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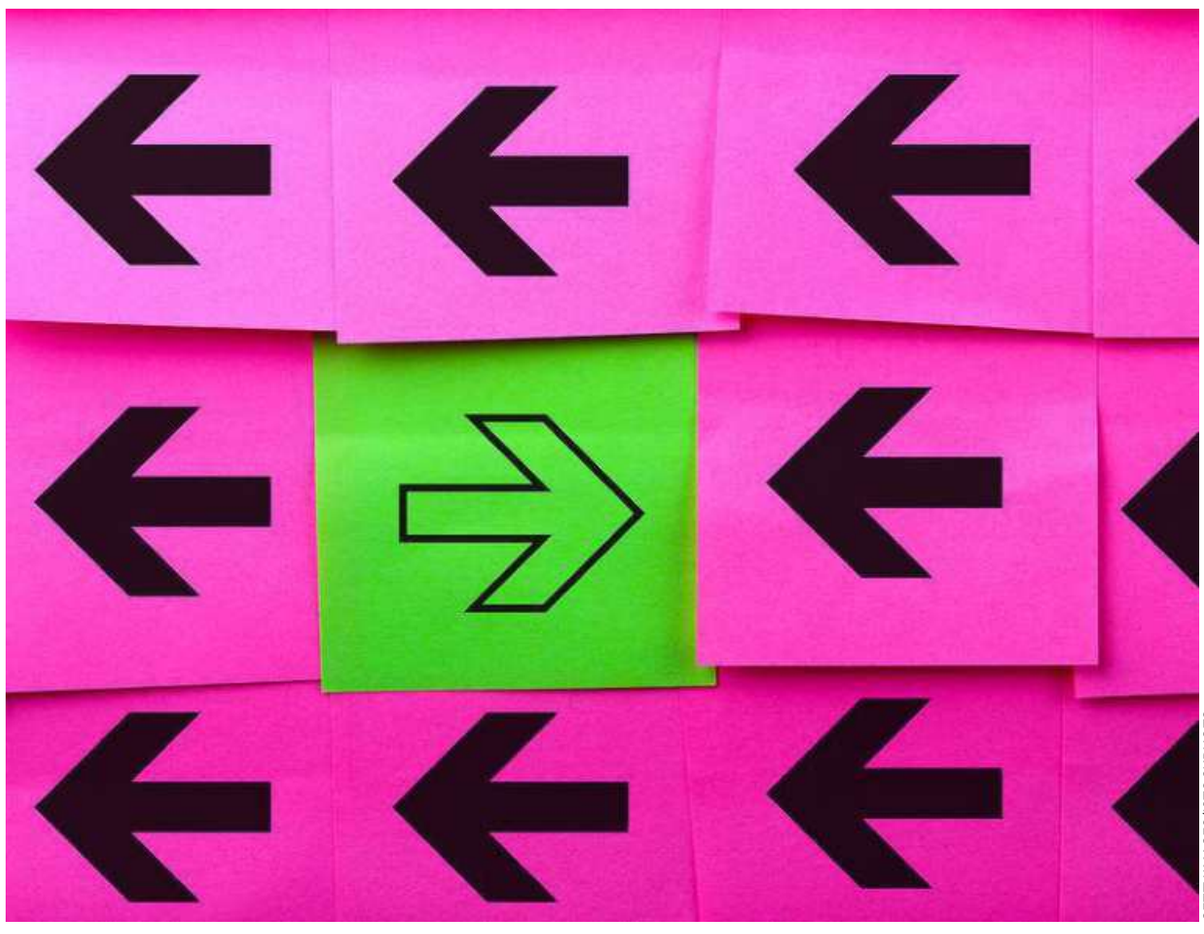

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Towards a green future

By equipping young people with green skills, India can chart a course toward a more sustainable and equitable future

India, known for its rich and diverse ecosystems, is facing severe environmental challenges due to rapid urbanisation and development. Pollution, deforestation, loss of biodiversity, and the looming impacts of climate change are taking a toll on the balance of fragile natural ecosystems. While this year has presented a multitude of climate challenges, each with far-reaching consequences, 2023 was the warmest year on record, and 2025 is projected to be even hotter. India has observed a significant mean temperature increase of 0.15°C per decade since 1950, according to a 2020 assessment by the Ministry of Earth Sciences. This has dire implications for ecosystems, agriculture, and human health.

Build resilience

The brunt of these environmental challenges is felt by the youth, who have to deal with not only the immediate effects but also the long-term consequences. Thus, for India's younger generation, building resilience against these crises is vital, as they will inherit and shape the planet's future. In this context, green skills have emerged as an essential tool in mitigating and adapting to the rapidly changing climate. These skills encompass technical knowledge, practical competencies, and mindsets required to implement sustainable practices, environmentally friendly technologies, and resource-efficient solutions across various sectors.

Green skills empower individuals to make sustainable choices, address pressing environmental concerns and are especially crucial for youngsters, who will drive the global shift towards sustainability. In India, approximately 20% of the workforce is already employed in green jobs, a number expected to double by 2030. This growing demand for green-skilled workers presents a unique opportunity to harness the country's demographic dividend. The range of green skills needed spans (but is not limited to) renewable energy, sustainable agriculture, water resource management, climate change adaptation, and waste management.

For example, skilling in solar panel installation, wind turbine maintenance, or hydroelectric power plant operations can significantly contribute to India's renewable energy transition. Expertise in sustainable farming practices, such as organic agriculture and water conservation, can strengthen food security while protecting the environment. Similarly, skills in urban planning, pollution control, and waste management are critical to create sustainable cities and reduce the ecological footprint of urban areas.

Green skills are not only about adopting new technologies but also include efficient management of existing infrastructure, services, and systems. India's continued growth relies on sustainable operations across sectors, from energy to agriculture, to ensure that economic expansion does not come at the cost of the environment.

Pivotal role

The role of the youth in the green transition is paramount. Youngsters are already at the forefront of the net zero transition with climate action and spearheading sustainability initiatives. But, to effectively lead this charge, they need access to training and upskilling opportunities. Whether through formal education, vocational training, or informal programmes, acquiring green skills is essential to tackle climate challenges and lead communities in climate adaptation efforts. Youth-led green businesses and start-ups are already emerging across India, introducing innovative solutions to environmental issues. By leveraging their creativity, digital expertise, and future-oriented thinking, youngsters are playing a pivotal role in reshaping the green economy. As leaders in green entrepreneurship, they are laying the groundwork for a sustainable future, driving economic and environmental progress.

The government has recognised the need to invest in green skills and the Green Skill Development Programme, for instance, aims to skill youth in fields related to the environment, renewable energy, forestry, wildlife conservation, and climate change. Such programmes are essential to ensure that India's future workforce is equipped to handle the demands of a green economy. There is also a growing shift in academic curricula, with an increasing emphasis on environmental education and sustainability.

However, there is still a need to align skilling courses and academic programmes with the specific needs of the green economy. This is a pivotal moment for India, as the youth have the potential not only to transform industries but also to drive a broader cultural shift towards sustainability in business, employment, and everyday life.

Balaji Vharkat is Climate Environment and Disaster Risk Reduction Officer, and Priyanka Shendage is State Consultant, UNICEF Mumbai.

SCHOLARSHIPS

OakNorth STEM Scholarship and Mentorship Programme
Eligibility: Girls from Haryana, Uttarakhand, and Bihar who are in any year of a STEM-related graduation course in government institutions and have scored 80% or above in Class 12 and 65% in the previous year. Annual family income must be less than ₹ 3.5 lakh.
Rewards: ₹30,000
Application: Online
Deadline: December 31
www.b4s.in/edge/ONSS3

Programme in Mathematics for Young Scientists (PROMYS)
Eligibility: Students in Classes 9-12 who are least 15 years on May 11, 2025
Rewards: Covers tuition fees and other benefits.
Application: Online
Deadline: January 15
www.b4s.in/edge/PROM2

Tata Capital Pankh Scholarship
Eligibility: Students in Classes 11 or 12, degree, diploma or ITI courses at recognised institutions who have scored at least 60% in the preceding class. Annual family income must be less than or equal to ₹ 2.5 lakh.
Rewards: Variable
Application: Online
Deadline: January 15
www.b4s.in/edge/TCPS27

Courtesy: buddy4study.com

OFF THE EDGE
Nandini Raman

Keep a Plan B ready!

Uncertain about your career options? Low on self-confidence? This column may help

I am in the second year of B.A. Economics (Business Studies minor). My primary career aspiration is Civil Services. Which Master's programme would be best to prepare for this? Ashrita

Dear Ashrita,

You could do an M.A. in Economics, Public Administration, Political Science, Sociology, Development Studies or even an MBA if you are inclined towards the business side of governance. It depends on choosing your core interests and strengths while preparing for the Civil Services.

Identify your career goals beyond Civil Services and have a Plan B before you make the choice.

What are the prospects of an online Data Science course from IIT-Madras in terms of its relevance and demand in the job market? My son is studying science in Class 12. Prasun

Dear Prasun,

This could be a great opportunity, especially considering the growing demand and industry relevance for Data Science professionals today. Since the course is online, it offers flexibility in terms of time and location. It is well-structured and focuses on both theoretical knowledge and hands-on skills in Python programming, statistics, machine learning algorithms, and data visualisation, all of which are crucial in the data science domain.

After the course, your son can explore roles such as Data Scientist, Data Analyst, Machine Learning Engineer, AI Engineer, Business Intelligence Analyst, and more. These are highly sought-after roles, with competitive salaries.

If your son is planning to pursue higher studies in fields like Computer Science, Engineering, or Statistics, a foundation in Data Science will give him an edge both academically and professionally.

I am in the second year of M.Sc. Zoology. I attempted NEET six times but didn't make it. I am wondering whether to take the CSIR-NET exam or the TNPSC exams. Which would be better? Rithik

Dear Rithik,

Both are great choices and offer distinct career opportunities. The choice depends on your long-term career goals and aspirations.

CSIR-NET is ideal for research and teaching. If you pass this exam, you become eligible for Junior Research Fellowship (JRF) and Assistant Professorship across universities and colleges. With your background in Zoology, you can opt for the Life Sciences paper in CSIR-NET, which will allow you to pursue PhD programmes and build a career in scientific research, including government-funded projects, university roles, or even in the private sector as a research scientist.

The TNPSC exams are ideal for jobs in the government. This will provide you with a secure and stable job in the administrative or public sector. You can qualify for a range of positions such as Assistant Director, Sub-Registrar, Deputy Collector, District Educational Officer and so on depending on the exam grade. It will provide a good salary, and benefits such as job security, promotions, and pensions. The exam assesses your knowledge of general studies, aptitude, Tamil culture, and administrative skills.

Base your decision on your career interest. Do you want to stay in Zoology and research or transition into administration and public service?

I completed M.Sc Maths in 2020 and am preparing for the Civil Services. I have developed an interest in social and environmental work and would like to be an entrepreneur. How can I transition to social entrepreneurship? Sima

Dear Sima,

Transitioning to social entrepreneurship requires combining your passion for social change with business acumen. Leverage your mathematical expertise and build knowledge in entrepreneurship, to create a meaningful enterprise that addresses critical social or environmental issues while staying financially sustainable.

What is the cause you are passionate about: sustainable development, education, healthcare, rural development, or climate change? Research and understand the challenges, gaps, and specific needs within that space. Apply data analysis, statistics, and problem-solving skills to develop solutions in areas like impact measurement, creating efficient models for social interventions, analysing data to drive environmental change and showcasing the impact through data-driven insights to attract funding and partners.

Understand the ecosystem of social entrepreneurship, study how social enterprises work, the business models, and how they differ from traditional businesses. Familiarise yourself with successful ones to understand how they operate and scale their impact. Volunteer or work with an established NGO, social enterprise, or environmental organisation in project management, community engagement, or fundraising to gain insights into how they function and network with people in the field.

Develop an entrepreneurial mindset and learn about business development, financial management, and marketing to create a sustainable business model. A course or training in social entrepreneurship will help. Connect with mentors, advisors and peers through communities like Ashoka, The Global Impact Hub, or Tata Social Enterprise Challenge.

Disclaimer: This column is merely a guiding voice and provides advice and suggestions on education and careers.

The writer is a practising counsellor and a trainer. Send your questions to eduplus.thehindu@gmail.com with the subject line Off the Edge

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At a crossroads

While 2024 exhibited the first signs path-breaking flexibilities, there is still a long way to go before India becomes a global powerhouse of higher education

Somak Raychaudhury

India, with its rich history of academic excellence, now stands at a crossroads, poised to transform its higher education system into a global powerhouse. However, if we look at the status of higher education in the country, India is still far from these ambitious goals. As of May 2024, India's gross enrolment ratio in higher education was 28.4%, with over 4.3 crore students enrolled in almost 1200 institutions. However, this is far below the current global average of 36.7%.

According to the Ministry of Education, almost nine lakh students went abroad for higher education last year. These students have spent $60 billion (₹5.1 lakh crores) on acquiring an education abroad in 2023. This figure has almost doubled from the $37 billion spent in 2019, the year before the pandemic. This is more than 10 times the annual budget allocated by the Union Government for Higher Education (₹ 44,090 crores or $5.2 billion) in 2023-24.

Clearly, current Indian students seeking higher education prefer to go abroad if they had the resources. Yet we aspire to become the destination of choice for higher education for students of the world in the coming decades.

Key focus areas

To achieve this ambitious goal, there are several key areas on which the country needs to focus, including fostering interdisciplinarity in fundamental areas of teaching and research, enhancing the quality of faculty at all levels, promoting global partnerships, ensuring the internationalisation of the curriculum followed, improving governance and autonomy, enhancing access and equity, and embracing technology and innovation. By addressing these areas, India can cultivate a new generation of global leaders equipped to tackle the complex challenges of the 21st century.

Education has been one of the core defining values of Indians. It has never been a secondary option, regardless of background, religion, ethnicity or era of existence. Since education is so central to our identity, now is the time to align our education system with the 21st-century goals of inclusivity, innovation, and global competence. The National Education Policy (NEP) 2020 provides a promising framework to provide a first step to achieve this vision.

Several key developments are needed in Indian higher education to empower the system for global leadership. Education needs to focus on transferable skills. In an age where information is widely available, and is mixed up with bewildering layers of misinformation, higher education has to highlight the crucial skills of critical thinking, problem-solving and communication. Universities need to become the locus of both teaching and research; collaborative research and innovation need to span across disciplines to address complex global challenges; and strong partnerships need to emerge in both teaching and research with industry and international partners.

Importance of faculty

All this is possible if Indian institutions of higher education can attract and retain top-notch faculty from around the world. Currently only the top tier institutions can declare that their faculty are comparable to the best of the world. However, these academics interact with only a small number of our students. Easier faculty mobility and collaboration across the world can partially address this. Empowering a wider range of institutions to develop online degree programmes, particularly in conjunction with international universities, can help achieve this goal. Currently only a handful of elite universities are allowed to offer formal online education and develop joint degree programmes with international partners.

As 2024 comes to a close, it can be viewed as a year marked by the first signs of the implementation of the path-breaking flexibilities that the NEP-2020 provides to the higher education landscape. The academic bank of credits enables students to pause education to get a taste of employment, or to move between institutions according to the availability of courses in their individual education plan. Towards the end of the year, we learnt that biannual admissions will become possible, making mobility between states, as well as for international students, much easier. Accessibility of primary sources for research has been too expensive for most researchers in the country. The recently announced One Nation, One Subscription policy is a crucial step that enables researchers to access high-quality research articles and foster an environment that supports innovation. As we look ahead, the trends that defined 2024 are poised to evolve further.

Views expressed are personal.

The writer is the Vice Chancellor, Ashoka University

Building green cities

Sustainable Architecture Studies equip students with the knowledge and skills to address climate change and create resilient, energy-efficient buildings

GETTY IMAGES/ISTOCKPHOTO

Gareth Puttock

No matter where you live in the world, it is becoming difficult to ignore climate change. The signs are everywhere, whether you are directly affected by the impact of these events or indirectly by rising food costs, reduced food security and the overall economy. News of extreme weather events across the globe has become a regular occurrence. This escalating climate crisis – characterised by rising temperatures, changing weather patterns, and declining biodiversity – demands urgent action.

While there are many aspects and elements to the causes of climate change, the 2023 Global Status Report for Buildings and Construction released at the latest round of climate talks in Dubai, COP28, found that the buildings and construction sector accounted for over 35% of worldwide energy demand. By adopting sustainable practices, architects can reduce emissions, enhance biodiversity, and improve living standards. Sustainable architecture, focusing on reducing environmental impact, promoting energy efficiency, and improving quality of life, offers a way forward.

Students of Sustainable Architecture need to go beyond the common aspects to low carbon design and think about regenerative architecture and develop the skills to create buildings that not only minimise their environmental impact but also have a positive net impact on the planet. Regenerative architects seek to design structures that restore ecosystems, enhance biodiversity, and contribute to the overall health of their surroundings to create buildings that interact harmoniously with their environments.

Sustainable Architecture Studies equips students with the essential skills to drive change and create a more sustainable future by combining technical expertise in building physics, materials, and modelling tools with a deep understanding of user needs and behaviour. This holistic approach enables students to develop innovative strategies and test ideas through data-driven analysis. Graduates of sustainable architecture programmes possess a diverse range of skills, including:

- Technical expertise: proficiency in building design, energy efficiency, and sustainable materials.
- Problem-solving: ability to address complex challenges related to climate change and urban development.
- Social responsibility: commitment to creating equitable and inclusive built environments.
- Innovation: capacity to develop innovative solutions for sustainable architecture. One of the most significant challenges facing the construction industry is the need to retrofit existing buildings to meet sustainability standards. Sustainable architecture professionals can play a crucial role in developing effective strategies to retrofit buildings while minimising risks and maximise energy efficiency.

A key challenge is the demands of rapid urbanisation. The neighbourhoods built today will be with us for generations to come and they should not only meet the needs of today and address carbon emissions but also be comfortable and habitable in a changing climate.

There are numerous challenges to this including balancing affordability with sustainability, ensuring adequate infrastructure, and addressing resource concerns. But opportunities abound in the form of innovative technologies and sustainable practices. By designing neighbourhoods that prioritise walkability, green spaces, and community engagement, architects can create sustainable environments that meet the needs of a growing population and contribute to a more resilient future.

The growing demand for sustainable professionals has opened up exciting new career avenues such as providing expert advice on green building practices through a sustainable design consultancy; working with government agencies to develop and implement sustainable building policies and regulations and work in research and academia to advance sustainable architecture knowledge or community development and work on projects that improve the quality of life for urban populations.

As the world transitions toward a more sustainable future, Sustainable Architecture Studies play a vital role in shaping a greener and more equitable world by equipping students with the knowledge and skills to address climate change and create resilient, energy-efficient buildings.

The writer is University Teacher at the School of Architecture and Landscape, University of Sheffield, the U.K.

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Where tech meets law

From AI to Machine Learning, technological integration into the legal sphere has opened new pathways for law aspirants

Anushita S.P. Karunakaram

The amalgamation of technology and the legal sphere has given rise to an indispensable offshoot, the LegalTech sector. According to Future Market Insights, the LegalTech industry, currently valued at $29.60 billion, is estimated to reach $68.04 billion by 2034, growing at a CAGR of 8.7% from 2024 to 2034.

LegalTech delivers support and services to the legal industry by helping lawyers, attorneys, and firms practise law more efficiently. With Artificial Intelligence (AI), Machine Learning, and blockchain being key drivers, LegalTech makes data analysis, contract review, and monetary transactions more secure and seamless. These technologies further allow professionals to automate routine tasks, providing them time to focus on strategic and high-value work.

With increasing dependence on AI and technology, law firms and departments worldwide are seeking tech-savvy professionals. By pursuing a career as a LegalTech professional, one can position themselves at the forefront of delivering technologically refined legal services. Here are some of the most lucrative career opportunities in this domain.

Regulatory Compliance Manager: Compliance managers ensure that a company complies with all relevant laws and regulations. They are primarily responsible for monitoring legislation and industry changes, proactively implementing them, and managing risks. Getting certifications like Certified Compliance and Ethics Professional (CCEP), Certified Regulatory Compliance Manager (CRCM) and Advanced Executive Programme in Cybersecurity can boost credibility.

Legal Technology Consultant: Legal technologists help law firms leverage technology and set up their website, provide online accounting services, and manage software and hardware systems. One can pursue a Legal Technology and Innovation Certificate or Certificates in Technology in Law Practice.

AI and Machine Learning Specialist: These professionals typically provide AI solutions to automate legal processes, process large sets of legal data, and create predictive models to gauge legal outcomes. One can pursue online courses in AI and Machine Learning for legal professionals from leading institutions.

E-Discovery Specialist: A relatively new part of the legal sector, an E-discovery specialist manages a large volume of electronic documents and uses automated tools to reduce human error and improve efficiency. Pursuing a career in this requires E-Discovery certification courses from universities and online platforms.

Legal Operations Manager: A legal operations manager is responsible for managing a multidisciplinary team and overseeing data analytics, project management, and marketing. One can obtain a Legal Operations Certificate, a Project Management Professional (PMP) Certification, or a Law-Diploma Certification.

Legal Data Analyst: This involves using data analysis techniques such as statistical analysis to derive insights and support legal decision-making. A legal data analyst gathers, interprets, and analyses court documents, papers, case outcomes and other data to extract insights to support decision-making. To start a career in this field, one can purse Data Science courses for legal professionals.

Outlook

From AI to machine learning, technological integration into the legal sphere is creating exciting non-traditional legal career opportunities. Professionals who can seamlessly integrate cutting-edge technology into legal procedures will be highly sought after. Over the coming years, AI will further revolutionise the legal sector, enhancing efficiency, and even reshaping traditional law practices. By strategically preparing and embracing this technological evolution, aspiring law professionals can stay ahead of the curve and redefine the way legal services are delivered.

The writer is Co-Founder and CEO at Lawyer Desk.

YOUNG ACHIEVER

Batting for sustainability

How a team from Amrita Vishwa Vidyapeetham, India, won the Global All-Track Grand Prize at HackHarvard 2024

C. Amrit Subramanian

At 5.00 a.m., my phone rang. "Amrit, we've been shortlisted for HackHarvard 2024," announced my team-mate.

I grabbed my laptop and checked my inbox. Sure enough, the top email read: "We are excited to accept and confirm your attendance. HackHarvard Team."

HackHarvard is an in-person Computer Science conference and hackathon held on Harvard's campus in Boston, the U.S. Thousands of undergraduate students from across the globe apply but nly a select few are accepted.

I had heard about the event on LinkedIn just two months before this. My teammates – Surya Santosh Kumar, Chukka Navneet Krishna, Kottaki Srikar Vamsi – and I applied without much hope. When the news of our selection came in, we had only a month to get our visas sorted.

The winning team: (from left) Kotakki Srikar Vamsi, Surya Santhosh Kumar, Chukka Navneet Krishna, and C. Amrit Subramanian SPECIAL ARRANGEMENT

We finally landed in Boston on a bright sunny but cold morning. The campus, with its lush green lawns and vintage buildings over 350 years old, gave off a charming, old-world vibe.

The hackathon was to take place at the Student Organization Center (SOCH) at Hilles, with over 500 hackers from prestigious schools like MIT, Stanford, and Harvard, as well as countries like Greece, Egypt, China, South Korea, and Japan.

Choosing the track

The hackathon tracks were announced on the first evening: Smart City (for tech innovations to make cities smarter and more efficient), HealthCare, Open Source Data (involving model training with data from organizations like NASA), and Sustainability. We decided to create something impactful for the environment, so we chose the Sustainability track.

Hit by jet lag, we slept long and didn't wake up until 10.00 a.m. on day two. We believe that building an app is pointless without a solid idea; so, we spent the next 10 hours brainstorming until we came up with Sustain-ify.

One feature we envisioned was helping users make sustainable consumer choices. For example, in a supermarket, a user could record a video of a product label, and our app would analyse the ingredients, highlighting parameters like sodium, sugar, and fat content. Based on this and the manufacturing process, health pros and cons would be displayed. If a product was produced in a non-environmentally friendly way, we would highlight potential hazards and suggest alternatives.

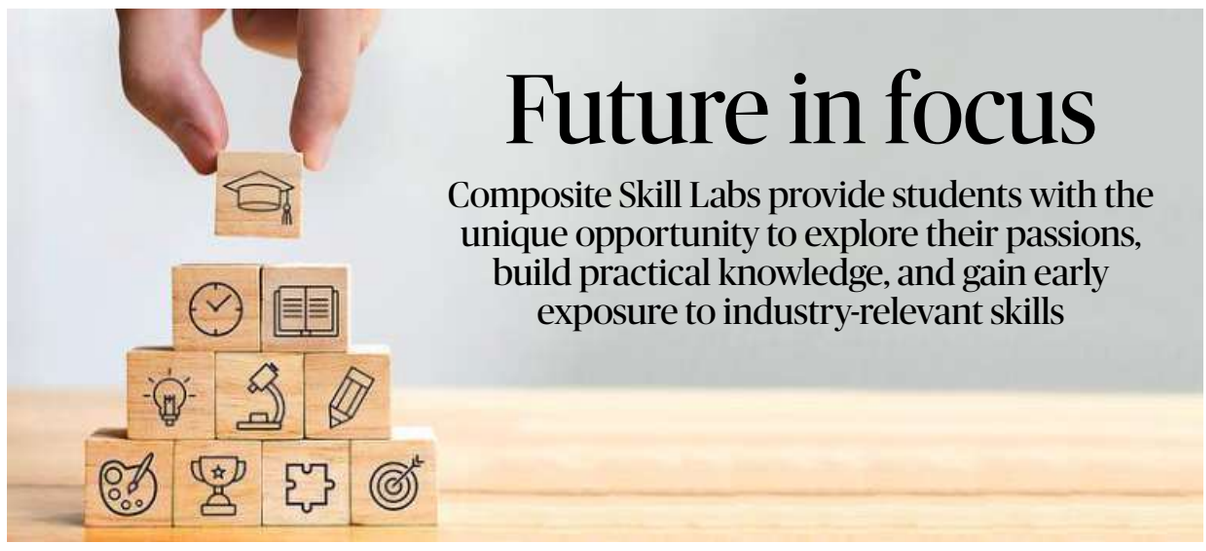
Challenge overcome

At this point, we encountered an issue: the need to personalise health tips . That's when our mentor, Dr. Premjith B., came to the rescue and suggested allowing users to upload medical reports like blood tests and other diagnostic results, which would allow tailored health insights based on individual data. For instance, if a user was allergic to peanuts and tried to buy a peanut bar, the app would alert them.

The second feature was the Do-It-Yourself (DIY) function, where users could take pictures of empty soda cans, bottles, and other waste and upload them on the app, which would then suggest creative ideas to reuse or recycle. For example, if a user uploaded the image of a disposable plastic bottle, the app would suggest creating a bird feeder or a pen stand, with step-by-step instructions. A visualisation would give users a preview of the final product.

After countless cups of caffeine and a sleepless night, we finished and presented the app to the judges. Boom! We won the First Best Hack Award, given to the best project in the event. That's when I learnt that hard work, backed by a solid plan, will always lead to success.

The writer is a third-year student of B.Tech. Artificial Intelligence Engineering at the School of AI, Amrita Vishwa Vidyapeetham.



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Future in focus

Composite Skill Labs provide students with the unique opportunity to explore their passions, build practical knowledge, and gain early exposure to industry-relevant skills

Monica Malhotra Kandhari

Education is evolving at breakneck speed, with rapid technological innovations playing an increasingly critical role in the learning process.

The traditional approach, which relies heavily on theoretical learning and rote memorisation, is no longer enough to meet the needs of students who are preparing for a future shaped by rapid technological advancements and a constantly evolving job market.

Recognising this, the Central Board of Secondary Education (CBSE) has introduced Composite Skill Labs (CSLs), an initiative that emphasises practical skills, critical thinking, and a more personalised approach to learning. While conventional schooling provides a solid foundation in academic subjects, it often doesn't fully prepare students for the challenges of the real world.

CSLs aim to fill this gap by blending classroom learning with practical, hands-on experiences that help students understand what they are learning and apply it in meaningful ways. CSLs are designated spaces within institutions where students can develop a wide range of skills, from technical abilities and vocational knowledge to life skills and creative expression and explore their passions and gain early exposure to industry-relevant skills.

Benefits

What makes CSLs particularly promising is their ability to reshape the way students learn. By immersing students in practical, hands-on activities, these labs help develop critical skills such as problem-solving, teamwork, and creativity, essential skills for any career path. The flexible curriculum allows students to dive into subjects that align with their personal interests and strengths, encouraging them to take ownership of their education and turn learning into a more engaging and fulfilling journey.

A key benefit of CSLs is the potential to significantly improve employability. Students who can gain practical experience while in school are better prepared to transition into the workforce.

Beyond technical skills, CSLs emphasise life skills like financial literacy, communication, and self-management, ensuring that students emerge as well-rounded individuals ready to face the complexities of the world.

New way of thinking

By giving students the space and resources to experiment, these labs encourage a mindset of exploration and problem-solving. Students are inspired to think outside the box and develop solutions to real-world challenges, laying the groundwork for future entrepreneurs and innovators. As technology continues to shape the world around us and the job market becomes more competitive, CSLs will play a crucial role in preparing students to adapt and succeed. These labs represent a new way of thinking about education; one that values practical skills, critical thinking, and personal growth just as much as academic achievement. In doing so,

CSLs are not only changing the way students learn but also empowering them to become the forward-thinking, well-rounded individuals that tomorrow's world will require.

The writer is the MD of AASOKA By MBD Group.