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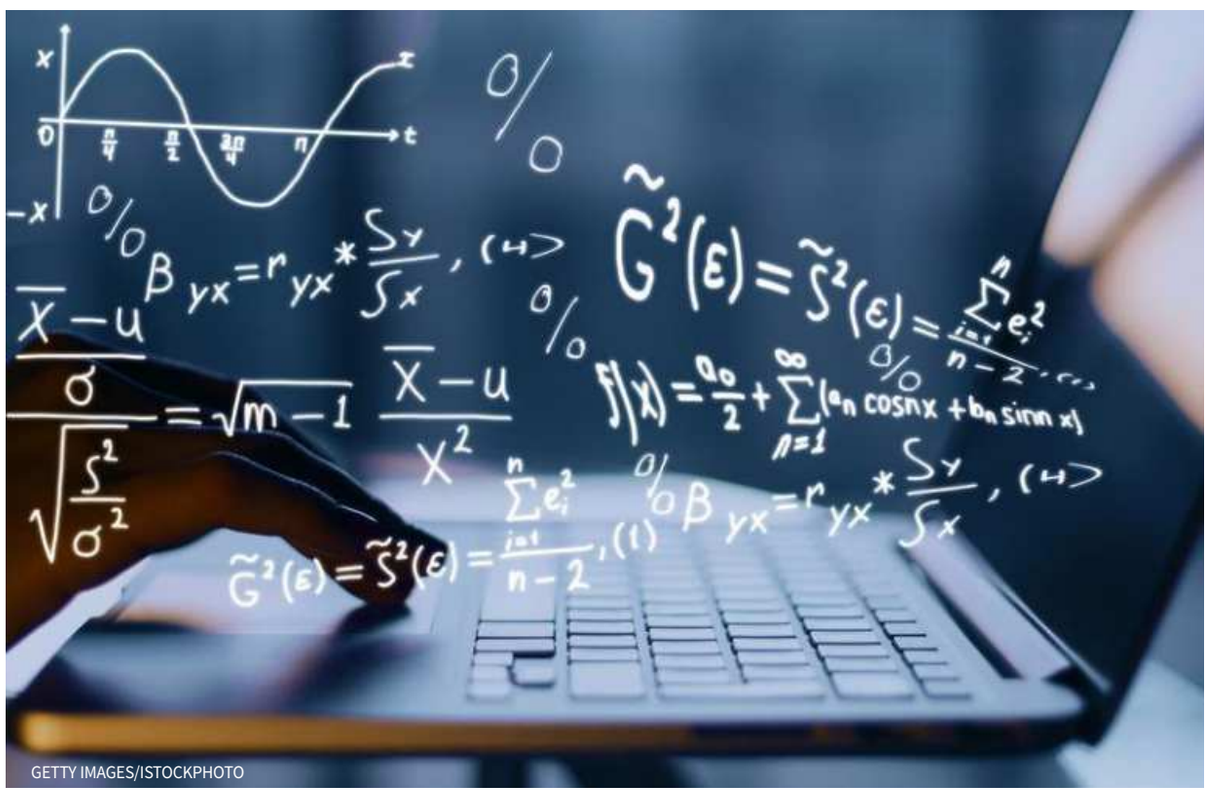
Make way for Maths 2.0

We must strive to modernise Maths education for the 21st century, cultivating spaces where learning the subject becomes a vibrant journey of discovery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Tristha Ramamurthy

Over the last several decades, there has barely been a change in how Maths has been taught in a classroom setting. The approach of solving multiple problems in the notebook and applying formulas without understanding why has stayed consistent.

High-school Maths education now stands at the crossroads of a significant transformation. It's time to advance beyond traditional problem-solving and prime our students for a future shaped by data and patterns. It is not enough just to teach them how to solve numerical problems; we must equip them to apply and connect their learning to the real world. As educators and leaders, we need to reassess how Maths is being taught and foster our students' ability to do Maths and think mathematically. It's about teaching students to abstract, systematise, and establish connections. When we frame Maths problems in real-world contexts and encourage students to engage in problem-based learning, we ignite curiosity and make Maths relevant. This enables not just the mastery of content but also the development of critical and reflective thinking.

Making maths relevant

Maths is not limited to pen and paper; it's out there in the world. To give students an opportunity to apply their learning to solve real-world problems, we need to design and transfer learning through authentic tasks that mirror real-world situations. Whether it's designing a sustainable building or analysing market trends, authentic performance tasks demonstrate the real power of Maths and helps enhance learning and shows students the tangible impact of Maths in everyday life and various professions.

Standards-based learning

Having clearly defined standards for instruction, assessment, skills, and content ensures mastery. Integrating standards-based learning into Maths is imperative to guide students into developing the essential core skills. By adhering to these standards, we raise the bar for education and empower students to navigate the academic landscape confidently and proficiently.

Harnessing technology

The digital age has transformed how we approach education. Technology like virtual labs and visualisation tools bring abstract concepts to life and allow students to engage with the subject in a dynamic and interactive way, making learning both enjoyable and effective.

Encourage discussions

Discussion is key to building an inclusive Maths classroom that normalises risk-taking and fosters critical thinking. It empowers students by promoting responsibility for their learning and building confidence. Furthermore, it creates a sense of community, enhances social-emotional learning skills, and encourages consideration of multiple perspectives.

Empowering educators

A vital part of modernising Maths is empowering teachers. Providing them with the latest tools and methodologies enhances the learning experiences and also supports them in guiding students through new and exciting educational landscapes.

Evaluating learning pathways

In rethinking Maths education, we must also evaluate our learning pathways. The integration of subjects like Data Science and logic with traditional Maths curricula under the National Education Policy (NEP) is a step in this direction. It's about crafting education that is not only academically sound but also deeply connected to the evolving demands of the world.

As we redefine Maths for the 21st century, our goal should be to transform classrooms into dynamic hubs of inquiry and innovation. We must strive to cultivate spaces where studying Maths becomes a vibrant journey of discovery, analytical thinking, and tackling real-world challenges. By doing so, we are not just teaching Maths but equipping our students with a toolkit for the future.

The writer is the Founder of Ekya Schools and Provost, CMR University.

SCHOLARSHIPS

V Able - Vidyadhan Disability Scholarship for Graduates
An opportunity offered by the Sarojini Damodaran Foundation.
Eligibility: Open for disabled students who have completed Class 12 and enrolled in a undergraduate course in 2022, with at least 60% marks or a CGPA of 6 in their HSC exam. Annual family income must be below ₹4 lakhs.
Rewards: Up to ₹60,000 per annum
Application: Online
Deadline: January 31
www.b4s.in/edge/VVDS2

NGSF Internship Programme
An internship opportunity offered by the Next Gen Scientists Foundation for those who wish to gain research experience in the Life Sciences.
Eligibility: Open to Indian students studying in their second/third year of undergraduate programme and Master's students in the second/fourth year of the integrated programme. Applicants must be willing to work for two-to-three months in the lab of a principal investigator at another Indian institute.
Rewards: ₹6,000 monthly
Application: Online
Deadline: March 31
www.b4s.in/edge/NGF1

Post-Matric Scholarship for OBC Students, Delhi
A centrally-sponsored scholarship offered by the Ministry of Social Justice and Empowerment, Government of India, and managed by the Department of Welfare of SC/ST/OBC.
Eligibility: Open to students from the Other Backward Class (OBC) category domiciled in Delhi who are studying at the post-matriculation /post-secondary level in a government-recognised institution/ college/ university within India and have at least 75% attendance in the previous year. Annual family income should not be more than ₹2.5 lakhs.
Rewards: Up to ₹10,000 annually
Application: Online
Deadline: March 31
www.b4s.in/edge/PMD2

Courtesy: buddy4study.com

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Assess your goals

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

OFF THE EDGE
Nandini Raman

I have been working on Big Data Analytics for two years but want to move towards finance. Should I do an MBA in Finance and supplement it with courses such as CFA, FRM? Will an online/distance education MBA have the same worth as a full-time programme? Ravi

Dear Ravi,

Transitioning from a career in Big Data Analytics to finance is feasible and pursuing an MBA in Finance along with certifications like CFA (Chartered Financial Analyst) and FRM (Financial Risk Manager) can be a strategic move. The choice between online/distance education and a full-time MBA programme depends on your specific circumstances, your preferences, financial situation, and career objectives. Evaluate each programme, and do thorough research to make an informed decision. An online/distance education MBA programme allows you to continue working while studying and are cost-effective. A full-time MBA typically offers extensive networking opportunities through in-person classes, group projects, and extracurricular activities. Many have robust placement and internship opportunities. But they are costly and require dedicated time. The combination of an MBA in Finance and CFA/FRM certifications will boost your prospects significantly. CFA is more focused on investment management, while FRM is oriented toward risk management. Your choice should align with the specific area within finance that you aim to pursue.

I am in the first year of a B.Sc. Computer Science programme. What extra courses in Science can I do alongside this? Sreekar

Dear Sreekar,

Your choice of courses should depend on your interests and long-term career goals. Advanced Maths, Statistics, Physics, Electronics, Chemistry, Biology, Environmental Science, Artificial Intelligence, Machine Learning, Cybersecurity, Data Science, Programming Languages, Web Development, Project Management, Bioinformatics, and Materials Science are all very useful. Consult with academic advisors to see which courses align best with your academic and career objectives.

I have finished Class 12 and am interested in Space Technology. Can I do a Bachelor's in Mechanical Engineering and do Aerospace Engineering for Master's? Deeksha

Dear Deeksha,

Pursuing a Bachelor's in Mechanical Engineering followed by a Master's in Aerospace Engineering is a viable option, as it provides a strong foundation in engineering principles and mechanical systems that are highly relevant to the aerospace industry. Fundamental engineering principles, mechanics, thermodynamics, materials science, and fluid dynamics are crucial areas for aerospace engineering. During your undergraduate studies, consider taking elective courses related to aerospace, aerodynamics or materials used in aerospace applications. Get involved in aerospace-related extracurricular activities, projects, or internships to gain practical experience. A Master's in Aerospace Engineering will offer specialised coursework in areas like aerodynamics, propulsion, space systems, satellite technology, and spacecraft design. Aerospace Engineering offers options across Aerospace Industry, Space Technology, Astronautics, Defence and Military, Research and Development, Private Sector companies, Government Agencies, Academia.

I am in the first year of B.Tech. I want to take the UPSC CSE but people say that it is a tough nut to crack and I should opt for the placement from my degree. Harsha

Dear Harsha,

Pursuing UPSC CSE or finding a job after your B.Tech is a choice that needs to be based on your interests, aspirations, and long-term career goals. The UPSC CSE is a highly competitive exam that demands rigorous preparation. Would you like to contribute to public administration? Are you passionate about public service, governance, policy-making and social change? Or are you more inclined towards the engineering and technology sector? Have a plan B in case plan A doesn't work out. Focus on your course on hand and also attend the college placements. The UPSC CSE requires dedicated preparation to succeed. Will you be able to stay financially afloat through this process? Assess if you are ready to invest this time and effort. Your engineering knowledge will be an asset here as it brings valuable analytical and problem-solving skills. There are many reputed coaching centres that will be able to help you understand this much better and assist in developing a structured approach if you are keen to explore this.

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

Lessons in kindness

Including kindness and compassion in the education ecosystem could be a driving force for change and can create a more positive environment in the world, says Prof. Robin Banerjee of the University of Sussex, the U.K.


GETTY IMAGES/ISTOCKPHOTO

Soma Basu

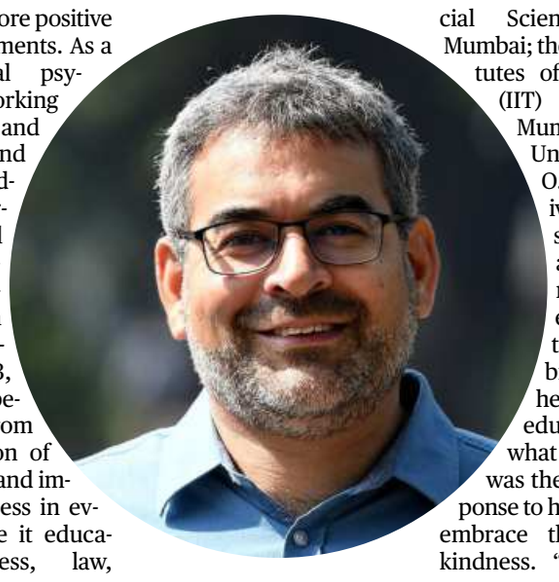
With wars and catastrophes around the globe, the world right now may not quite be the place it ought to be or what we wish it to be. "The culture of kindness should be top national priority with all governments. We should challenge our leaders to show compassion and kindness," Robin Banerjee's soft but emphatic statement underlines why kindness should not be trivialised as a weak attribute.

The Pro-Vice Chancellor for Global and Civic Engagement at University of Sussex, who was in India in late 2023, reiterated that kindness could be a driving force for change in the world for better learning in schools, colleges and universities and for creating more positive work environments. As a developmental psychologist working with children and adolescents and who also headed the university's School of Developmental Psychology from 1998 to September 2023, Banerjee's belief stems from his exploration of the existence and impact of kindness in every sector, be it education, business, law, healthcare or politics through the Sussex Centre for Research in Kindness, which he established in 2021.

Sense of community

Three years ago, he led an online Kindness Test, in collaboration with BBC Radio4, in which more than 60,000 people participated. The results suggested that people need each other more than ever. "Crisis like the pandemic brought the sense of community to the fore. Seeing, receiving or giving kindness motivates and fosters a connection among people. Education is part of the ecosystem that helps to connect," says Banerjee.

However, as a topic, kindness has failed to receive adequate attention in academic literature. Though the link between kindness, positive outcomes, and well-being is scientifically proven, the number of articles on kindness in scientific journals through the 1980s was only 35. It grew to 1,000 between 2010 and 2019 and Banerjee felt the time was right to launch a course on Psychology of Kindness in 2022.



The 'study-at-your-pace' online course attracted 80 individuals from different nationalities in the first round and has completed six editions since. "The rising number of applicants means people understand and feel the growing need for a culture of kindness and want leaders and mentors to create conditions which foster kindness," he says.

In India, the University of Sussex is working with the Tata Institute of Social Sciences (TISS), Mumbai; the Indian Institutes of Technology (IIT) Delhi and Mumbai; Amity University and O.P. Jindal University for research in areas such as neurosciences, AI, migration, sustainability, global health, internet education. But what excited him was the positive response to his proposal to embrace the spirit of kindness. "India has a young population and I see tremendous potential here; kindness is a nice way to bring the youth together," he said.

Desire to be good

Citing the Kindness Test on BBC, Banerjee pointed out that, when people were asked to look within themselves for an experience of kindness, the respondents said they receive kindness from their close friends and family all the time but rarely notice. This barrier has to be removed because even simple gestures such as fetching a glass of water or holding the door for someone, or smiling at a stranger could brighten someone's day and forge a sense of bonding. Kindness is not about extraordinary acts of generosity involving big money or self-sacrifice; even the smallest of acts motivated by care for another adds up and snowball the good feeling. Banerjee feels it is time for academic institutions to move towards a culture of kindness where nobody is instructed to be kind but the desire to be good to another person grows naturally from within.

Five years ago, he convinced the Welsh government to start the concept of kind schools by adopting whole school universal approach to Social and Emotion Learning (SEAL). It led to an overhaul of the national curriculum with health, mental well-being and expressive arts being put at the core of the academic syllabus. "The dynamics of relationship between students, staff and parents has changed; everybody understands the importance and impact of kindness and realises it is not about charity or help but to selflessly benefit others. It makes intention more important than just the act of doing something good."

In his opinion, when we start giving attention to the small acts of kindness in our homes and daily lives, it becomes easy to be kind in an unkind world. "There is a culture of disconnect now and it is hard to make friends in a gadget-centric world. The financial gloom, climate change threat, the cost-of-living crisis are all global challenges but, if people notice kindness during difficult times, it enables them to connect."

If we identify facilitators, barriers and impacts of kindness with public service, cultivate compassion in our education systems, design and evaluate well-being interventions, it will help us zoom out from the individual and think collectively about life. "Kindness triggers a sense of belonging to each other; making others feel good is a step towards building a good society and that is what the world needs today," says Banerjee.

Be wary, not sorry

Falling prey to job scams leads to substantial loss in terms of money and time, along with the compromise of confidential information

Vikram Kumar

As fresh graduates stand on the threshold of their professional journey, the transition from academia to the job market marks a pivotal moment in their lives.

Armed with knowledge, ambition, and a thirst for new challenges, these young professionals and students are poised to make their mark in the world of work. However, it's crucial to navigate this terrain with caution and discernment. In today's digitally advanced era, the job hunting landscape has undergone a significant transformation, but regrettably, it has also witnessed a troubling surge in job scams.

According to a recent Hirect report, 56% of Indian job seekers have fallen victim to scams during their search. Of this, those between 20 and 29 years appear to be particularly vulnerable to scams and fraudulent offers.

Scammers employ a strategic approach, targeting a wide range of potential job applicants, making enticing yet unreal promises on behalf of entirely fictitious companies. This often involves the sharing of a fraudulent bank account number, convincing candidates to deposit a certain sum as an advance payment. Such tactics have ensnared a significant number of unsuspecting candidates, leading to substantial losses both in terms money and time, along with the compromise of confidential information.

Fake job postings on e-mails and work-from-home options look inviting and candidates often pay enrollment fees to register. On social media, scammers use various platforms to attract potential applicants and create counterfeit websites for applications to dupe applicants into making advance payments.

Another method is fraud calls involve scammers impersonating employers and soliciting money from job seekers. Here are some tips on how students can combat such scams.

Safeguard privacy: Protecting online privacy is vital in the job search. Usage of tools like antivirus, password managers, and ad blockers can help prevent scams and attacks. Most importantly, one must report phishing emails promptly to stop further scams.

URL check: Scam emails are often sent from very abrupt e-mail addresses whereas a legitimate company will always share emails from its official URL, which will have the company's official name in it. This web address incorporates the company's precise name. For example, if a company were to send an email to a potential candidate, the format of the sender's address would typically be 'employeename@company-name.com'.

Thorough screening: Every company has a Human Resources department in place, responsible for conducting a comprehensive evaluation of each candidate. This entails a multi-stage process, involving multiple rounds of interviews. Following these assessments, the company makes a decision regarding the candidate's onboarding, and subsequently notifies the selected candidates through an official confirmation email. It is important to note that any fraudulent emails offering a job without undergoing the standard screening process should be treated with caution.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Research & Dispersion (R&D): Candidates should thoroughly investigate whether the job postings flooding their LinkedIn, email, Instagram, or Facebook are genuine. Equally important is sharing accurate information with relevant stakeholders to reduce the rate of scams. This will empower individuals and organisations to stay vigilant, make informed decisions, and take proactive steps to protect themselves.

Become the grammar police: Legitimate job postings are meticulously proofread, resulting in minimal grammatical or spelling errors. In contrast, fraudulent postings often contain numerous grammatical and spelling mistakes. Recognising this discrepancy can aid job applicants in distinguishing between authentic and deceptive job advertisements.

Watch out for payday paradise: Candidates must be aware of postings that promise an extremely high salary and, moreover, postings that disclose the pay package on the mail body. This is a glaring red flag, as reputable companies never divulge confidential information on public forums.

Monetary requirement: The primary goal of every job scam is to extract money from unsuspecting applicants. A legitimate company, however, will never demand deposits or advance payments as a condition of employment. Job seekers must keep an eye out for postings that request monetary commitments. To verify authenticity, candidates should visit the company in person if possible, or contact them through their official website to confirm that emails requesting deposits are not fraudulent.

To safeguard oneself from job scams, it's crucial to be mindful of the platforms used for job hunting, ensuring they are authentic and legitimate. Most importantly, circulating accurate information can collectively prevent these occurrences and create a safer job market.

The writer is the MD and Co-Founder of SRV Media Pvt Ltd.

Look beyond the

Parents and teachers must understand the reality of life in the Civil Services before pushing children into choosing this as a career

WIDE ANGLE
Albert P' Rayan

Recently, I met a young man who had been preparing for the UPSC Civil Services Exam for the past four years but had not succeeded. Curious about his motivation, I asked why he aspired to become a civil servant. His answer: it was not his personal interest but rather his parents' dream for him. After completing BE in Computer Science and Engineering, he had enrolled in a coaching academy and had spent around Rs. 5 lakhs but hadn't cleared even the Preliminary Examination. While his parents believed in his potential, he was wondering whether it was worth spending another year to prepare and try again or if he should give up.

The UPSC conducts the Civil Services Exam annually to select candidates for the Indian Administrative Service (IAS), Indian Police Service (IPS), Indian Foreign Service (IFS), Indian Revenue Service (IRS), among others. The exam comprises three stages: Prelims, Mains, and Interview, with an overall success rate of 0.2%. In 2023, 1.3 million appeared for the Preliminary Exam but only 14,624 candidates progressed to the Mains.

Perpetuating a myth

In recent times, there have been movies glorifying the IAS and IPS services, perpetuating the myth that a career in the civil services symbolises prestige and respect, that those who crack the exams are the brightest individuals in the country, and that these exams are exclusive to those with a high IQ or suitable for those with specific academic backgrounds such as Medicine and Engineering. They also propagate the idea that only those who attend coaching in so-called "reputed" academies can succeed.

The Hindi film, *12th Fail*, directed by Vidhu Vinod Chopra and adapted from Anurag Pathak's book recounting the real-life journey of an individual who triumphed over extreme poverty to become an IPS, received acclaim for its powerful messages: an individual's success in achieving the rank of an IAS or IPS officer signifies success for the entire community, and a determined individual should possess a never-give-up attitude. However, the film falsely glorifies the Indian Police Service and perpetuates the myth that attending coaching is a prerequisite to crack the exams.

There is nothing wrong with parents dreaming about their children becoming IAS or IPS officers, as civil service jobs are considered to be prestigious. However, they should be aware of the ground reality and understand their children's genuine interests and aptitudes. The level of respect that "civil servants" receive from those in power and whether they genuinely enjoy their roles as district collectors, secretaries to ministers, or commissioners of police need careful analysis. There is a growing trend of parents misguiding their children without being informed about the reality, urging them to pursue careers for which they have no interest.

Some aspirants may be highly motivated and have a clear goal. For example, a few months ago, Divya Mittal, a 2013 batch IAS officer of the UP cadre, tweeted, "I am an IAS officer. But my journey has many ups and downs. Have left well-settled paths to struggle From IIT went to IIM. Left a well-paying London job to return Was training as an IPS and doing well. Then started afresh as an IAS..."

Critically examining the tweet, a person commented: "... But why IITians opt for civil services. Aren't they supposed to bring technological prowess for the country. Hell lit of (a hell a lot of) money is spent by Govt to make 1 IITian." Thought-provoking questions, indeed! It is possible that Mittal herself was made to believe that becoming an IAS officer was her best option.

Some teachers also mislead their students by stating that civil service jobs are the best for academically successful students because all civil servants possess a high IQ. All fields (teaching, research, media, marketing, and so on) also require people with a high IQ and other quotients such as Emotional Quotient (EQ), Social Quotient (SQ), and Adversity Quotient (AQ).

Many "educated" people seem to believe that IAS and IPS officers and other "civil servants" are individuals with high integrity and dedication and serve as good role models for the youth. However, this is a misconception. Rarely do honest IAS and IPS officers achieve success in their mission of being honest. It is said that, in the civil services, merit and integrity do not matter, and only those officers who can compromise and are ready to be compliant are appointed to high offices.

Educators, parents, and others interested in the development of the nation should motivate students and young people by instilling hope in them that they can serve the nation by choosing any profession they are interested in, not necessarily by becoming civil servants. Everything that glitters is not gold.

Views expressed are personal

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Search among the stars

A spectrum of educational and career opportunities await students of Space Science and Astronomy

Sachin Bahmba

With the success of Chandrayaan-3, the nation's eyes have turned towards Space Science and Astronomy, which cover many topics, from observing celestial objects to sending rockets searching for another 'Earth.' The major fields of astronomy include Astrophysics, Astrometry, Astrogeology, and Astrobiology.

Each field deals with a varied range of interests, ranging from cosmology, the study of birth and end of the universe to Helioseismology, the study of the interior structure of stars. Astrophysics includes learning about Cosmology, Spectroscopy, Photometry, Heliophysics, Helioseismology, and Asteroseismology, while Astrometry studies the precise motion of all celestial objects like planets, stars, and so on.

With an understanding of the composition of the planet and the features of planets, one can define if the planet is habitable. The Astrogeology branch deals with this. It is closely related to exogeology, which focuses on how geology relates to celestial bodies like planets, moons, asteroids, meteorites, and comets. Once the geology is understood, the crucial part of making it a habitable planet comes into play. The study of the search for life outside our Earth is called Astrobiology. Thus, a spectrum of educational degrees awaits those interested in these fields.


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Certifications and Diplomas: Short-term programmes providing foundational knowledge in Astronomy are ideal for enthusiasts who have just developed an interest.

Undergraduate courses: A B.Sc. in Astronomy offers a comprehensive grounding in the subject, which covers celestial mechanics, astrophysics, and observational techniques. Hands-on experience with telescopes and data analysis feature prominently.

Postgraduate courses: An M.Sc. Astrophysics or specialisation in Astrophysics delves into into specialised areas and advanced research. Astounding phenomena, planetary exploration, and cosmological inquiries await the eager scholar.

Doctoral courses: A Ph.D. in Astronomy is a testament to original research and intellectual prowess and forging new pathways in scientific inquiry.

For an M.Sc. Astronpomy or Astrophysics, students can look at institutes such as Pondicherry University; Punjabi University, Patiala; Osmania University; Aligarh Muslim University (AMU), Indian Institute of Science, Madurai Kamaraj University; Mahatma Gandhi University, Kottayam; Pandit RaviShankar Shukla University, Roorkee, and Swami Ramanand Teerth University, Nanded. Apart from the above, numerous research institutes offer postgraduate and doctoral programs such as the Harish Chandra Research Institute; Indian Institute of Astrophysics (IIA), Bengaluru; Institute of Physics (IOP), Bhubaneswar; Institute for Plasma Research (IPR), Gandhinagar; Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune; Inter-University Consortium for DAE Facilities (IUC-DAEF), Indore; Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Bengaluru; National Centre for Biological Sciences (NCBS), Bengaluru; Tata Institute of Fundamental Research, Bengaluru; Tata Institute of Fundamental Research, Pune; National Centre for Radio Astrophysics (NCRA), Pune; Physical Research Laboratory (PRL), Ahmedabad; Raman Research Institute (RRI), Bengaluru; S.. Bose Centre for Basic Natural Sciences (SNBNCBS), Kolkata; and The Institute of Mathematical Sciences (IMSc.), Chennai.

Career options in the field have a wide range. Some possibilities include

Researcher/Academician: This involves conceiving experiments, scrutinising data, and sharing their revelations in esteemed journals. Academic journals play a pivotal role in the research process of the next generation.

Observatory Technician: He/she is involved in experiments conducted in the observatories. Behind every celestial discovery lies the precision work of observatory technicians who manage telescopes and associated equipment, ensuring precise observations and contributing to the quest for knowledge.

Astrophotographer: Astrophotographers capture stunning celestial images, merging artistry with science. Their work adorns scientific publications and inspires the public's imagination, fostering a deeper appreciation for the cosmos.

Space Educators: Educators craft and deliver educational programmes that ignite curiosity in the minds of both young and old.

Space Industry Consultant: With the rise of private enterprises, there is a huge demand for experts in celestial mechanics, orbital dynamics, and space technology. Consultants play a pivotal role in propelling the space industry forward. Opportunities have opened up both in the private sector as well as in the government, where organisations like the Indian Space Research Organisation (ISRO) and Defense Research and Development Organisation (DRDO) have employment avenues for scientists, engineers, and software analysts.

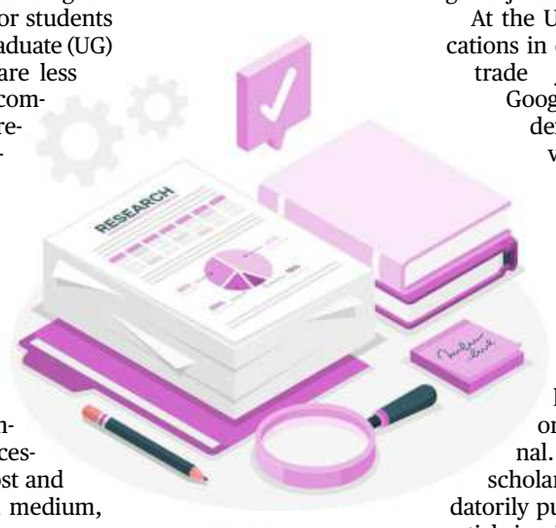
The writer is CMD, Space Group of Companies

Positive impact

A look at the different kinds of journals and publications that publish research work and what to look for

N. Gokarneshan

Achieving academic excellence has become crucial in a competitive environment and publishing in reputed journals is an integral part of research and academic excellence. However, this involves many aspects. Publications can be categorised broadly as commercial or trade journals and peer-reviewed, scientific, refereed journals. The former are good for beginners or students at the undergraduate (UG) level as they are less significant compared to peer-reviewed journals, which play a vital role in research. Peer-reviewed journals are classified into grades, quartiles, impact factor, accessibility, and cost and graded as top, medium, and low grade.



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Factors at play

In the first category are those that have Scientific Citation Index, Web of Science. Publication of papers in the Scientific Citation Index journals fetch the highest credit. Those listed in the University Grants Commission (UGC) and UGC CARE are considered medium-grade journals, while those under Google Scholar Indexing and also non-indexed journals are deemed low-grade journals.

At the UG level, publications in commercial or trade journals and Google Scholar Indexed peer-reviewed journals are adequate. A postgraduate student should publish at least one article as review article in a UGC-listed journal or SCOPUS journal. A research scholar should mandatorily publish a review article in a Web of Science or preferably in a Scientific Citation Index journal. Collaborating with internationally reputed researchers will enhance chances of article being accepted in top-grade journals and also earn more citations.

Peer-reviewed journals are classified under quartile range as Q1, Q2, Q3 and Q4, with the first being the highest grade of publication. Since these have a high visibility, it is considered very prestigious to have one's research published in them, giving the researcher a high credit and many citations. A research scholar should publish at least papers in Q4 as the bare minimum requirement.

Apart from this, journals are also classified as high and low impact. Despite being peer-reviewed, a journal may be classified as no impact and fetch low credit. A journal that has an impact factor above five is considered high impact and offers a researcher high visibility.

The next aspect is accessibility. Open access journals get better visibility but may charge a publication fee depending on the grade or level. Today, many top-grade journals have made their content open access. Many journals require payment to process the article. While some have nominal charges, other require quite heavy fees.

A critical parameter to evaluate a researcher's eminence is the H index, which is based on the number of citations from a published article. Getting more citations from more published articles increases a researcher's H index value. A value above 20 implies a good researcher.

Thus, the being published in journals indicate a researcher's analytical and scholastic ability and helps promote both the individual and the institution.

The writer is Professor and Head, Department of Textile Chemistry, SSM College of Engineering, Komarapalayam.