

EDUCATION PLUS

GET THE EDGE

Follow us

facebook.com/thehindu

twitter.com/the_hindu

instagram.com/the_hindu

Re-crafting thinking patterns

Understanding their own needs and development as adult learners can help teachers relate better to their students

T.T. Srinath

During a conversation with teachers, which revolved around needs being met or not met by the institution, many 'teachers' expressed unhappiness with some of their fundamental needs being unmet. These included aspects that Abraham Maslow, a psychologist in the 1950s, defined as "Hierarchy of Needs". Maslow's theory postulates that human needs operate at five levels in the form of a pyramid. At the bottom are basic or physiological needs, such as food and clothing. From here, an individual rises through four other layers to the top where one 'self-actualises' and realises one's purpose in life.'

How we view things

Many teachers were stuck at Level 3: the need for love and belonging. To help them understand the way they think and how that could impact the way they behave and teach, I use a model developed by Robert Kegan, an American developmental psychologist. He explained that developing as an adult was not about learning new things but about transforming the way we view things.

In Kegan's model, which also follows a pyramidal



GETTY IMAGES/STOCKPHOTO

structure, the bottom is classified as an 'impulsive mind', which is limited by our ability to consider other perspectives. This is similar to what Maslow says is our 'psychological need' for self-preservation.

Kegan explains that an adult's thinking graduates from the bottom and rises through four layers to the top, as the individual evolves into what he describes as having a 'transforming mindset', characterised by a capacity to learn and grow, which pa-

rallels Maslow's 'self-actualisation' state.

When the two models were explained, the teachers recognised that their need for love and belonging bore heavily on what Kegan calls 'Socialised Mind', which was Level 3 in the pyramid and reflected a need for external validation. When invited to explore their thought processes, many understood that their thinking was affected by their felt need.

As teachers whose es-

sential task is to impart knowledge, which is largely cognitive, they observed that their manner of communicating with children was affected by the state of their mind, which in itself was impacted by whether their personal needs were met or not. Reflecting primarily on their behaviour towards students, the teachers understood that their thoughts, and therefore behaviours, were showing up as being deficit or growth-oriented because of their funda-

mental human need being met or not.

Connecting with children

When imparting knowledge to children, the teachers realised that if they were aware of the human need they were experiencing in the 'Present', it would help them connect with children with self-compassion. Many realised that they were numb to this aspect simply because they were executing their roles as teachers from a

task perspective and were divorced from appreciating their own state of mind. Hence recognising how the hierarchy of needs was playing out in them and affecting their thinking provided them a handle to appreciate how personal transformation can take place.

The teachers also sensed that their evolving thoughts and needs were not strictly linear with one need leading to the next but that multiple needs were present at the same time. These affected their thoughts and manifested in their behaviour and communication in class.

At the end of the session, the teachers wished to understand the Kegan model better, as it explained to them that developing as an 'adult learner' involved personal transformation and changing the manner in which they view the world, rather than learning new things.

In conclusion, Kegan's model combined with Maslow's hierarchy of needs lays out a clear path on how we may re-craft our patterns of thinking and cultivate a more authentic way of relating as teachers to students.

The writer is an organisational and behavioural consultant and visiting professor at the Great Lakes Institute of Management, Chennai. Email tsrinath@gmail.com

SCHOLARSHIPS

The Cadence Scholarship

An initiative to support students pursuing higher education.

Eligibility: Indian nationals from lower-income families who are residing and studying in Delhi NCR, Bengaluru, Pune, Ahmedabad, or Hyderabad and have scored 60% overall in Class 12.

Preference will be given to girls, specially abled or transgender students and those pursuing STEM courses.

Reward: Up to \$2,000 (one-time).

Application: Online

Deadline: May 30 www.b4s.in/edge/AISDG8

Computer Engineering for the academic year 2024-25 with a minimum 3.0 GPA who demonstrate excellent communication and leadership abilities with a history of community service and extracurricular involvement.

Reward: Up to \$2,000 (one-time).

Application: Online

Deadline: May 30 www.b4s.in/edge/AISDG8

POSE Scholarship

An initiative of the Haryana State Council for Science and Technology, Government of Haryana.

Eligibility: Domiciled residents of Haryana who are in the first year of a UG, PG or Integrated degree in Basic and Natural Science subjects and are not receiving any other scholarship or grant.

Reward: Up to ₹6,000 per month and one-time grant of up to ₹22,000.

Application: Online

Deadline: May 12 www.b4s.in/edge/PSE6

Courtesy: buddy4study

GMAC Advancery

The Graduate Management Admission Council (GMAC) has launched Advancery to guide candidates through their business education journey by offering a personalised approach to programme selection and application

strategy. This includes verified programme data from business schools, analysis of online discussions on programme types and formats, personalised skill assessment, comparison of programmes based on various parameters and streamlined application process. Details at advancery.gmac.com/

Science and Maths than girls. They must be trained to identify practices that might favour one gender over the other and understand gender dynamics to create a gender-responsive pedagogy.

There are enough case studies and literature to show that this pedagogical approach can benefit quality outcomes not just for girls but for boys as well. Access to resources, workshops that analyse teaching styles and possible gender bias, and constant evolution of teacher training initiatives are key to realising change on ground. Interactive classroom sessions, which focus on inculcating gender-progressive attitudes in students, will lead to gender-equitable behaviour and perceptions.

Apart from this, it is also important to provide mentorship to go beyond gendered expectations and encourage more girls to work towards STEM careers. Gender-specific programmes – such as IIT's STEM mentorship programme for girls – to encourage curiosity in Science and Technology, must be mandatory as must sessions with female scientists, engineers, and technology analysts who can motivate them outside the curriculum and inspire them to work towards a career of their choice.

In India, research has shown that gender bias has been internalised to a point where parents unfairly favour boys when investing in STEM education. Systemic changes early in schooling to break traditional stereotypes can help transform parent and community behaviours that create these barriers for girls.

Overall, a policy framework that addresses gender equality and equity across all areas of school environment, learning approaches, and teacher training must be at the heart of national education reforms and strategies for the future of education.

The writer is Pro Vice-Chairperson of Delhi Public School, Sector-45, Gurugram; Delhi Public School-Jaipur; Dhara High School-Jaipur; and DPS International, Gurugram.

Build your skills

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



OFF THE EDGE

Nandini Raman

I have a Bachelor's degree in English and want to pursue a Master's from a Central University. What if I do not score enough on the CUET-PG exam? Also, what kind of jobs will I get? Karthik

Dear Karthik,
CUET-PG is now the primary entrance exam for most Central Universities for PG programmes and so prepare well. If you do not get your desired score, then you can apply to Master's programmes in state Universities. They have their own entrance exams and admission criteria. Some well-respected ones include Presidency University, Kolkata; Jadavpur University, Kolkata; University of Mumbai; University of Madras; and University of Hyderabad. You can also consider private universities such as Ashoka University, FLAME, Christ University, Jain University, and OP Jindal Global University. Open universities like IGNOU could also be a good option if you prefer distance learning or need more flexibility.

A Master's in English opens up a variety of career paths with each requiring different skill sets and offering diverse work environments. To teach in a school, you will need to do a B.Ed. To teach in a college

or do research you have to clear the UGC-NET/JRF. Other options are content writing or editing for websites, blogs, social media sites, being a technical writer or a content creator for digital media, working with publishing companies as a proof reader, public relations, corporate communications and so on.

Which of these appeals to you? Do you enjoy teaching, writing, working with people, or research? Identify and build the skills needed for your desired career path.

I finished my B.A. in 2021 and have been preparing for the UPSC CSE, as I aspire to join the police. I don't have any other degree or job. Should I study further or stay focused on the UPSC?

Evaluate your situation objectively and be realistic about your chance of success in future attempts. Identify your weaknesses and areas for improvement if you still want to try again but set a realistic time frame. A gap of four years is a key concern with no other degree or job to showcase. This will limit your career options if you choose to move away now. What about State Police Service

exams or the Central Armed Police Forces (CAPF)? Check the exam details online. What about an MBA or Master's in Public Administration, Political Science, International Relations or a relevant subject that can enhance your resume? If you still feel confused, meet a career counsellor who will help you find out what your interests are.

I am in B.A. first year and want to be an Air Force officer (Flying branch). In class 12, I had PCB as subjects. How can I achieve my dream? Pranav

Dear Pranav,
You will have to take the Combined Defence Services Examination (CDSE) conducted by the UPSC. If selected, you can join the Air Force Academy directly for training. If you are a member of the NCC Air Wing and have a C certificate, you can apply under the NCC Special Entry Scheme.

Requirements for Flying Branch are graduate degree (any discipline) with Physics and Mathematics at the 10+2 level or a B.E. or B.Tech. You will have to clear stringent physical fitness and medical standards and pass the

competitions, we need to understand what she is going through. Is it perfectionism, fear of failure or rejection, lack of self-confidence and low self-esteem or social awkwardness or just indifference to competition?

At 12-13, children go through significant physical, emotional, and social changes. It is a time of self-discovery and developing their identity. Talk to her about her interests and pay attention to what makes her feel engaged and energised. Focus on praising her effort and progress rather than the results.

What is going on at school? What about her friendships?

If she finds it difficult to open up to you, suggest meeting a competent therapist and foster an environment where she feels safe to express herself and make mistakes. Support her in exploring different activities and hobbies, even if they are outside her comfort zone. Encourage her to participate in smaller events within her comfort zone and celebrate her participation and effort, regardless of the outcome. Be her cheerleader.

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

The University of Manchester, the U.K., invites applications for its M.A. in Social Anthropology.
Eligibility: First- or upper-second Bachelor's degree or overseas equivalent in any discipline. Overall IELTS Academic score of 7, with 7 in writing and no other component below 6.5 or equivalents.

JAIN Online invites applications for its two-year online MBA programme in Digital Marketing and E-Commerce.
Eligibility: Minimum 50% or equivalent in UG in any stream from a recognised institution.

ITM Institute of Hotel Management announced a Scholarship Programme for 2025. Amount will be based on performance in the scholarship exam.
Deadline: April 19
<https://tinyurl.com/4xjpm6d>

For true inclusion

Strategies for educational institutions to put gender sensitivity at the centre of classroom environments, teaching approaches, and pedagogy



Devvani Jaipuria

A simple question from a seven-year-old girl puts into perspective all we need to know about gender sensitive education: "Why is the nurse always a female and the doctor always a male?"

This stemmed from a seemingly innocuous illustration. Exposure to a stereotypical portrayal of gendered roles and careers may lead her to believe that she doesn't have what it takes to become a doctor. Thus challenging these norms and breaking away from gendered stereotypes through education is imperative.

While we have taken great strides in making education accessible to all genders, to achieve inclusivity in its truest sense and accelerate real action towards equity, gender sensitivity needs to be at the core of classroom environments, teaching approaches, and pedagogy. A critical aspect is integrating gender sensitivity into the curriculum to effectively challenge stereotypes and encourage inclusivity.

Role of teachers
This brings us to what is perhaps one of the most important points: the role of teachers. While they can be active changemakers, this also means that effective gender-sensitive education relies greatly on well-trained teachers who need to be made aware of their own biases – something as simple as believing that boys are better at

Admissions
The University of Strathclyde, Glasgow, the U.K., invites applications for its M.Sc. in Advanced Mathematical Modelling.
Eligibility: Minimum second-class (2:2) honours degree or overseas

Ujjwal Singh

With over 21 lakh candidates taking the NEET 2025 exam, it is important to ensure that not only do you prepare well but also retain what you have learnt.

The exam this year has gone back to the pre-COVID pattern: 180 minutes totally with 45 questions each in Physics and Chemistry and 90 in Biology and no optional questions to fall back on.

So here are some tips to help you as you navigate this journey.

Spaced repetition: Ever wondered why a concept you nailed last week vanished during a mock test? That's the forgetting curve at play. But here's the antidote: spaced repetition. Revisiting topics strategically – 24 hours,

three days, seven days, 14 days – rewrites the brain, shifting knowledge from short-term recall to long-term retention. NCERT is your Holy Book, especially for Biology. But passive reading isn't enough. Condense it into bite-sized notes for a cheat code for crunch time. It's not about cramming; it's about creating a toolkit that works for you.

Subject-specific revision: Biology isn't a list to memorise; it's a story to understand. Concept mapping is your secret weapon. Link photosynthesis to respiration, hormones to homeostasis. Sketch these connections and tricky questions will feel like a solved puzzle. That's progress powered by understanding, not rote memory.

For many, Physics is an Achilles' heel. But here's a secret: half the questions are formula plug-ins, so

Strategies to help you retain all that you have learnt for the NEET exam



build a formula journal covering Mechanics, Electrodynamics, and Modern Physics; all high-yield topics that deliver results. Practise applying, not just solving. Why wrestle with a complex pulley system question when quick formula mastery gets you there faster? For Chemistry, keep it to bite-sized wins that stack up. This requires discipline and consistency. The periodic table? Make it muscle

memory. Organic reactions? Chart them systematically: nomenclature, mechanisms, and shortcuts.

Mistake notebook technique: Document every incorrect answer from test and mock exam. By regularly revisiting these errors, patterns will emerge that highlight knowledge gaps. For example, if you consistently miss questions about the human endocrine system or semiconductor physics, these areas need targeted revision. This approach addresses weaknesses directly rather than revising everything equally.

Revision environment: Get real! Late-night marathons with four hours of sleep will not help. They only make you foggy. Your brain needs 6-7 hours of rest and is sharper in the morning than at midnight. Set up a distraction-free zone and watch retention soar.

Personalise your notes, colour-code concepts, and sketch mind maps.

Strategic preparation: With NEET 2025's tight clock and no optional questions, pacing is king. Timed mocks in the new format aren't optional; they're your training ground. The last weeks? No new topics; just sharpen what you know. Prioritise high-yield topics identified from previous years' question papers. Double down, visualise cardiac cycles, nuclear reactions ... mental snapshots stick when words fail. Add a mnemonic for taxonomy, and you will excel. Don't chase hours; chase outcomes.

Smart revision isn't about 180 minutes of glory; it's about wiring your brain to think, solve, and lead. It's not about more but about being smarter. This will help you face the challenge of NEET.

The writer is Founding CEO, Infinity Learn by Sri Chaitanya

Tiny but mighty

Gadhadar Reddy, Founder and CEO of NoPo Nanotechnologies, on his domain.



FUTURE PERFECT
Ananya Ganapathy

The next in the series featuring conversations with entrepreneurs, technologists and researchers about emerging technologies and what students need to know about these fields.

What do you do?

I am Founder and CEO of NoPo Nanotechnologies, a nanomaterials company. We make an advanced material called single-wall carbon nanotubes (SWCNT). Besides leading the company, I specifically direct the R&D around SWCNT and its applications. I have an Electronics and Communications degree from BMS College of Engineering, Bengaluru, and Master's in Nanotechnology from Louisiana Tech University, the U.S.

Why is your work important?

SWCNT are very small; about two lakh times smaller than a single hair strand but are also one of the strongest materials known to mankind. They are highly conductive, exhibit semi-conductor properties, and can transfer both heat and electrons rapidly. They find applications in electric vehicle



is exciting for all of us at NoPo.

Any experiences in college that led you to become an entrepreneur?

I knew I was going to make carbon nanotubes but not that I was going to be an entrepreneur. I set up nanotech clubs in college. During my Master's in the U.S. I realised that the state-of-the-art is quite hard. Instead of waiting for someone to solve this problem, I decided to work on it in my own small way. Which led to the company I lead today.

What should students specifically know about your field?

Material science in general – and nanomaterials specifically – is challenging because we are trying to create something that Nature did not conceive. Creating new materials is hard. It is interdisciplinary and requires deep understanding of several fields including the physical, chemical, and mechanical properties of materials and how they respond to pressure and high temperatures. If you love problem-solving and have a creative and engineering bent of mind, this is an exciting field to be in.

The writer is an avid follower of emerging technologies and their applications.

battery technologies to increase the battery capacity and also to make them cheaper. They are also used in advanced electronics to shrink the size of transistors and improve energy efficiency.

What is exciting about your work?

With increased adoption of AI globally, demand for energy is growing. On the other hand, electric vehicles that are replacing fossil fuel-based technologies require smaller, more efficient and cheaper batteries. We are one of the few companies who have developed the technology to produce carbon nanotubes with such small diameters and very high precision.

To work from India on advanced technologies like SWCNT – which can solve long-standing global problems such as cleaner water, smaller electronics, better energy storage, greener energy –

Hitesh Goswami

Imagine a career where your everyday work could impact the lives of millions of people. Were you curious to know more about genomics during COVID-19? The pandemic was a big reminder of the role and importance of genomics and its potential to solve some of the most pressing issues of our time. As we stand on the brink of unprecedented breakthroughs in healthcare, students and young professionals have a unique opportunity to shape the future by entering the field of genomics.

Genomics is not just an academic pursuit; it is a transformative field with the power to solve some of humanity's greatest challenges. It is at the intersection of Biology, Data Science, and technology; a trifecta of skills that defines the future of healthcare. It is not just about understanding genes but about leveraging that knowledge to address critical issues like cancer, rare genetic disorders, and even infectious diseases like COVID-19. Its applications go beyond healthcare. From agriculture to climate science, genomics is driving innovations such as genetically engineered crops that withstand harsh conditions and microbiomes that promote environmental sustainability.

What it involves

Genomics research focuses on studying an organism's entire DNA, including all its genes, to uncover insights into health, disease, and evolution. It involves:

Genome mapping:

Sequencing DNA to identify

the location and function of genes

Genetic variation: Exploring mutations and differences that influence traits and disease risks

Precision medicine:

Using genomic data to personalise diagnostics and treatments

Functional genomics:

Understanding how genes interact to regulate biological processes

Epigenomics:

Investigating how gene activity is

modified by environmental or chemical factors

Education and skills

Genomics research typically requires a Bachelor's degree in Biotechnology, Genetics, Molecular Biology, or related field and a Master's degree for specialised roles in genomics, bioinformatics, or clinical applications. A Ph.D. is essential for leadership roles in research and academia.

Aspirants require a blend of technical, analytical, and soft skills. Additional certifications in

bioinformatics, next-gen-

eration sequencing (NGS), or clinical genomics (e.g., ACMG, NSGC) and technical expertise in CRISPR, data analysis tools like R and Python, and laboratory techniques such as PCR

are crucial. Strong data analysis skills to interpret large datasets and detect patterns are essential, along with interdisciplinary knowledge combining Biology, Computer Science, and Statistics. Effective communication and is vital to write research papers, collaborate with teams, and explain findings to non-specialists.

Prospects

Genomics offers diverse career paths. Junior and senior research fellows (JRF/SRF) and PhD researchers focus on lab work, experiments, and scientific advancements. Lab technicians play a vital role in maintaining operations and conducting key experiments. Field application scientists support tools like Illumina machines through troubleshooting and optimisation. Scientific liaisons bridge the gap between researchers and clinicians, translating genomic insights into practical applications. Additionally, business development professionals drive collaborations and market growth, leveraging their understanding of genomics to expand industry impact.

Governments and private sectors worldwide are investing heavily in genomics and biotech and the market is projected to grow exponentially, creating an array of career opportunities from research and development to entrepreneurship and policy-making. In India, initiatives like Startup India, Make in India, and increased focus on healthcare innovation offer fertile ground for aspiring professionals. There is a need for talented and passionate professionals who are pushing the boundaries of what is possible.

Genomics is transforming healthcare and driving innovation in biodiversity conservation, agriculture and environmental science, making it a cornerstone of 21st-century research.

The writer is CEO and Co-Founder, 4baseCare.

Decoding tomorrow

With applications that go beyond healthcare, genomics research offers an array of opportunities in various sectors



FREEPICK

Make it count

A look at the various aspects that go into making a postgraduate course useful for students



N. Gokarneshan

Over the last few years, many students who join a postgraduate degree programme are not sure of their motivation to do so. As a result, they get into a state of confusion and are contented with a certificate and unaware of their prospects after completion. There are also myths that doing a PG course reduces job prospects or that the course should be done only in a top-tier institution leading to apprehensions among students.

First, PG courses can pave the way for a career in research and to pursue a doctorate. Many companies prefer applicants to have completed PG or Ph.D. to strengthen quality control and research and development not just at entry level but also at middle and senior positions. Doing well in postgraduate studies requires a mature mindset and an innate passion to upgrade and update oneself on the developments in one's field.

Publishing research

Besides the prescribed curriculum, students should be made aware of scientific journals that publish quality work and spend considerable time in exploring articles connected to their

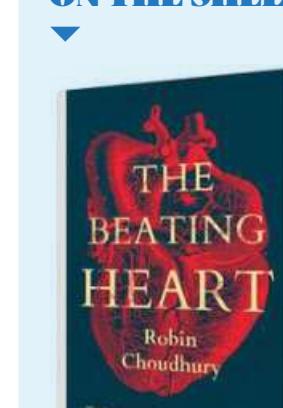
dents must aspire to get cited and achieve at least H-Index score so that their work gains visibility. Faculty members can help them get a funded project from government organisations like the AICTE or the DRDO and train them in developing the scholastic skills required to publish articles in reputed journals. Yet another factor is being able to get a patent for their project.

All this will also make it easy for them to get admission to Ph.D. courses in top institutions in the country and abroad and also increase chances of getting jobs in leading research organisations. All this also requires faculty members with a good academic and research track record to motivate and inspire students by sharing their experiences and success stories. It is, therefore, important that students do not stop with mere acquisition of a degree but actively pursue a career in research and development.

With inputs from R. Sasirekha, Sona M. Anton and Z. Shahanaz from Hindustan Institute of Technology and Science, Chennai, and C. Kayalvizhi from Jaya Engineering College, Tiruniravur.

The writer is a professor at the Department of Textile Chemistry, SSM College of Engineering, Komarapalayam.

ON THE SHELF



The Beating Heart

A distinguished cardiologist explores how the heart has been represented over time and across cultures. He investigates the interplay between the heart depictions of successive eras and the prevailing cultural discourse – religious, social, philosophical – of each. In parallel, he considers how the 'scientific' understanding of the function of the heart has unfolded over 2,500 years, from the observations of Aristotle, through detailed anatomical descriptions beginning in the Renaissance, to the emergence

of experimental physiology in the 17th century, culminating in the 20th in full understanding of the molecular and cellular processes by which the heart beats autonomously. *The Beating Heart* is an illustrated journey of discovery across four millennia of human history, in the company of an author whose medical knowledge of the heart is matched by his fascination with the visual arts.

Author: Robin Choudhury

Publisher: Bloomsbury

Price: ₹2299

Genesis: Artificial Intelligence, Hope, And The Human Spirit

AI will help us to address enormous crises, from climate change to geopolitical conflicts to income inequality. It might well solve some of the greatest mysteries of our universe, revolutionise fields as diverse as medicine and architecture, and elevate the human spirit to unimaginable heights. But it will also pose challenges on a scale and of an intensity that we have never seen. Whom will we choose to lead our species through this wilderness? Or have we, passively and unwittingly,

already chosen? The last book of elder statesman Henry Kissinger, written with technologists Eric Schmidt and Craig Mundie, it prepares the decisionmakers of today – that is, all of us – for the choices of tomorrow, and equips us to seize the opportunities presented by AI without falling prey to the darker forces that this revolution has unleashed. Charting a course between blind faith and unjustified fear, *Genesis* outlines an effective strategy for navigating the age of AI.

Authors: Henry A. Kissinger, Craig Mundie, and Eric Schmidt

Publisher: Hachette

Price: ₹699

