plan rather than a career pathway in itself. That assumption is becoming less definitive.

A recent finding that 81% of study-abroad aspirants intend to return to India after completing their education is significant in this context. It points to a broader change in how students are thinking about international education. The value of an overseas degree is increasingly being assessed not only by where it can take a student, but by what the student can do with the knowledge, skills and exposure acquired through that experience.

This needs to be viewed alongside the changing nature of India's employment landscape. India is increasingly becoming part of the global talent and capability ecosystem, rather than simply a source of international students.

From international employment to international employability

The distinction between international employment and international employability is becoming increasingly important. An international education does not necessarily have to culminate in permanent employment overseas for it to create long-term value. A student returning from the UK, Australia, Europe or another international destination may bring back technical knowledge, exposure to different academic and professional environments, international networks and experience of working across cultures.

These capabilities are becoming more relevant as the Indian workplace itself becomes increasingly global. Around 60% of the world's top 500 companies already run a Global Capability Centre in India, while roughly 80% of new GCCs launched in 2026 are prioritising artificial intelligence and machine learning as their core mandate. These are increasingly not traditional back-office roles. They are roles in frontier technology, research, product development and global business functions.

For globally educated graduates, this creates a different opportunity set from the one that existed a decade ago. International exposure can be relevant to organisations that are themselves operating across markets and building capabilities for global customers.

The same applies to India's research ecosystem. The government's new PMRC Scheme 2026 aims to place at least 120 global Indian-origin researchers into India's R&D ecosystem between 2026 and 2030. This reflects a broader effort to connect international expertise with India's growing research and innovation capacity.

The question, therefore, is not simply whether internationally educated Indians have relevant capabilities. Increasingly, it is how effectively those capabilities can be translated into the Indian employment market.

The translation gap

This is an important distinction. The HEPI 2025 analysis, examining the experience of Indian students following the UK's withdrawal of the Post-Study Work route in 2012, highlighted the difficulties faced by Indian returnees in competing in the domestic employment market. The UK subsequently introduced the Graduate Route in 2021, restoring a pathway for eligible international graduates to gain work experience in the country. The experience nevertheless highlighted a broader issue: international education and work experience do not automatically translate into credibility within a graduate's home market. The problem was not necessarily capability. It was a translation.

A graduate may return with an international qualification, experience of working with diverse teams and exposure to different business practices. But employers need to understand what that experience means in relation to a specific role in India. At the same time, graduates need to understand how to position their international experience against the requirements of Indian employers.

This is where employability preparation becomes important. The transition from education to employment cannot be treated as something that begins only at graduation. It needs to be addressed much earlier through mentorship, employer engagement, practical exposure and a clearer understanding of how international experience translates across labour markets.

Building the bridge closer to home

The international education ecosystem is also beginning to create some of these bridges closer to home. More than 15 international universities are expected to be offering degrees in India by the end of 2026. At OneStep Global, we are closely involved with several UK universities as they explore transnational education and branch-campus opportunities in India.

These models have significance beyond providing access to international qualifications. They can create a more direct connection between international academic standards and the Indian ecosystem, reducing the translation gap at the point of qualification rather than requiring graduates to address it only after returning.

This is particularly relevant as international student mobility becomes less linear. Students can study across countries, gain experience across markets and eventually choose where their skills create the greatest professional value.

Making the return journey more purposeful

My own experience has shaped how I look at this evolution. I studied at a leading Russell Group university and went on to work with global MNCs in both the UK and India before starting my own company. This experience gave me a first-hand understanding of both international and Indian professional environments, as well as the gap between how global institutions viewed India and what the Indian market actually needed. That experience was one of the starting points for OneStep Global.

Our work has since evolved beyond connecting international institutions and students. Increasingly, we are looking at the relationship between international education and employability, particularly what happens after students acquire their international qualification and experience.

Building a more informed return pathway

This thinking is also behind ReRoot, an initiative we are developing at OneStep Global. The objective is not to tell international students whether they should remain overseas or return to India. It is to make that decision more informed. ReRoot is being developed around a pull-based employability model, built around mentorship, structured employer engagement and market-ready credentialing for returning graduates.

Returning to India should not be presented as the only successful outcome of an international education journey. For some students, the right opportunity will continue to be overseas. For others, India may offer an increasingly relevant career pathway. What matters is that the decision is based on opportunity and capability rather than the assumption that studying overseas must necessarily lead to permanent migration.

The broader shift is therefore not simply about more students returning to India. It is about whether the ecosystem is equipped to recognise and use the capabilities they bring back. For India, the opportunity is to become not only one of the world's largest sources of international students, but also a market where globally educated talent can build careers, contribute to research and innovation, and participate in increasingly global businesses.

The fundamentals of international education remain strong, but the pathways are becoming more flexible. The next phase will be less about where a student eventually settles and more about how effectively the skills, knowledge and experience they acquire can move across markets. For returning graduates, the opportunity is already emerging. The priority now is to build the bridges that allow international capability to translate into Indian-market credibility and, ultimately, meaningful employment.



ROTE LEARNING MAY WIN MARKS BUT REAL UNDERSTANDING BUILDS MINDS

Why Kashmir's education system must move beyond memorizing answers and focus on understanding, critical thinking, creativity and the ability to apply knowledge in real life.

There is a familiar scene in Kashmir every examination season. The recent one too was no different.

Books remain open late into the night. Notes are underlined, answers are memorized and previous question papers are solved repeatedly. Parents calculate percentages. Students compare expected marks. Schools celebrate toppers with photographs, bouquets and certificates.

A 90% score brings applause. A 95% score becomes a badge of honor.

But beneath the celebration is a more uncomfortable question:

How much of what a student writes in an examination does the student actually understand?

That question goes to the heart of a larger problem confronting education in Jammu and Kashmir and across India: the difference between rote learning and real learning.

Rote learning can help a student remember a definition, reproduce a paragraph or solve a familiar examination question. Proper learning enables a student to explain an idea in their own words, connect it with everyday life, apply it in an unfamiliar situation, question an assumption and arrive at a solution independently.

The distinction matters because a mark sheet measures performance at a particular point in time.

It does not, by itself, measure understanding.

When memory becomes the destination

For generations, examinations have rewarded students who can remember large amounts of information and reproduce it accurately.

The system is understandable. Marks are measurable. They provide a simple way of comparing performance and remain important for admission to colleges and professional courses.

But the danger begins when marks stop being a measure of learning and become the definition of learning itself.

A student who spends weeks memorizing model answers may perform brilliantly in an examination. Yet if that student cannot explain the concept without the textbook, the high score tells only part of the story.

For one Class XII student, the pressure to score often comes at the cost of understanding.



"Sometimes we know that we are memorizing an answer only because we expect it in the examination. We may score well, but after the examination we forget much of it. We should work hard to really understand the topic so that we can remember it for a long time." said Shakeel Ahmad, a Srinagar resident.

"That is the fundamental weakness of rote learning. It often produces short-term recall without long-term understanding." he added.

The price students pay

The consequences go beyond forgetting a chapter after the examination.

Rote learning can discourage curiosity. If the expected answer is already available, why ask another question? If mistakes reduce marks, why experiment? If every lesson is ultimately reduced to what may appear in the examination, why explore something outside the syllabus?

Gradually, students can learn to fear being wrong rather than enjoy discovering something new.

They become examination-smart but not necessarily intellectually confident.

This can also create anxiety, many argue.

"The pressure to secure high marks pushes many students towards a cycle of memorization, repeated testing and coaching, leaving little time for reading beyond textbooks, practical work, discussion or independent exploration." said Zahoor Ahmad, a Physics teacher from Kupwara district.

"The irony is that the very skills students need after school are often the skills the marks race can push to the margins." he added.

The graduate test

The limitations of rote learning often become clearer after students leave school.

In school, remembering a formula may be enough to answer a question. At university or in the workplace, the challenge is often to determine which formula to use, why it applies and what to do when the problem does not resemble anything encountered before.

A post graduate from north Kashmir, reflecting on the transition from school to higher education, offers this perspective: "In school, I was trained to prepare answers for examinations. At college, I realized that teachers expected me to understand the subject, discuss it and sometimes form my own opinion. Initially, that was difficult because I was used to looking for the 'correct' answer." said Abrar Ahmad.

Another Kupwara graduate Shazia Akther echoed a similar point:

"Good marks helped me enter college, but they did not give me confidence. I had to learn how to communicate, research, make presentations and solve problems without someone telling me exactly what to memorize."

That transition exposes an uncomfortable gap.

Passing an examination and being prepared for life are not necessarily the same thing.

The warning in the learning data

Recent Annual Status of Education Report (ASER) findings make the issue particularly relevant.

The report repeatedly shows that being enrolled in school does not necessarily mean that children have acquired foundational skills.

ASER 2024 data for Jammu and Kashmir pointed to continuing gaps in foundational reading and arithmetic. Among Class 5 children surveyed, only about 37.7% could read text at the level expected of a Class 2 child, while around 25.1% could perform division.

The numbers should not be treated as a verdict on teachers or schools. They are a warning that educational progress cannot be judged only by enrolment, infrastructure or examination results.

A child who has not mastered basic concepts may still learn enough material to pass an examination.

But the underlying gap remains.

Memorizing an answer cannot permanently compensate for not understanding the concept behind it, according to senior English Lecturer.

"Rote learning may help students reproduce information and secure good marks in an examination, but it does not necessarily translate into genuine understanding. Its biggest disadvantage is that it can discourage curiosity, independent thinking and creativity." Mohd Afzal told Education Post.

"Students become focused on remembering what is written in the textbook rather than understanding why something happens or how that knowledge can be applied to a new situation. In the long run, this can leave young people academically qualified but less confident when they are required to analyze, communicate, solve unfamiliar problems and make decisions independently." he added.

Real learning — more durable

Proper learning is slower than memorization but considerably more durable.

A student who understands photosynthesis does not merely remember its definition. The student can explain why plants need sunlight, connect the process with food production and perhaps understand what happens when environmental conditions change.

A student who understands mathematics can apply a concept to an unfamiliar problem instead of searching memory for a question that looks identical.

A student who understands history can examine cause and consequence rather than simply memorizing dates.

A student who understands science can ask what would happen if one variable changed.

This is where education becomes meaningful.

An undergraduate student Shahzad Shiekh from Bandipora district puts the difference this way:

"When we memorize something, we are thinking about finishing the chapter. When we understand it, we start asking more questions. The second kind of learning takes more time, but it stays with you for much longer."

That should be the direction of educational reform. Jammu and Kashmir itself can become the classroom as it offers enormous possibilities for experiential learning.

A lesson on ecology can begin beside a stream or wetland. Likewise one such geography class can examine the region's mountains, rivers and changing environment.

Teachers need the space and training to move beyond dictation and textbook completion towards discussion, experimentation, project work and problem-solving.

A good teacher does not simply provide an answer. A good teacher asks another question.

"What do you think? Can you prove it? Is there another explanation? What would happen if we changed this? Such questions can transform a classroom." A retired head teacher said while offering explanation.

"They also make teaching more demanding. It is easier to dictate a paragraph than conduct a discussion. It is easier to test memorization than assess critical thinking. But education that prepares young people for a rapidly changing world cannot remain trapped in the easiest method of assessment." he added.

Parents have a role too. The marks culture is not created by schools alone. Parents are part of it.

"For many families, marks are understandably associated with security, opportunity and social mobility. In a competitive education system, parents worry about their children's future." said Ab. Majid, father of a Class X11 student.

But the question asked at home can influence how a child understands education. Instead of only asking, "How many marks did you get?, parents can also ask: What did you



understand? What interested you? and What was difficult?" he noted.

A child who scores 95% deserves appreciation. So does a child who finally understands a difficult concept after struggling with it. The goal should not be to make marks irrelevant. It should be to put marks in their proper place.

From memory banks to independent thinkers

The National Education Policy 2020 seeks to move assessment away from excessive reliance on rote memorization towards conceptual understanding, competency, analysis and critical thinking. Jammu and Kashmir, too, is moving towards competency-based assessment.

That is an important shift. The culture of learning has to change alongside the examination.

Students must be allowed to question. Teachers must be encouraged to experiment. Parents must recognize different forms of achievement. Schools must create opportunities for reading, writing, discussion, research, practical work and creativity.

A graduate's success should not depend solely on how accurately they reproduced what someone else had already written.

The real report card

Kashmir's education system should certainly celebrate academic achievement. But it should also ask what happens after the marksheet is put away. Can the student think independently? Can the student communicate? Can the student distinguish fact from opinion? Can the student work with others? and Can the student accept being wrong and try again?

These are the abilities that determine whether education becomes a lifelong asset or merely a certificate of examination performance.

The most successful student of tomorrow may not be the one who remembers the most answers. It may be the one who knows how to ask the right question. And perhaps that is the distinction Kashmir's education debate needs to confront most honestly.

Rote learning can help a student pass an examination but real learning prepares a student to face life.

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WHAT STUDENTS TODAY REALLY NEED FROM THEIR MENTORS

Dr. Ketan Deshpande
Founder & Chairman, FUEL (Friends Union for Energising Lives)

As the world in which current learners are expected to navigate changes, so too does the definition of what constitutes mentoring. Learners are coming of age in a world where knowledge is literally at their fingertips, the number of career paths continues to grow, and technology, creativity, and professional pursuits are becoming less distinct from one another than ever before.

Indeed, as the world has changed, so too have the number of experiences to which students have been exposed, as well as the number of ideas. And in a world that presents such a seemingly boundless array of possibilities, it becomes important for a mentor to help students learn to ask the right questions.

For students, context may be one of the greatest gifts they can get from a mentor. The student may realize that a certain profession would interest him or her thanks to a post on social media or conversation with a friend, or that it is a profession which is becoming trendy now. However, to understand what the profession is about and where it will lead is important as well. In this case, a mentor may provide additional perspective, helping students connect various pieces of information with experience and see opportunities which are available for them.

This aspect becomes even more important when students start thinking of the careers they want to build in the future. The students are no longer expected to think of a certain career as something which defines the whole path of professional development; rather, they can explore different professions and develop their careers according to their skills and interests. In this case, it becomes important for students to have mentors who can help them with this exploration.

Instead of trying to forecast where a student will be after ten years of education, mentorship can concentrate on building enough self-confidence and judgment for making conscious decisions throughout the process.

Uncertainty is not an easy thing to manage

Students are going to face moments in which they will be unsure about the topic they are learning, career path they should choose, new opportunities or even about themselves. However, these experiences can turn into lessons when there is someone who supports the student and pushes him to stop and realize what he could learn from the situation.

Such lessons can be obtained by means of meaningful dialogue between a student and a mentor. One can pose questions to the student such as, “What have you learned from it? “, “What should you do next? “ or “What should you do differently next time? “.

In addition, mentoring can prove to be extremely useful for helping students develop their self-awareness. Even though knowledge and achievements in terms of academics are very important, traits of personality like curiosity, communication skills, resilience, creativity, empathy, teamwork, and adaptability become increasingly more important in terms of individual learning and professional performance.

With the help of mentoring by means of dialogue, projects, and practical experience, the mentor can assist the student in identifying his/her personal traits and applying them beyond the classroom. A student who learns how to express a particular idea, collaborate with people of opposing opinions and treat new things with curiosity is developing skills which might be applied in any number of future careers.

Another important element of mentoring in today’s world is exposure

As an opportunity is experienced personally by an individual, there is an improvement in understanding. Such personal experience might include meeting an expert in a new field, participation in a project, visit to the workplace, doing an internship, or having an interaction within an industry.

Lastly, mentoring gives one an opportunity to get to know themselves better. While academic success remains a crucial aspect of education, so do other characteristics that are increasingly becoming important in terms of how individuals learn and succeed – curiosity, communication skills, resilience, ability to create and think outside the box, empathy, collaboration and adaptability.

This type of experience helps students to explore different career possibilities and, in addition to discovering new passions, gives them a chance to understand where their strengths and preferences lie. In this case, career exploration becomes a discovery of both – things that interest a person and things that don’t appeal to him/her at all.

Furthermore, this kind of experience enables students to make a connection between what they learn in the classroom and the application of this knowledge in practice.

At the same time, students receive help from mentors who promote the curiosity of young people without focusing on achievements only. Given that there is an increasing amount of information, possibilities and career guidance available to today’s youth, it is important to have someone who would be able to filter it based on individual preferences of a student.

But it does not involve constraining their options.It is to enable them to acquire the ability to sift, analyse, and prioritise. With a good mentor, they will be able to question themselves as to whether it is something they really like, what they will gain from it, if it suits their interests and capabilities, and what they need to know in order to proceed further.

At least, modern mentorship has a lot more to do with empowerment than dependence. The key point about mentors today is that they should listen to students’ thoughts, stimulate them to think, provide them with various viewpoints, and support them in forming opinions.

It does not mean that the perfect mentor is the person who knows everything and gives the right answer. On the contrary, it means that the perfect mentor is a person who helps a student create an environment in which he or she can ask the right questions and try new solutions.

As the world of education and business moves forward, it might become one of the most important functions that mentorship performs nowadays – preparing people not only for professional life, but also for learning for the rest of their life because ultimately, the purpose of mentorship is not showing where students should go. The purpose of mentorship is helping them understand how to get there.



CAN INDIA'S EDUCATION SYSTEM BUILD THE WORKFORCE OF A DEVELOPED INDIA?

Dr. Prashant R. Nair
Associate Director, Internal Quality Assurance Cell (IQAC),
Amrita Vishwa Vidyapeetham, Coimbatore

India has one of the largest, diverse and intricate higher educational systems in the world with 1100+ universities and 60,000\ Educational Institutions (HEI). Indian higher education system is the third largest after China and United States of America (USA). However, in terms of number and diversity of HEI, India is on top of the pyramid. The Gross Enrollment Ratio (GER) is presently inching towards 30% with various interventions and reforms from NEP2020 accelerating this uptick. Private sector has also contributed to this ramping of number of enrolments in universities and colleges with the southern states accounting for the lion share of these enrolments. It is estimated that higher educational enrolment will touch 140 million by 2030, which translates to one in every four graduates globally in the future workforce will be from India.

As we march towards Viksit Bharat 2047, higher education enrolment is key to leveraging the demographic dividend towards attaining this lofty goal. The median age in India is 29, meaning that half the population is young which can be leveraged to drive economic growth India's economic development and transformation is intrinsically linked to its education and skilling. Only an educated country can aspire to be a developed country. The India Skills Report 2025 is a report brought out with industry-academia-government collaboration providing insights on the employability of India's youth. As per this report, employability rate is around 55% for Indian graduates in higher education. No doubt, there are multifarious challenges towards architecting and futureproofing the workforce of the developed India. **These challenges include:**

- Globalization, competition, and internationalization rendering the world as a global village and single market
- Promoting Innovation in the knowledge-driven economy
- Leveraging Generative & Agentic AI with checks and balances promoting AI for Good so as to ensure creativity and originality is not lost due to the usage of AI. This also entails eliminating bias, hallucinations, and inaccuracies which come with the territory
- Advent of big data and social media explosion
- Reskilling and developing 21st century skills such as AI, cybersecurity, data science, robotics, and Industry 5.0 in addition to reskilling
- Building quality and employability commensurate with the increase in numbers of graduates entering the workforce.
- Ensuring equity and access in higher education

Some of the suggested interventions in curriculum to tide over these challenges can include:

- Skilling and vocational training mainstreamed into higher education degrees with mapping courses to learning outcome and skill frameworks with 21st century skills being part of the credit structure irrespective of discipline or educational program. The program need not be engineering and/or computing and can be expanded to medicine, law, agriculture, etc.
- Compulsory internships and apprenticeships being part of the credit structure irrespective of discipline or educational program.
- AI-literacy and digital literacy as compulsory courses irrespective of discipline or educational program
- Expansion of online degrees, online modules and MOOCs into the credit structure so as to mainstream these irrespective of discipline or educational program
- Innovation, entrepreneurship, design thinking, critical thinking, experiential learning, capstone, sustainability, and problem-solving paradigms woven into the pedagogy and teaching learning process.

Other interventions could include:

- Accelerating the pace of NEP2020 structural reforms such as scraping of the affiliation system of universities and putting universities and colleges in distinct buckets such as research, teaching and hybrid institutions
- Promoting private sector institutions, especially in underserved regions where imbalances exist with respect to equity and access
- Expanding partnerships and deep collaborations with international universities and moving from the common mechanisms such as faculty and student exchange to twinning programs and dual degrees and joint centers of excellence and research
- Mandatory accreditation and ranking for any and every higher educational institution
- National mission to promote faculty quality with lifelong learning to be promoted with mandatory upskilling programs for all professions to be conducted by professional bodies in the field

Universities in India have a tremendous opportunity to meet the need for talent on a global scale, with the potential for talent mobility across borders to contribute US $ 500 billion to the global economy provided steps are taken to increase the employability and quality of Indian graduates. 15+ foreign universities are setting up campuses in India, and this trend is only likely to accelerate. With globalization being the norm and foreign universities on the lookout, this is another tremendous opportunity for Indian universities. Universities can and need to play a critical role in driving innovation and commercializing research. The setting up of Anusandhan National Research Foundation (ANRF), launch of various national missions in Quantum, Semiconductor, AI, and Cyber Physical Systems (CPS) and availability of substantial government funding like the recently launched Research Development and Innovation (RDI) Scheme Fund of ₹1 lakh crore are also exciting opportunities for universities to leverage.

Structured efforts are needed to develop a skilled, inclusive, AI-literate, digitally enabled, adaptable and flexible workforce that will transform India into the league of the top 3 largest economies in the world. There needs to be transformational shift from credentials to capabilities, academic inputs to learning outcomes, and competition to collaboration.



FOREIGN UNIVERSITIES ARE COMING TO INDIA. WILL THEY CHANGE THE HIGHER EDUCATION MARKET?

With foreign universities beginning operations under the UGC's 2023 framework, Indian institutions face new competition for students, faculty, research partnerships and international demand.

Prabhav Anand

The arrival of foreign universities in India is moving from policy announcements to operating campuses. The University of Western Australia (UWA) has received final approval from the University Grants Commission (UGC) for its Mumbai campus, while the Illinois Institute of Technology has received approval to begin its first Indian intake in September 2026. Both institutions are preparing to admit students in Mumbai this year.

The developments come less than three years after the UGC notified the University Grants Commission (Setting up and Operation of Campuses of Foreign Higher Educational Institutions in India) Regulations, 2023. The regulations created a formal route for foreign higher education institutions to establish campuses in India and offer programmes at undergraduate, postgraduate and doctoral levels, subject to UGC approval.

The question now is no longer whether foreign universities can enter the Indian market. The first campuses are already opening. The larger question is what their presence will mean for Indian universities competing for students, faculty, research funding and international academic partnerships.

As of August 2026, 15 foreign higher education institutions had received 16 Letters of Intent to establish campuses in India, according to information presented by the Union Education Ministry in Parliament. The institutions receiving approvals or permissions include universities from Australia, Italy, the United Kingdom and the United States, with campuses planned across cities including Mumbai, Bengaluru, Gurugram and other locations.

A policy change that opened the door

The UGC's 2023 regulations were introduced as part of the broader internationalisation agenda under the National Education Policy (NEP) 2020.

The regulations apply to foreign higher education institutions seeking approval to establish Indian campuses for certificate, diploma, degree, research and other programmes at undergraduate, postgraduate, doctoral and post-doctoral levels.

The framework does not allow a foreign university to simply establish a campus and begin teaching. The institution requires prior approval from the UGC. The regulations specifically prohibit a foreign higher educational institution from establishing or operating a campus or offering a programme in India without Commission approval.

The framework also gives foreign universities considerable flexibility in designing their admissions and fee structures. They can develop their own admission processes and criteria for domestic and international students. Their fee structures must be transparent and reasonable, and institutions are required to publish information on fees, refunds, seats, eligibility and admission procedures before admissions begin. The regulations also permit merit-based and need-based scholarships and tuition concessions for Indian citizens.

This creates a regulatory model that is different from simply bringing an overseas university's brand into an existing Indian institution through an academic collaboration.

The foreign institution operates an approved campus in India and awards its own qualifications under the regulatory framework.

Why foreign universities are entering now

There is a clear demand-side reason for the expansion.

NITI Aayog's 2025 report on the internationalisation of higher education found that more than 13 lakh Indian students were studying abroad in 2024. At the same time, India hosted only around 50,000 international students in 2021-22, according to the report.

The imbalance is also visible in the financial flows associated with overseas education. A NITI Aayog working paper found that annual outward remittances under the Reserve Bank of India's 'studies abroad' category increased from about US$0.16 billion in 2013-14 to nearly US$3.4 billion in 2023-24. The figure covers remittances recorded under the category and does not represent the entire cost incurred by Indian students overseas.

NITI Aayog's analysis places this within the broader objective of developing internationalisation 'at home' — providing Indian students with greater access to international academic exposure, collaborations and education without requiring every student to leave the country.

For foreign universities, India therefore offers a large domestic student market alongside opportunities for research collaboration, industry partnerships and longer-term institutional presence.

The motivations are not identical for every university.

For some institutions, the Indian campus is part of a broader internationalisation strategy. For some UK universities, the expansion also comes at a time when their domestic higher education sector is facing financial and policy pressures.

Reuters reported in February 2026 that British universities were expanding into India amid tighter UK immigration policies and financial pressures at home. The report said the University of Southampton had opened a campus near Delhi and that other UK universities were planning Indian campuses.

India is therefore becoming both an education destination and an alternative location through which foreign universities can reach Indian students.

Mumbai becomes the first major test

Mumbai is emerging as one of the principal centres of this expansion.

In June 2025, the Union Education Ministry announced Letters of Intent for five foreign universities to establish campuses in Mumbai: the University of York, University of Aberdeen, University of Western Australia, Illinois Institute of Technology and Italy's Istituto Europeo di Design.

UWA has since moved closer to its September 2026 launch. The university announced in August that it had received the UGC's Letter of Approval for its Mumbai campus. It plans to open the campus on September 18, 2026, with its first cohort.

UWA's Mumbai campus is located in Andheri East. The university has said teaching is scheduled to begin in September 2026, while its proposed Chennai campus is progressing through the required approvals.

Illinois Tech has also received its UGC Letter of Approval. The university said its Mumbai campus will begin enrolling students for programmes commencing in September 2026. It will offer undergraduate and



graduate programmes including computer science, artificial intelligence, business and data science.

The fee question is already visible. Illinois Tech lists undergraduate tuition at ₹16 lakh per year on its Mumbai campus. Its current website lists graduate tuition at ₹15 lakh per year, while its 2026 prospectus lists ₹20 lakh per year for the graduate programmes covered in that document. The difference means prospective students need to check the applicable programme-specific fee schedule rather than assume one figure applies to every graduate course.

The university says scholarships can provide up to ₹20 lakh over four years for undergraduate students and up to ₹10 lakh over two years for graduate students, subject to eligibility.

These figures also illustrate an important limitation of the foreign-campus model: a foreign degree delivered in India may reduce the cost of living and other expenses associated with studying overseas, but it does not automatically make international higher education inexpensive.

Will studying at home be cheaper than studying abroad?

The answer will vary by institution, programme and student. A student studying at a foreign campus in India does not normally have to pay for overseas accommodation, international travel or the other costs associated with relocating to another country. Visa-related requirements also do not apply to domestic study.

That creates a different cost structure from studying at the parent university overseas. But tuition remains a major factor.

The UGC regulations do not prescribe a common fee ceiling for foreign university campuses. Instead, institutions decide their fee structures subject to the requirement that fees be transparent and reasonable. They must disclose the fee structure and other admission details before admissions begin.

The result is likely to be a segmented market. Students who already have the financial capacity and intention to pursue an overseas degree may find an Indian campus attractive if the academic programme, qualification and international mobility opportunities meet their expectations.

At the same time, students comparing these campuses with Indian public universities, established private universities and lower-cost professional institutions will make a different calculation. The foreign university's international brand alone may not determine the decision.

Can foreign universities take India's best students?

They can compete for the same pool of students, particularly in fields where international university brands already have strong recognition. Illinois Tech, for example, is entering India with programmes in areas such as artificial intelligence, computer science, data science and business. UWA is planning undergraduate and postgraduate offerings across STEM and business-related fields.

These are also areas in which Indian universities have been expanding programmes and infrastructure. The competitive question will therefore involve more than rankings.

Students will compare tuition, scholarships, curriculum, internships, faculty, placements, research opportunities, international mobility and the reputation of the qualification in the Indian employment market. The presence of a foreign campus could make those comparisons more direct.

An Indian university that previously competed primarily against domestic institutions may increasingly have to explain why a student should choose its programme instead of an equivalent programme delivered by an overseas university on Indian soil.

However, there is no evidence yet that foreign campuses will cause a large-scale movement of India's highest-performing students away from Indian universities. The campuses are still at an early stage, and most have not yet built sizeable student cohorts or graduate employment records in India.

What happens to Indian private universities?

The effect on private universities could be more immediate than on public universities. India's private universities already compete heavily on international collaborations, industry exposure, foreign faculty, international exchange programmes and overseas partnerships.

Foreign branch campuses introduce another model. Instead of an Indian university partnering with a foreign institution, the foreign institution itself becomes the degree-awarding university in India. This distinction could matter to students who specifically want a foreign university qualification.

But the competition will not necessarily be limited to branding. Indian private universities have built campuses, laboratories, residential infrastructure and industry relationships around the domestic market. Many also compete on fees and scholarships. Foreign universities entering India will have to build comparable academic and employment ecosystems locally.

The University of Southampton provides an early example. It opened its Delhi campus in August 2025 and describes itself as the first foreign higher education institution with a full UGC licence to run a campus in India under the new framework.

The performance of its first graduating cohorts will provide one of the first opportunities to assess how an overseas university's Indian operation performs against established domestic institutions.

Faculty could become another competitive market

Student recruitment is only one part of the equation. Foreign universities operating in India also require faculty and academic leadership. If multiple institutions recruit simultaneously in the same cities and disciplines, competition for specialised academic talent could increase.

This could be particularly relevant in areas such as artificial intelligence, computer science, engineering, business and emerging technology fields, where universities are already competing with industry for specialised professionals.

However, the effect on salaries cannot yet be established. There is insufficient evidence from the newly opened campuses to conclude that foreign university entry has already produced a broad increase in faculty compensation across Indian higher education.

The longer-term effect will depend on the scale of expansion, the number of faculty positions created, recruitment models adopted by foreign institutions and the extent to which Indian universities respond.

The bigger question: research

Research may be the most consequential test of whether these campuses become full academic institutions or primarily teaching-focused operations.

The UGC framework permits foreign institutions to conduct research programmes through their Indian campuses. The regulations cover degree and research programmes at undergraduate, postgraduate, doctoral and post-doctoral levels.

NITI Aayog's internationalisation report places research collaboration alongside student and faculty mobility as part of the broader internationalisation of Indian higher education. The report also argues that strengthening India's research capacity and aligning curricula with global standards are important components of internationalisation.

Foreign universities therefore have an opportunity to build research partnerships with Indian institutions, companies and government organisations. UWA has said its India initiative is intended to create new research and industry partnerships. But announcements about research partnerships are different from measurable research output.

The eventual test will be the number and quality of research projects conducted in India, doctoral researchers supported, patents and publications generated, industry-funded projects undertaken and collaborations established with Indian institutions. That evidence will take several years to accumulate.

Could foreign campuses reduce India's student outflow?

This is one of the clearest policy objectives behind internationalisation at home.

NITI Aayog has identified the large imbalance between Indian students going abroad and international students coming to India as a problem for the country's higher education system. Its 2025 report noted that more than 13 lakh Indian students were studying abroad in 2024.

Foreign campuses can offer one possible alternative. A student who wants an overseas university qualification but does not want to relocate could choose an Indian campus.

That does not mean the campuses will replace overseas education. Students may still leave India because they want access to foreign labour markets, migration opportunities, specialised programmes, research infrastructure, campus experiences or employment in the country where they study.

Foreign campuses can address only part of that demand. Their ability to reduce outbound mobility will therefore depend on whether students consider the Indian campus academically and professionally equivalent to the overseas option for their particular goals.

What happens to smaller universities?

The impact is likely to be uneven. Large, established Indian universities may have greater capacity to respond through research investment, faculty recruitment, international collaborations, new programmes and scholarships.

Smaller institutions may have fewer resources to compete directly for students who are specifically seeking internationally branded degrees. But foreign universities are unlikely to compete with every Indian institution in the same market.

A university focused primarily on regional demand, low-cost education or specialised local programmes may face a different competitive environment from a private university in Mumbai, Bengaluru or Delhi offering high-fee technology and management programmes.

The market will therefore be segmented by geography, discipline, price and institutional positioning.

Will students receive the same experience as at the parent campus?

This remains another question that can only be answered through actual student outcomes. A foreign university can bring its curriculum, academic regulations, qualification and institutional brand to India. But the student experience depends on the faculty available locally, campus facilities, laboratories, research opportunities, industry exposure, internships, student services and the extent of academic interaction with the parent campus.

UGC rules require foreign institutions to operate within the approved framework, but the existence of the regulatory approval itself does not establish that the Indian campus will replicate every aspect of the parent institution's overseas campus.

That will depend on how each university operates. The first cohorts will therefore be important.

Their academic progression, internships, placements, research participation and opportunities for mobility between Indian and overseas campuses will provide evidence that is currently unavailable.

A new layer of competition

India's foreign university experiment is now entering its operational phase. The UGC has created a route for international universities to establish campuses, and institutions are beginning to use it. Southampton has already opened its Delhi-area campus. UWA and Illinois Tech are preparing their Mumbai operations for September 2026, while other foreign institutions are moving through the approval and establishment process.

The policy objective extends beyond giving students more brands to choose from. NITI Aayog's internationalisation strategy links foreign campuses with wider goals around international exposure, research collaboration, talent retention and reducing the imbalance between outbound and inbound student mobility.

Whether that happens will depend on what these universities build in India. If foreign campuses remain concentrated in high-fee programmes and a limited number of major cities, they may develop as a premium segment alongside India's existing higher education market.

If they expand access, recruit strong faculty, establish meaningful research operations, build industry partnerships and produce competitive graduate outcomes, their effect could extend beyond student recruitment.

For Indian universities, the immediate challenge is therefore not simply the arrival of foreign brands. It is the possibility that students will have more opportunities to compare institutions on academic quality, faculty, research, employment outcomes and international mobility.

The evidence for that competition is only beginning to emerge. The first campuses will provide the test.

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THINK EDUCATION. THINK EDUCATION POST



INDIA IS REWRITING ITS SCHOOL CURRICULUM. BUT WHO IS LEFT TO RUN IT?

NCERT has 1,596 vacant posts and CBSE has 933, as Parliament flags manpower shortages alongside delays in textbooks and changes in school examinations.

Prabhav Anand

India is in the middle of a large-scale overhaul of school education under the National Education Policy (NEP) 2020 and the National Curriculum Framework for School Education (NCF-SE) 2023. But the institutions responsible for much of that transition are operating with substantial staff vacancies.

The Tenth Report of the Committee on Estimates for 2026-27, presented in the Lok Sabha on August 12, found that 1,596 of the 2,844 sanctioned posts at the National Council of Educational Research and Training (NCERT) were vacant. That leaves the organisation with 1,248 employees against its sanctioned strength, meaning more than 56 per cent of its posts were unfilled.

The Central Board of Secondary Education (CBSE) faced a similar shortage. Of its 2,117 sanctioned posts, 933 were vacant, leaving about 44 per cent of positions unfilled. The committee raised concerns over the shortage of permanent manpower and recommended steps to fill vacant positions on a time-bound basis.

The figures matter because NCERT and CBSE sit at different but closely connected points in India's school education system. NCERT develops curriculum frameworks, syllabi, textbooks, educational research and learning resources, while CBSE is responsible for the implementation of its curriculum across affiliated schools, examinations, assessment and several related academic functions.

The staffing gap comes at a time when both institutions are dealing with changes linked to NEP 2020 and NCF-SE 2023.

The parliamentary committee has separately flagged a gap between curriculum development and implementation for Classes 9 to 12. It noted that CBSE has aligned its curriculum with NEP 2020 and NCF 2023, while NCERT is still in the process of rolling out new textbooks for the higher classes. The panel said the non-availability of textbooks, combined with newer application-based examination patterns, was creating stress and confusion among students, particularly those preparing for Classes 10 and 12 examinations.

That creates a question that goes beyond the vacancy figures: whether the institutions responsible for implementing the country's school education reforms have the manpower required to carry out the work at the pace at which policy changes are being introduced.

The manpower gap at NCERT

The NCERT vacancy figures are spread across different categories of posts.

According to the parliamentary report cited in the material reviewed for this story, NCERT had 145 vacancies in academic positions and 131 in school teaching positions. The largest category was ministerial posts, with 916 vacancies, followed by 404 vacancies in ancillary positions.

Taken together, these vacancies leave more than half of NCERT's sanctioned workforce positions unfilled.

The shortage is particularly relevant to the current curriculum transition because NCERT is responsible for developing educational materials associated with the new frameworks. The Ministry of Education has informed the parliamentary committee that NCERT has developed the National Curriculum Framework for Foundational Stage and the National Curriculum Framework for School Education and has initiated the development of syllabi and textbooks based on these frameworks in line with NEP 2020.

The organisation is also recruiting.

NCERT's official website lists recruitment activity during 2026, including Advertisement No. 177/2026 for vacant academic positions through direct recruitment. Its website also lists recruitment for various research and project positions and other academic and administrative roles.

That indicates that the vacancy problem is not being left entirely unaddressed. But the available recruitment notices do not, by themselves, establish how many of the 1,596 vacancies identified by the parliamentary committee have since been filled.

That distinction is important. A recruitment advertisement shows an attempt to fill a position; it does not mean that the post has already been occupied.

CBSE is also operating below sanctioned strength

CBSE's staffing position presents a similar problem.

The board has 2,117 sanctioned posts, of which 933 were vacant according to the parliamentary committee. That means roughly four out of every ten sanctioned positions were unfilled. The committee also flagged dependence on temporary or contractual manpower.

The shortage comes as CBSE is managing changes in curriculum, assessment and examination practices.

The board's official recruitment page shows that it has conducted the Direct Recruitment Quota Examination 2026 and published a vacancy notification in December 2025. It also lists recruitment on deputation and other recruitment-related processes.

Again, the existence of recruitment activity does not establish that the entire vacancy position identified by Parliament has been resolved.

The committee's concern was therefore not simply about the number of vacant desks in government offices. It linked the availability of permanent manpower to the functioning of CBSE, including the smooth conduct of examinations.

For an organisation that administers board examinations for millions of students and manages a large network of affiliated schools, staffing capacity becomes part of the operational infrastructure of the examination system.

The textbook problem

The clearest indication of the pressure created by curriculum transition has appeared in the availability of textbooks.

CBSE has been moving ahead with curriculum changes for Classes 9 to 12 in line with NEP 2020 and NCF 2023. At the same time, NCERT has been developing and releasing the corresponding textbooks.

The parliamentary committee found that this created a gap between curriculum design and its implementation in schools. It specifically raised concerns about the availability of textbooks for Classes 9 to 12 and the introduction of newer, application-based examination patterns.

The issue has also been reported from schools.

In July 2026, The Times of India reported that some Class 9 students in Delhi government schools were still waiting for Hindi-medium NCERT Science and Social Science textbooks four months into the academic session. Parents and education activists said students were relying on teachers' phones and handwritten notes in the absence of physical textbooks.



Similar problems were reported in other cities.

In Indore, The Times of India reported in July that thousands of CBSE Class 9 students were facing difficulties because newly prescribed NCERT textbooks for Social Science and Computer Education were unavailable more than two months after the academic session began. Schools were using notes, worksheets and online material as interim measures.

In Bengaluru, reports in June said several CBSE schools were facing shortages of NCERT textbooks for Classes 6 to 9, with Class 9 particularly affected because a new syllabus had been introduced.

The problem was not confined to one city. A separate report from Chandigarh said government schools began receiving NCERT textbooks more than two months after the start of the academic session.

These reports do not establish that staffing vacancies caused the textbook shortages. That causal link would require evidence from NCERT or the Ministry of Education.

What they do establish is that curriculum changes and textbook availability have not always moved at the same pace.

When curriculum changes move faster than classroom material

The connection between curriculum and textbooks is especially important under the current reform process.

In December 2025, CBSE's governing body considered the introduction of a two-level curriculum for Class 9 Mathematics and Science, aligned with new NCERT textbooks. The board's records said the curriculum proposal was linked to NCF-SE 2023 and NEP 2020 and that the availability of NCERT textbooks was necessary to operationalise the model.

The document shows how closely the two institutions' work is connected.

NCERT develops the academic material. CBSE uses that material within its curriculum and examination framework. Schools then have to teach the resulting syllabus, train teachers and prepare students for assessment.

A delay at one stage can therefore create pressure at the next.

That does not mean every delay is caused by staff shortages. Curriculum development, textbook writing, review, translation, printing, distribution and school-level implementation involve multiple processes and institutions.

But the parliamentary committee's findings put the manpower question alongside those implementation problems.

The NEP implementation test

NEP 2020 has set out changes across India's school education system, including changes in curriculum, pedagogy, assessment and teacher preparation.

NCERT has a central role in converting those policy objectives into curriculum frameworks, syllabi, textbooks and other learning resources. CBSE then operates at the implementation and assessment end for its affiliated schools.

The current transition therefore requires capacity at both institutions.

The parliamentary committee noted NCERT's role in developing the National Curriculum Framework for Foundational Stage and NCF-SE 2023 and in developing syllabi and textbooks based on those frameworks.

At the CBSE end, the board has already introduced curriculum and assessment changes associated with the broader reform process.

The board's official website, for example, records its 2026 examination activities and recruitment processes alongside its regular academic and administrative work.

The scale of the transition means that the question is not only whether policies have been announced, but whether the organisations responsible for converting those policies into textbooks, curricula, examinations and guidance have sufficient institutional capacity.

Recruitment is underway, but the gap remains

There is evidence of recruitment activity at both institutions.

NCERT's official website lists direct recruitment for academic positions and several other recruitment exercises during 2026.

CBSE's recruitment page records the Direct Recruitment Quota Examination 2026, including a vacancy notification issued in December 2025 and subsequent examination stages. The board has also listed recruitment on deputation.

The parliamentary committee, however, has recommended faster action to fill the vacancies.

The distinction between recruitment activity and actual staffing is central to the issue. Until vacancies are filled, the sanctioned strength remains different from the workforce actually available to carry out the institution's responsibilities.

The committee's data puts that gap at 1,596 positions in NCERT and 933 in CBSE.

The pressure does not stop with textbooks

The parliamentary report also raised concerns about teacher capacity building.

The committee noted a sharp decline in online teacher training, from more than 5.3 million teachers in 2022 to around 162,814 in 2025. It also noted that while government-school teachers receive free training, teachers in private affiliated schools, particularly in rural and difficult areas, may have to pay the regular training fee as well as an additional ₹700 for single-day workshops.

The committee recommended continuity in teacher capacity-building programmes and year-wise targets for teacher training. It also recommended reviewing training fees to enable teachers from financially constrained private schools to participate.

This adds another layer to the implementation problem.

A curriculum reform does not end with the publication of a syllabus or textbook. Schools need teachers who understand the new curriculum, teaching material that corresponds with it and assessment systems that test what students have been taught.

If any of these components moves at a different pace, the transition becomes more difficult for schools.

What Parliament has actually established

The available evidence establishes several separate facts.

First, NCERT has a large number of vacant sanctioned posts. Second, CBSE also has a substantial vacancy position. Third, both institutions are engaged in recruitment. Fourth, NCERT is developing new textbooks as part of the implementation of new curriculum frameworks. Fifth, CBSE has introduced curriculum and assessment changes aligned with NEP 2020 and NCF 2023. And sixth, the parliamentary committee has identified delays and gaps between curriculum design, textbook availability and classroom implementation.

What the evidence does not establish is that the staff vacancies directly caused the textbook shortages.

That distinction matters for a news report.

The stronger story is therefore not that vacant posts caused every implementation problem. It is that India is attempting a major school education transition while the institutions responsible for significant parts of that transition are themselves operating below their sanctioned staffing strength.

That is the institutional capacity question raised by the parliamentary findings.

The question for the education system

The immediate issue for students is simple: what they are expected to learn, what material they receive and how they are assessed.

For the institutions running the system, the problem is more complex.

NCERT has to develop curriculum-linked academic material. CBSE has to translate curriculum decisions into operational guidelines, examinations and assessment systems. Teachers have to understand the changes and schools have to implement them.

The parliamentary committee's findings show that this process is taking place alongside major staffing gaps.

NCERT has 1,596 vacant posts against a sanctioned strength of 2,844. CBSE has 933 vacancies against 2,117 sanctioned posts.

At the same time, schools have reported shortages of newly prescribed textbooks, while the parliamentary committee has raised concerns about the gap between curriculum design and implementation.

The next stage of India's school education reform will therefore depend not only on what the policy documents require, but also on whether the institutions responsible for delivering those requirements have the people, materials and operational capacity to do the work.

For now, Parliament has identified the manpower gap. Recruitment is underway. The unresolved question is how quickly that gap can be closed while the curriculum transition continues.



COUNTING EVERY CHILD

INSIDE INDIA'S PUSH FOR A DATA-DRIVEN SCHOOL SYSTEM

Pragya Kumari

India's school system is beginning to track more than who enters a classroom. It is increasingly measuring who stays, who drops out, who moves to the next stage, and what support each student needs to continue learning.

This shift is reflected in the Unified District Information System for Education Plus (UDISE+) Report 2025-26, released by the Union Ministry of Education in July.

Covering 24.72 crore students, the report offers a detailed view of India's school education system, from enrollment and teacher availability to dropout rates, gender participation, infrastructure and digital access.

At the heart of this transformation is a nationwide student-wise database. UDISE+ began collecting individual student-level information from all recognized schools in 2022-23.

The system is intended to help authorities identify students who have dropped out, detect duplicate or ghost records, ensure government benefits reach eligible children, improve expenditure management and better understand individual learning needs.

The approach supports the National Education Policy (NEP) 2020, which places universal enrollment and regular attendance among the central goals of school education. The policy calls for students to remain enrolled, attend regularly and receive opportunities to return if they leave school.

A national database takes shape

India recorded 24.72 crore students across the foundational, preparatory, middle and secondary stages during 2025-26. The foundational-stage figures include Balvatika and pre-primary students in schools registered under UDISE+, but exclude enrollment at Anganwadi centers operated by the Ministry of Women and Child Development.

The database is also increasingly linked with Aadhaar. Around 22.3 crore students, or approximately 90.2% of total enrollment, voluntarily provided their Aadhaar numbers during 2025-26.

Andhra Pradesh and Lakshadweep recorded the highest Aadhaar seeding rate at 99.6%, followed by the Andaman and Nicobar Islands and Chandigarh at 99.2%. Puducherry recorded 98.6%, Haryana 98.5% and Maharashtra 98%.

However, the national average masks significant regional gaps. Meghalaya reported the lowest seeding rate at 35.3%, followed by Nagaland at 65.1% and Manipur at 69.2%.

Where schools and students do not align

India's school infrastructure is unevenly distributed in relation to its student population. Uttar Pradesh, Madhya Pradesh, Rajasthan, Karnataka, Odisha, Andhra Pradesh, Chhattisgarh, Assam, Jammu and Kashmir, Uttarakhand, Himachal Pradesh and Meghalaya have relatively more schools compared with enrolled students, suggesting some infrastructure may be underused.

The reverse pattern is visible in Maharashtra, Bihar, West Bengal, Tamil Nadu, Gujarat, Telangana, Punjab, Haryana, Delhi and Kerala, where comparatively fewer schools serve larger student populations.

The imbalance becomes particularly important across educational stages. While the number of foundational and preparatory schools expanded following the Right to Education Act, the growth of secondary schools has not kept pace.

That gap can become a dropout risk when students reach higher grades and find secondary education less accessible. West Bengal, for example, has 78.9% of its schools at the foundational and preparatory levels but only 11.7% at the secondary level.

Chandigarh presents a stark contrast, with 83.7% of its schools at the secondary level and only 5.3% at the foundational and preparatory stages.

Girls gain ground

Gender participation continues to show gradual improvement. Girls accounted for 48.4% of total school enrollment in 2025-26, compared with 48.3% in 2024-25 and 48.0% in 2022-23.

The Gender Parity Index remained above 1 across all educational stages, indicating proportionately higher participation by girls than boys. For publication purposes, the ministry has included transgender student data within the "boys" category.

The teaching workforce has also become more female. Women represented 54.9% of all teachers in 2025-26, up from 54.2% in 2024-25 and 52.3% in 2022-23. The ministry said the increasing presence of female teachers can support more inclusive and gender-sensitive learning environments.

The report also records the social composition of enrollment. OBC students constitute 44.9% of the student population, followed by the General category at 27.5%, Scheduled Castes at 17.7% and Scheduled Tribes at 10%.

Minority students account for more than 20% of total enrollment. Among enrolled minority students, Muslims make up 79.4%, Christians 10.1%, Sikhs 7.1%, Buddhists 2.0%, Jains 1.3% and Parsis 0.1%.

More teachers, better ratios

India's teaching workforce has continued to expand. The number of teachers reached 1,02,73,020 in 2025-26, an 8.3% increase from 94,83,294 in 2022-23. Teacher strength stood at 98,07,600 in 2023-24 and 1,01,22,420 in 2024-25.

The increase has been accompanied by improved Pupil-Teacher Ratios (PTR). In 2025-26, the PTR stood at 10 at the foundational level, 12 at the preparatory level, 17 at the middle level and 21 at the secondary level.

These figures are below the 30:1 ratio recommended by NEP 2020. Compared with 2022-23, PTR improved from 11 to 10 at the foundational level, from 14 to 12 at the preparatory level, from 18 to 17 at the middle level and from 23 to 21 at the secondary level.

A lower PTR can allow teachers to provide more individualized attention and strengthen classroom interaction. Yet regional differences remain. Chandigarh and Delhi have among the highest numbers of students per school while maintaining PTRs within Right to Education norms.

Ladakh, Mizoram, Himachal Pradesh, Sikkim and Meghalaya have fewer students per school, indicating potential scope to optimize infrastructure and teacher deployment.

Dropouts continue to fall

The decline in dropout rates is among the report's most encouraging findings. At the preparatory level, the dropout rate fell from 2.3% in 2024-25 to 1.8% in 2025-26. The middle-level rate increased marginally from 3.5% to 3.6%, while the secondary-level rate declined from 8.2% to 7.0%.

The longer-term improvement is particularly striking at the secondary level. Its dropout rate fell from 13.8% in 2022-23 to 10.9% in 2023-24, 8.2% in 2024-25 and 7.0% in 2025-26.

At the preparatory level, the rate declined from 8.7% in 2022-23 to 3.7% in 2023-24, 2.3% in 2024-25 and 1.8% in 2025-26. The ministry attributed the trend to improved retention and initiatives aimed at keeping children engaged in education.

More students are staying

Retention has also improved, particularly at the middle and secondary levels. Middle-level retention increased from 82.8% in 2024-25 to 83.7% in 2025-26, while secondary-level retention climbed from 47.2% to 51.9%.

The secondary figure has risen steadily from 44.1% in 2022-23 to 45.6% in 2023-24, 47.2% in 2024-25 and 51.9% in 2025-26.

Middle-level retention also increased from 75.8% to 78.0%, 82.8% and 83.7% over the same period.

Foundational and preparatory retention, however, recorded marginal declines in 2025-26 after three years of improvement. Foundational retention fell from 98.9% to 98.5%, while preparatory retention declined from 92.4% to 91.1%.

The ministry identified the expansion of secondary schools as one factor behind the improvement in secondary retention.

The transition points improve

More students are also progressing from one stage to another. The transition rate from foundational to preparatory education increased from 98.6% in 2024-25 to 99.2% in 2025-26. Preparatory-to-middle transition rose from 92.2% to 93.8%, while middle-to-secondary transition increased from 86.6% to 88.3%.

The gains indicate that fewer students are being lost during key transition points, particularly the move into secondary education.

Secondary participation rises

The Gross Enrolment Ratio (GER), another key measure of participation, also improved at the secondary level. GER increased from 68.5% in 2024-25 to 71.7% in 2025-26, compared with 67.6% in 2022-23 and 66.5% in 2023-24.

Middle-level GER stood at 89.6% in 2025-26, compared with 90.3% in 2024-25.

NEP 2020 aims to achieve universal school education and a 100% GER up to the secondary level by 2030. The latest increase therefore marks progress toward a key national target.

The ministry noted that GER generally changes gradually and that longer-term trends provide a more meaningful measure of progress. A GER above 100% can result from overage or underage enrollment, interstate migration and demographic variations.

The digital divide narrows

Digital infrastructure is expanding, although access remains incomplete. The share of schools with computer access rose from 64.7% in 2024-25 to 69.9% in 2025-26, while internet connectivity increased from 63.5% to 67.4%.

The expansion reflects efforts to integrate technology into classrooms and improve access to digital educational resources. However, roughly three in 10 schools still lacked computer access, while about one-third did not have internet connectivity.

Basic facilities show steady gains

Schools have also continued to improve their basic facilities. In 2025-26, electricity was available in 95.0% of schools, safe drinking water in 99.5%, girls' toilets in 98.5%, boys' toilets in 97.2% and handwashing facilities in 96.9%.

Library access increased to 90.5%, while rainwater harvesting facilities reached 29.9%. Playground availability, however, slipped from 83.0% in 2024-25 to 81.9%.

Around 58.2% of schools had ramps and handrails, an important step toward making education more accessible to students with disabilities.

The government has continued to support infrastructure improvements through the Samagra Shiksha Scheme, which provides financial assistance to states and Union Territories.

Fewer single-teacher and empty schools

The number of single-teacher schools fell by around 3% in 2025-26, from 1,04,125 to 1,00,843. Schools with zero enrollment declined by around 29%, from 7,993 to 5,663.

The figures can help authorities identify underutilized institutions and improve teacher allocation, although infrastructure rationalization must also consider the needs of children in remote and sparsely populated areas.

A more measurable education system

The latest UDISE+ report presents a school system showing measurable gains alongside persistent regional disparities. Teacher strength has crossed 1 crore, dropout rates have declined, secondary retention and enrollment have improved, and access to digital and basic infrastructure has expanded.

Yet the data also exposes unfinished work. Aadhaar seeding remains uneven, secondary-school availability varies sharply, digital access is incomplete and school utilization differs considerably across regions.

The larger significance of UDISE+ lies in connecting these indicators. By linking student-level records with information on teachers, schools, infrastructure, enrollment, retention and transitions, the system gives policymakers a clearer view of where students are progressing and where they are being lost.

For NEP 2020, the challenge ahead is therefore larger than simply getting children into classrooms. India must ensure that students stay, progress through each stage and have access to the teachers, infrastructure and technology needed to complete their education.

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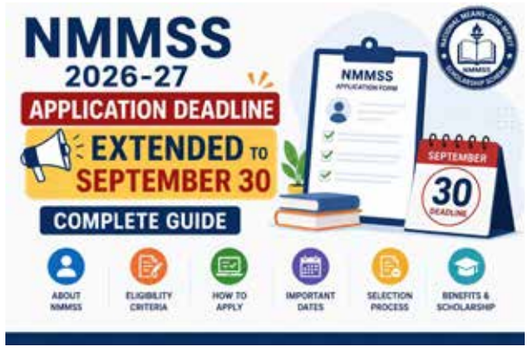


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SDM University sets the highest standard of teaching and learning, awakening the intelligence of the students and nurturing the creativity hidden in them by creating an environment where the ancient wisdom blends with modern science to transform them into human being to face the challenges. The University functions with the mission to ensure the journey of education is inspiring, pleasant and enjoyable to attract best of the Teachers and Students. The objective of the University is to transform the students of today to be the Leaders of tomorrow, a better human being and to produce passionate teachers.

MONTHLY DIGEST

Centre Extends NMMSS Scholarship Deadline to September 30



The Ministry of Education has extended the National Means-cum-Merit Scholarship Scheme deadline to September 30. The scheme provides ₹12,000 annually to one lakh Class IX students from economically weaker families, helping them continue schooling through Class XII.

CBSE Three-Language Policy Implementation Plan Under Review

The Centre told the Supreme Court that CBSE is finalising arrangements for implementing its three-language policy for Class IX, including two Indian languages. The Court has stressed that implementation should not create excessive academic pressure on students.

Delhi Opens Vacant EWS Seats in Private Schools



The Delhi government has begun filling vacant Economically Weaker Section and freeship seats in private unaided schools from Class II onwards. Eligible students will receive allotments through a computerised draw under the Right to Education framework.

Reliance Foundation Opens 5,100 Scholarships for 2026–27

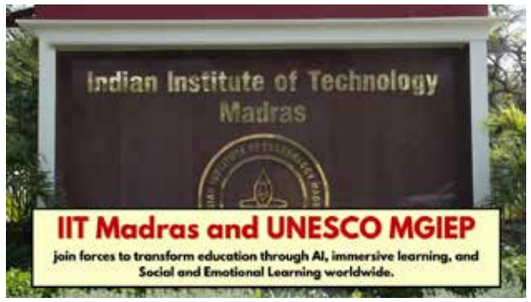


Reliance Foundation has opened applications for 5,000 undergraduate and 100 postgraduate scholarships. Undergraduate scholars can receive up to ₹2 lakh, while postgraduate scholars can receive up to ₹6 lakh alongside mentorship and leadership-development opportunities.

IIT Madras and UNESCO MGIEP Partner on AI-Based Learning

IIT Madras and UNESCO MGIEP have joined hands to develop next-generation AI and immersive learning technologies. The collaboration will combine artificial intelligence, extended reality, game design and social-emotional learning to explore new approaches to education.

Government Expands Scholarship Support to 1.09 Crore Students



Government data presented in Parliament showed that around 1.09 crore scholarships were facilitated during 2025–26. The expansion covers students from different social groups and aims to reduce financial barriers to education and research.

MONTHLY DIGEST

AICTE Launches ₹245-Crore Doctoral Fellowship Programme



AICTE has launched a ₹245-crore doctoral fellowship programme designed to encourage problem-driven and application-oriented research. The initiative aims to connect doctoral research with innovation, entrepreneurship and practical challenges rather than limiting it to academic output.

Delhi Schools Launch Wellbeing Programme for 30,000 Children

The Delhi government has introduced the ‘Eat Well Live Well’ programme across 75 CM-SHRI schools. It will reach around 30,000 students through practical activities, wellbeing committees and a School Wellbeing Score focused on healthier everyday habits.

Teachers Asked to Address Screen Addiction and Student Wellbeing



Prime Minister Narendra Modi urged teachers to look beyond academic performance and remain alert to excessive screen use and drug-related risks among students. He encouraged sports, physical activities and creative hobbies as part of holistic student development.

Odisha Launches Overseas Scholarship for SC/ST Students



Odisha has introduced the Bidesh Sikhya Bruti scheme, under which 50 SC/ST students will receive financial assistance of up to ₹25 lakh to pursue higher education at foreign universities, expanding international study opportunities for disadvantaged learners.

UDISE+ Records One Teacher for Every 10 Foundational-Stage Students

The latest UDISE+ data shows India has reached a teacher-student ratio of roughly one teacher for every ten students at the foundational stage. The improvement highlights expanding teacher availability and greater scope for individual attention in early schooling.

Azim Premji Foundation Expands Scholarship Support for Delhi Girls



The Azim Premji Foundation has announced scholarships for up to 20,000 girls from Delhi-NCR. Eligible students can receive ₹30,000 annually from their first undergraduate year until completion, helping reduce financial barriers to higher education.

MONTHLY DIGEST

Teacher Education Institutions Face Greater Regulatory Accountability

The Supreme Court has upheld the NCTE's authority to require teacher education institutions to submit annual Performance Appraisal Reports. The judgment reinforces regulatory oversight of institutions responsible for preparing India's future school teachers.

IIT Madras Launches New International Solar-Technology Programme



IIT Madras has launched an academic programme at its Sonipat campus involving applied solar technologies and international exposure. Fellows completing the programme will undertake an internship in Europe, linking higher education with clean-energy research and industry applications.

ICAR Introduces Direct Scholarship Transfers Through NSP

ICAR has launched an NSP-enabled Direct Benefit Transfer system for scholarships and fellowships in agricultural and allied sciences. ₹21.35 crore is being transferred directly to more than 6,000 students, aiming to make financial assistance faster and more transparent.

India's School Education Roadmap Puts Foundational Learning First

Union Education Minister Pralhad Joshi reviewed the school education roadmap with senior officials, identifying foundational learning, technology-driven solutions and a supportive learning environment as key priorities for strengthening school education across the country.

Rising Costs and Visa Restrictions Reshape Study-Abroad Plans



A recent survey indicates that rising education costs and tighter visa restrictions are influencing Indian students' overseas-study decisions. Increasingly, students are considering domestic universities and alternative international pathways to reduce financial and logistical risks.

UGC Prepares Scholarship Portals for Northeast Students

The UGC is preparing to open applications for the National Scholarship for Postgraduate Studies and Ishan UDAY Special Scholarship. The schemes are intended to provide financial support for higher education, including targeted assistance for students from the Northeast.

AI Research Turns Attention to Responsible K–12 Teacher Training



New research has proposed a framework for generative-AI literacy among K–12 teachers, covering technical skills, critical evaluation, human-AI collaboration, contextual awareness, ethics and learner agency as schools prepare for wider AI adoption.

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MATHEMATICS CHALLENGE

CMT – SERIES PROBLEMS – by GANIT MATH (गणित मठ)

CMT-2020/78:

Evaluate:

$$\left(\frac{\left\{\tan^2\left(\frac{\pi}{7}\right)+\tan^2\left(\frac{2\pi}{7}\right)+\tan^2\left(\frac{3\pi}{7}\right)\right\}\times\left\{\cot^2\left(\frac{\pi}{7}\right)+\cot^2\left(\frac{2\pi}{7}\right)+\cot^2\left(\frac{3\pi}{7}\right)\right\}+\left\{\tan^2\left(\frac{\pi}{7}\right)\tan^2\left(\frac{2\pi}{7}\right)\tan^2\left(\frac{3\pi}{7}\right)\right\}}{\left\{\tan^2\left(\frac{\pi}{7}\right)\tan^2\left(\frac{2\pi}{7}\right)\tan^2\left(\frac{3\pi}{7}\right)\right\}}\right)^{1/4}$$

CMT-2020/79:

Evaluate: $\int \frac{1}{1+\tan x}\,dx$

CMT-2020/80:

Evaluate:

$$\lim_{x\to 0}\left\{\frac{2-\left(\sqrt{1+\sin x}+\sqrt{1-\sin x}\right)}{x^2}\right\}-\left[\lim_{x\to 0}\left\{\frac{x-\sin x}{x^2\left(\sqrt{1+\sin x}+\sqrt{1-\sin x}\right)}\right\}\right]$$

Composed by:
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If $x^2+y^2=\alpha$ and $xy=\beta$, then find the value of: $x^{16}+y^{16}, x^{15}+y^{15}$ and $x^{12}+y^{12}$ in terms of α and β in the simplest form.

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Solve for positive integral value(s) of x and y without hit-and-trial:

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$$y^3+(x^2-3)y-x=0$$

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Work Book
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If $\operatorname{cosec}^2(3\theta)+\cot^4(3\theta)=3\cot(3\theta)\{\operatorname{cosec}^2(3\theta)+\cot(3\theta)\}$, then $\tan^8(3\theta)+\cot^8(3\theta)=?$

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Answers:

CMT-2020/76: **0** CMT-2020/77: $\frac{1}{4}$

Answers will be published in the next issue. You can ask any queries and send your solution to: Email: ganitmath.india@gmail.com, M: +91 8826337312.
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