Enabling India to shine in the world of science

Any discussion on the state of science in India must begin with discussing how our children learn science in schools. Most of them are forced to learn by rote in schools and colleges. We have to help them become adept at analytical thinking and problem solving.

The urgent need is to train them to translate what they learn into the language of the natural and physical phenomena of science in the real world, and thinking of solving problems in the society around them. Independent thinking and a healthy scepticism of widely-accepted theories should be placed above students’ mastery of school notes.

Let me cite just two books that can enhance thinking power and problem-solving capability of our high school children. “Thinking Physics: Understandable Practical Reality” by Lewis Carroll Epstein is known to help appreciate the role of physics in understanding daily-life phenomena, and, therefore, their curiosity and critical thinking.

For high school economics, I would recommend “The Economic Naturalist: Why Economics Explains Almost Everything” by Robert Frank, who will help students think critically about fundamental concepts of economics. We would have succeeded in helping the next generation to think critically and to analyse deeply if our children start using such books.

The key is to shift focus. There is an urgent need to shift our focus from passing examinations to understanding the concepts in physics. In my conversations with several students of computer science at Infosys, I am sad that most of them had forgotten even the fundamental concepts of programming within three months of their examination.

We should also create platforms for competition in science and mathematical thinking in every small town in the country so that children are encouraged to think critically. The best among them should be sent to State, regional, and national level competitions. The winners at the national level should be sent to international competitions so that they can compete with the best in the world. We should also submit our school system to global comparisons and benchmarks to measure where we stand. I was told by a very enlightened bureaucrat that we used to do it in the past but stopped it when we found we were consistently rated low.

For science, we need to reform our school-level teaching. The universities that have created the most impact in the world have excelled both in research and in teaching. Therefore, our higher educational institutions must focus not just on teaching but on research as well. Currently, our research output – measured by papers published in internationally-acclaimed conferences and peer-reviewed journals, and patent filings – lags behind China, the U.S., and several developed countries.

The best way to improve our performance in this area is to work on developing a research-oriented mindset among undergraduate students by focusing on independent and critical thinking.

The ways

For instance, expecting students to read the material to be discussed in a class, devoting a part of the class time to just teaching critical issues in the material that the students have studied at home, and allotting most of the class time to questions and answers can be the first steps in improving curiosity and analytical thinking.

A classical example of such a method would be the well-known course on Justice by Prof. Michael Sandel at Harvard University. This is a very popular undergraduate course in philosophy and is held at the Sanders Theatre in Cambridge, Massachusetts, to accommodate around 1,500 students who take this class every year. The course video is available free for downloading at iTunes University.

This may be a good idea to encourage our undergraduates to spend a semester doing independent research on a topic chosen by them in consultation with their teachers. The outcome of research is less important compared with a change in students’ mindset. At the least, this scheme will help our younger gain confidence in independent and critical thinking. Thanks to such a scheme, I have seen several bright students excel in research at Cornell, Stanford and Tokyo Universities. In fact, professors at many well-known universities in the U.S., have told me about the effectiveness of this scheme in attracting young minds to research careers.

Such a focus on analytical thinking and problem solving is extremely important in a country like India that is riddled with anti-economic and developmental challenges. These challenges to our inclusive growth actually represent a significant opportunity and act as a source of inspiration for young researchers.

The need

In a country where 350 million-plus people lack access to decent primary education, health care, shelter, safe drinking water and basic sanitation, a research-and-problem-solving orientation among the young will play a seminal role in improving the overall quality of life for the poorest of the poor. We have to encourage such efforts with awards and recognition.

This is where the Infosys Prizes from Infosys will hopefully, play a role in saluting the efforts of our young researchers.

The only way we can ignite the minds of our children and youngsters is by making them proud of the impact of our educational institutions on our society. The world will recognize our institutions and salutes them if these institutions help transform the lives of every Indian like many of the universities in the developed countries have done. We would have arrived when we have 10 Indian high schools among the global 50, and 10 Indian universities among the global 50. This will happen when our universities and institutes compare favourably with universities like MIT, Harvard, Oxford, Ecole Polytechnique, Cornell, and Cambridge in their research output, citation index and patents.

I am optimistic and confident we can achieve this. We can do it as long as we complement our desire to get there with a single-minded focus on speed and execution. We have an abundance of scientific talent. That has never been in doubt. It is now up to us to unleash the full potential of our young minds.

N.R. Narayana Murthy

Trustee - Infosys Science Foundation, and Chairman Emeritus, Infosys Limited, Bangalore.
A testament to the Capital’s transformation

PREMIER INSTITUTIONS From hospitals to museums to educational institutions to a zoo – New Delhi witnessed the emergence of several landmark institutions in the first two decades after Independence. These soon became icons of national importance.

DELHI PUBLIC LIBRARY
The story of the Delhi Public Library is one of the biggest achievements of India’s educational and cultural heritage. The library was founded in 1862 by Sir Joseph Dalton Hooker, the then Governor-General of India. The library’s original collections included books in English and Hindi. Today, it is one of the oldest libraries in the world and serves as a focal point for literature lovers across the city. It also has a rich collection of rare books, making it a library for every reader and connoisseur.

THE 100 WONDERS
As New Delhi celebrates its 100 years, HT has identified 100 iconic buildings and institutions that have been pivotal in shaping the Capital. In this series, we’ll feature 10 icons that Delhi came to be identified with. Today, we present seven of them.

INDIAN INSTITUTE OF MEDICAL SCIENCES
Established in 1956, the Indian Institute of Medical Sciences (IIHS) is India’s premier institute for medical research and training. It is known for its contributions to various medical fields, including cardiology, neurology, and oncology. The institute is also known for its research on diabetes, a disease that affects millions of people worldwide.

NATIONAL MUSEUM
The National Museum, established in 1912, is one of the largest museums in India. It houses a vast collection of artifacts that showcase the rich cultural heritage of India. The museum has dedicated galleries for various periods and regions, including the Mughal, Rajput, and Buddhist art. It is also home to the famous Nalanda archaeological section, which highlights the contributions of the ancient Nalanda University.

SIR GANESHA RAM HOSPITAL
The Sir Ganesha Ram Hospital, established in 1925, is one of the oldest hospitals in India. It is known for its state-of-the-art medical facilities and is a popular destination for patients seeking specialized care. The hospital has several branches across the city, making it accessible to a wide range of patients.

INDIA INTERNATIONAL CENTRE (HIC) & VISHWA BHAWAN
The India International Centre (HIC) is a cultural and educational hub that promotes dialogue and understanding among people from different parts of the world. It houses the Indian High Commission and is also home to the Jawaharlal Nehru Centre for Advanced Science and Technology. Vishwa Bhawan, the tallest building in the city, is located adjacent to the HIC and is a popular landmark.

DELHI ZOO
The Delhi Zoo, established in 1903, is one of the oldest and largest zoos in India. It houses a diverse array of animals, including tigers, lions, elephants, and various species of birds. The zoo is a popular destination for families and offers educational programs to promote awareness about wildlife conservation.

INDIAN INSTITUTE OF TECHNOLOGY (IIT)
The Indian Institute of Technology (IIT), established in 1951, is one of the premier institutions in India for technological education and research. It has several campuses across the country, including those in Kharagpur, Kanpur, and Mumbai. The IITs are known for their contributions to technology and innovation, making them symbols of India’s scientific and technological progress.

SRI SRI RAMAKRISHNA MATH
The Sri Sri Ravi Shankar Ramakrishna Math, established in 1955, is a spiritual and educational organization that promotes the teachings of Swami Vivekananda. The math has branches across the country, including in Delhi, and is known for its cultural and spiritual activities.
IIP scientists invent petrol from plastic

DEHRA DUN, NOV 16

A team of scientists at the Indian Institute of Petroleum (IIP) has developed a new technology to convert environmentally-hazardous plastic into petroleum products.

After nearly a decade-long experiments, the team of six scientists of IIP led by its Director Madhukar Omkarnath Garg has managed to achieve a breakthrough in developing a "combination of catalysts" which can convert the plastic either into gasoline or diesel or aromatics along with LPG as a common byproduct.

"We believe it is a big achievement of our scientists to produce petroleum products from waste plastics," IIP spokesman S K Sharma said here today.

GAIL, which has sponsored the entire project, is also exploring the economic viability of the project in order to produce the petroleum products on mass-scale, scientists said.

"The unique features of the technology is that liquid fuel - gasoline and diesel - meets Euro III fuel specifications and different products can be obtained from the same raw material simply by changing the catalysts and operating parameters," Sanat Kumar, a member of the research team, said.

Moreover, the process is completely environmentally friendly as no toxic substances are emitted, he said, adding that almost 100 per cent conversion is achieved and formation of the residue is dependent upon the quality of the raw material and can be as low as less than 0.5 per cent in case of clean raw material.

"The process is suitable for small as well as large scale industries," said Shrikant Nanoti, another scientist involved in the project.

The exploration of feasibility of the project 'Waste Plastics to Fuels and Petrochemicals' was started in 2002 and it took almost four years to establish that the conversion of waste plastics, the safe disposal of which has become a world-wide problem, into fuel is possible.
IIM Chiefs Stress on Sustainability Studies

Challenge is to create a far more diverse academic learning ambience

OUR BUREAU
KOLKATA.

To address the issue of sustainability as it relates to management education, the big challenge is to create a far more diverse academic learning ambience than what is present in B-schools at present, said IIM Bangalore Director Pankaj Chandra in Kolkata on Tuesday.

He was speaking at a directors' conclave in IIM Calcutta on management education for a sustainable tomorrow which had educational heads across B-schools and technical institutes discussing their views on the subject.

While IIFT Director KT Chacko spoke of the institute organising sustainable technology venture competitions and students' four-week attachments with NGOs, IIM Ranchi Director MK Xavier said that excessive stress on certain types of education had led to a lopsided approach in that the people with excessive analytical skills were being produced.

"We want to give them an interest in liberal arts. We will be successful in what I call harmonious coexistence when we can celebrate our uniqueness," said Dr Xavier.

Prof IM Pandey of Delhi University spoke of the urgent need for IIMs to think and do something to include sustainability in the curriculum. IIM Trichy Director Prafulla Agnihotri agreed, saying that he equates sustainability with survival.

IIM Rohtak Director P Ramaseshan said: "Unless we change our attitude, the concept of sustainability cannot be sustained. It is our responsibility to preserve the earth's resources for the next generation."

On the same subject, IIM Raipur Director BS Sahay also spoke of how this year during admissions, six new IIMs had decided to have diversity as a factor. "The sustainability issue assumes greater importance," said IIM Calcutta Director Shekhar Chaudhuri, "when students need to get all round development at a time when enrolments have been dropping in management schools across the world."

Earlier in day, Nokia India Managing Director D Shivakumar exhorted B-Schools to introduce the concept of continuous management education, saying it was critical for professional managers to reorient themselves with the latest concepts and trends to effectively manage global organisations.

"Management education is a continuous process. It needs to be revisited regularly. It is for the top B-Schools to decide when an MBA graduate who passed out in, say 2011, needs to return to campus to reorient himself with the latest concepts and trends," said Shivakumar. He added that B-schools ought to also serve as growth engines for entrepreneurship. There should be more incubation centres and seed capital facilitation mechanisms for promoting entrepreneurship," he said while delivering the keynote on the second day of the IIMC's Golden Jubilee proceedings on Tuesday.

The Nokia India CEO also pointed out that income disparity levels between the rich and poor were on the rise in markets like the US where the average CEO salary was a whopping 113 times more than the average salary of a US factory worker.

What's more, he said, youth unemployment levels were on the rise in major markets and posed a huge challenge.

"Youth unemployment levels in South Africa, Spain, the UK, Ireland and Italy are as high as 50.5%, 41.7%, 19.6%, 27.9% and 27.8% respectively. The India numbers are not reliable but my sense is it is about 10%. Managing youth unemployment will be one of the biggest challenges for the world's top economies," said the Nokia India MD.
‘Agni Putri’ Thomas blasts through glass ceiling

Rajat Pandit TNN

New Delhi: Tessy Thomas can take a bow as ‘Agni Putri’, or the daughter of fire, proving as she has her mettle as the project director of the 3,500-km new-generation Agni-IV missile that was successfully test-fired on Tuesday.

Having systematically broken gender barriers in the decided male preserve of strategic weapons and nuclear-capable ballistic missiles over the last two decades, does she still feel out of place? “No, not at all. Science has no gender. I have five-six women working in my team,” the 42-year-old beaming DRDO scientist told TOI.

There are around 20 other women scientists working on the Agni programme, but Hyderabad-based Thomas was the first to become the project director of an Agni system in 2008. She was a little down and out last December, when Agni-IV’s earlier avatar Agni-II-Prime plunged into the Bay of Bengal barely 30 seconds into its parabolic trajectory. “It was a failure but not a complete failure. We were perplexed

but we got lot of support and encouragement...it motivated us to work harder,” she said on Wednesday.

The team led by Thomas, at Wheelers’ Island off the Odisha coast, prepared, fired and tracked the nuclear-capable missile as it attained a height of 900-km and then splashed down near the pre-designated target in the Bay of Bengal over 3,000-km away. “Next, we have to do Agni-V,” she said.

“Dr APJ Kalam was my original guru. He was my director. I have been with the Agni programme since 1988...I have designed the guidance programmes for all the Agni missiles,” she said. From the original ‘missle man’ to the new ‘missile woman’, things have indeed come full circle.
Deter the Dragon: India to enter elite ICBM club in 3 months

5,000km Agni-V To Be Tested By February

Rajat Pandit | TNN

New Delhi: The countdown has begun. Within three months, India will gatecrash the super-exclusive ICBM (inter-continental ballistic missile) club, largely the preserve of countries like the US, Russia and China, that brandish long-range strategic missiles with strike ranges beyond 5,000km.

Rise in indigenous content, P 14

But it will become a full-fledged member of the club only when its most ambitious nuclear-capable Agni-V ballistic missile, which will be able of targeting even northern China if required, becomes fully-operational in 2014.

All gung-ho a day after the successful test of the new-generation 3500km Agni-V missile, senior defence scientists on Wednesday declared that Agni-V, with a strike range of over 5,000km, would be test-fired within the December-February time frame.

“The three-stage Agni-V is undergoing integration at the moment... it’s on schedule,” said DRDO chief V K Saraswat, adding that both the Agni-IV and Agni-V were comparable to the best missiles in their class, including Chinese.

Agni programme director Avinash Chander added his team was ‘‘confident” of offering the 17.5 metre tall Agni-V for induction to the armed forces by 2014. The much lighter two-stage Agni-IV will be operational by 2015 after two to four more “repeatability”tests.

“Our aim is to take just two to three years from the first test to the induction phase,” he said.

An ‘Agni Putri’ was behind this missile

Tassy Thomas can now take a bow as the ‘Agni Putri’, having pulled off the Agni-IV missile as project director. “Science has no gender. I have five-six women working in my team,” says the 48 year-old scientist, whose fascination with rockets began as a schoolgirl in Alappuzha, Kerala. And her work is far from done.

“Next, we have to do Agni-V,” she said.
Don’t put cart before horse

The National Innovation Council’s proposal — endorsed by the Union HRD ministry — to setup the world’s first meta university is a case of misplaced policy priorities. The concept of a meta university — where, say, an IIT-Delhi student could obtain a literature degree from Jadavpur University — appears cutting edge for its time to give students flexibility and choice. But there will always be the risk of online courses not providing the same quality and quantity as actual classes. Moreover, since many problems plague our higher education system, let’s not postpone the cart before the horse. Fancy measures encouraging cross-discipline studies can only be contemplated if the basics are in place first.

There’s a massive dearth of quality universities in India. This was highlighted at the beginning of the current academic season by the scandalously high admission cut-offs to various programmes in Delhi University — which in one case touched 100%. Students turned away by colleges here have gone on to secure admission and scholarships to top foreign universities. There is an urgent need to stem the demand-supply mismatch and reverse brain drain. On the quality front, it’s telling that not a single Indian varsity features in the 2011 ranking of the world’s top 200 universities. Lack of autonomy is a key reason why our universities fare poorly on research and innovation. It’s hard to see how a meta university can remedy these ills.

Colleges here are separate silos within a single university. Integrating them would automatically encourage interdepartmental studies, as in the American system. Moreover, restriction on profit-making is the main reason investments in education are found wanting. Private commercial universities can use long in locating vocational education and entering the market. These and other structural issues need to be addressed first. Meta universities can wait.

It’ll foster innovative thinking

A common criticism levelled against our authorities is that they resist change and lack innovative thinking. In this context, the government’s proposed meta university is the first of its kind in the world. Shouldn’t it dissemble the notion that our policy makers can’t think outside the box?

Kamal Nath

Yet, there will be doubters who will question the rationale of the proposal. It’s an interesting idea that’s bound to fail in the absence of a coherent implementation strategy. And, rather than seeing the point of pursuing inter university collaboration, many would want universities to first encourage an interdisciplinarity approach internally. But surely we needn’t have an either/or approach to the issue. Why can’t we do both?

If anything, the idea of a meta university is in tune with 21st century knowledge requirements. We could in fact make the best use of technologies available, including the internet, by integrating them with university education. Under the current system, students in one university can’t take up courses offered in another, unless there are formal exchange programmes between the two. So, allowing them to pursue studies in different places of learning will broaden their choice, range of subjects and access to faculty. In this sense, a meta university helps break physical barriers and overcome accessibility issues when it comes to quality education.

In fact, a meta university will solve many problems that higher education faces: describe good institutions, faculty and infrastructure. Flexibility to design study programmes can better serve the varied interests within a single course. That will create ‘new minds’ conducive to the growth of innovation.

Kamal Nath
Placements at IIMs defy slowdown, attract new sectors

Kirtika Sunega

New Delhi, Nov 18: Though the economy is showing signs of slowdown and corporate bottom lines are shrinking, summer placements at the country’s premier management institutes are going briskly In fact, the Indian Institutes of Management (IIMs) have not only received a greater number of first-time recruiters for summer placements this year but also from sectors that were not very popular before.

For instance, at IIM Ahmedabad, the first batch of summer placements comprised three groups — international investment banks, global strategy consulting, and private equity, venture capital and investment management. More than 20 companies conducted interviews in the first batch, which included regular recruiters like BCG, McKinsey & Co, Bain & Company, Goldman Sachs, Deutsche Bank, Royal Bank of Scotland and Morgan Stanley. First-time recruiters included a Japanese major, Daiwa Securities, BCG, Royal Bank of Scotland and Accenture made offers in double digits.

Summer placements are different from job placements. During such placements students go through the mandatory summer training. Good summer placements are an indicator of final job placements.

Similarly at IIM Calcutta, the first day of summer placements saw a total of 90 offers being handed out by investment banks and consulting and private equity houses.

Continued on Page 2
IIM CALCUTTA HAS ITS WAY
Institute faculty tweaks Balakrishnan committee recommendation to have its own three-year work plan in place

SWAYAM GANGA
Mumbai

Faculty members at the Indian Institute of Management Calcutta (IIM-C) will now have to submit a three-year plan dividing their time between research, consultancy, teaching and administrative work.

Over six months on and some protests later — to the A jul Balakrishnan Committee’s controversial recommendation of making 160 hours of classroom teaching mandatory for faculty at IIMs — faculty members at IIM-C have arrived at this solution.

“We understand that not every faculty member will be interested in all four areas. Therefore it makes sense that they devote their time correctly in an iron clad manner and submit a three-year target plan, at the end of which they will be evaluated on target achievement,” says Ajit Balakrishnan, chairman of the IIM-C board of governors.

In April, the IIM-C faculty members in protest of the Balakrishnan committee’s recommendations, put up a paper on the institute website, raising point by point the attempt of Ministry of Human Resource Development (MHRD) to implement steps to moderate faculty evaluation procedures. An IIM-C faculty member says the present system was acceptable because it allowed the faculty some manoeuvring room in their areas of interest. This would ensure that even in the event of excess consultancy work, classroom teaching would not be compromised.

According to the Balakrishnan committee, faculty members are required to put in about 160 hours of teaching annually against about 90 hours at present, which is the case with most IIMs. This recommendation was made to bring in a healthy development where more teaching and research happens. This, however, would have impacted the revenue of the IIMs.

Today, the bulk of the money that the IIMs generate is through the management development programmes (MDPs) or executive education programmes. If they did not have these, they would still be running at a loss or just marginally breaking even.

Every IIM has a scheme that the money earned via MDPs is shared between the faculty member who carries it out and the institution. Of the 160 odd hours at the IIMs, only 50 per cent are to be done MDPs. Some of them are able to earn as much as 140 lakh each year. Thus there is a strong interest in carrying out MDPs. More teaching and more research would mean less MDPs and in turn less income for not only the professors but also for the IIMs.

Thus the K C Bhargava committee suggested the creation of a corpus at the IIMs, where the corpus income can be used both for making IIMs financially viable and giving extra income to professors who do good work on research or conducting MDPs.

FACULTY MEMBERS ARE REQUIRED TO PUT IN 160 HOURS OF TEACHING ANNUALLY AGAINST 90 HOURS AT PRESENT, WHICH IS THE CASE WITH MOST IIMs.

ACCORDING TO THE BALAKRISHNAN COMMITTEE, FACULTY MEMBERS ARE REQUIRED TO PUT IN 160 HOURS OF TEACHING ANNUALLY AGAINST 90 HOURS AT PRESENT, WHICH IS THE CASE WITH MOST IIMs.

The bill will have provisions for a grievance redressal mechanism

The bill will have provisions for a grievance redressal mechanism

AGE CORRESPONDENT
NEW DELHI, NOV. 15

Providing with a fine of `1 crore for demanding capital fee, the government on Wednesday approved amendments to a proposed bill which is aimed at curbing unfair practices in higher technical education institutes. The approved bill also provides for a grievance redressal mechanism for students and other stakeholders.

The Union Cabinet at its meeting here, which was chaired by Prime Minister Manmohan Singh, approved the amendments in the “Prohibition of Unfair Practices in Technical Educational Institutions, Medical Educational Institutions and Universities Bill, 2010.”

The bill, which was introduced in the Lok Sabha in March last year, was referred to the parliament standing committee on HRD. The parliamentary panel had submitted its recommen-

Asian Age ND 17-Nov-11
p-3

The bill will have provisions for a grievance redressal mechanism

EDUCATION BILL REVAMP

The bill will have provisions for a grievance redressal mechanism

EDUCATION BILL REVAMP

The bill will have provisions for a grievance redressal mechanism

Recommendations of the committee were accepted, while seven were rejected. Among the recommendations accepted by the government included raising the penal provisions for charging capital fee from `50 lakh to `1 crore, they informed.

The bill will also have provisions for a grievance redressal mechanism and will also have scope for inclusion of any new type of unfair practice other than the specified ones after the passage of the bill.

Grievance redressal system for students
₹1 Cr Fine for Demanding Capitation Fee for Admission

OUR POLITICAL BUREAU
NEW DELHI

In an effort to curb unfair practices in the higher education segment, the government has doubled the penalty that institutions will have to pay for demanding a capitation fee. The penalty has been raised to ₹1 crore.

The Cabinet approved the amended Prohibition of Unfair Practices in Technical Educational Institutions, Medical Educational Institutions and Universities Bill, 2010, now renamed as Higher Educational Institutions Act, 2011, at its meeting on Wednesday:

The proposed legislation aims to provide an institutional mechanism for preventing, prohibiting and punishing unfair practices in technical and medical educational institutions and universities. It will bring all higher educational institutions except agriculture education and research, which is a state subject, under its purview.

The Cabinet approved the Higher Educational Institutions Act, 2011, at its meeting on Wednesday.

The Bill was introduced in the Lok Sabha in March last year and was referred to the Parliament Standing Committee on Human Resource Development.

The committee submitted its recommendations in May this year. Of the 48 amendments suggested by the Parliamentary Standing Committee, the government accepted 41 of the suggested changes.

A new clause, which prohibits unqualified teachers from being engaged, has been introduced.

Failure to meet any promise made in the prospectus would also be an offence. The accepted amendments, include increasing the penal provisions for charging capitation fee from ₹50 lakh to ₹1 crore.

The Bill will have provisions for a grievance redressal mechanism. It also provides for the inclusion of any new type of unfair practice other than those specified in the Bill.
NASA grows audience through tweetups

Rocket science isn't easily explainable in 140 characters, but NASA is asking a group of people to do just that with a series of VIP tours for some of its ardent Twitter followers.

The events called tweetups offer ordinary science fans a behind-the-scenes look at the space agency's facilities that can include its astronauts and scientists. In exchange, many participants whose day jobs range from church office worker to baker narrate their day through tweets, photographs and videos.

NASA's imagination-grabbing work gives it a bigger pool of fans to draw from than many companies or government agencies, and it sets itself apart further with its egalitarian approach to social media. While it's not unusual for an organization to give special access to journalists or influential bloggers, experts say NASA sets itself apart by inviting people who may only have a few dozen followers.

"It goes against the grain of only talking to people that have a lot of influence," said William Ward, a social media professor at Syracuse University.

Participants are chosen through a lottery. While some end up being self-described techies who blog regularly about space, it's important to NASA that it draws people with a wide range of interests who can tweet with authentic voices to a varied audience.

"I think everybody knows if you hear it from a friend or a family member, you see it as being much more credible than it being from a government organization like NASA," said Stephanie Schierholz, NASA's social media manager.

The sentiment was echoed by a participant in a tweetup held last week at Langley Research Center in Hampton.

"I know I have friends at home who are following every word here. And they're not normally space enthusiasts, but it's just something that, 'Hey, David's going down there. Let's see what he's up to.' And they're following my photos and my tweets and they get excited, too," said David Parmet, from Westchester County, New York.

NASA's first tweetup was in 2009, and it's held a total of 30. Some have coincided with news events like rocket launches, and one is planned in Florida the week of Thanksgiving for the Mars rover launch. The event can last from two hours to two days, ranging from a few dozen participants to more than 100. Participants pay their own travel expenses.

While it's not clear how many new Twitter followers NASA has gained from the tweetups, the number is expanding rapidly. Since June, nearly 600,000 people have started following the agency about 4,000 to 5,000 per day for a total of about 1.6 million.

NASA tweetup alumni closely monitor their reach and noted that when 150 participants were invited to Kennedy Space Center in Florida this August for the Juno spacecraft launch their tweets through the power of retweets had 39.9 million potential views.

"This is pretty small from a resource perspective, yet it has this huge impact," Schierholz said.

The tweetup has become a prime example of how NASA is harnessing social media to keep the agency in the public's imagination in an era where its most recognizable programme, the space shuttle, has come to an end.

"We know more about Kim Kardashian than we do important scientific events that are happening in our country," said Donna Hoffman, a marketing professor at the University of California at Riverside. "This is NASA's opportunity, I think, to educate a new demographic."

Schierholz said the public generally has a strong positive reaction to NASA, but is unfamiliar with a lot of its work.

That is particularly true at Langley. Among other things, the center's research has resulted in wing design that allows airplanes to use less fuel.

It's currently testing whether a craft designed to send astronauts into deep space can survive falling into the Pacific Ocean.

The work is important, but it rarely generates public excitement.

The problem

Illustrating the center's lack of fame, one participant at last week's tweetup from Maine was late because he thought the center was across the state in Langley, Virginia, the same place that's home to the CIA. It's a common mistake.

Even for those who live near one, opportunities to visit a NASA facility are limited.

"It's a good chance to actually see Langley. Just dropping in is one of those things you don't do much," said Langley tweetup participant Matthew Francis of Richmond.

This kind of thing is very cool.

Those who followed along with tweetup participants could watch Langley test the Orion space capsule what NASA plans to send astronauts to Mars in and also found out that the center is working on a new air traffic control system, among other things.

Those are exactly the kind of tweets the center's research director was hoping for. — AP
नोएडा। सीधे एआईईई द्वारा आयोजित की गई बीआई/अन्य उपलब्ध के साथ साथ एआईईई की अंतिम परीक्षा का छात्र देश को अंतिम परीक्षा के लिए पेपर की धारा इन्जिनियरिंग का छात्र देश की जाति परीक्षा होने की गई।

* नोएडा-दिल्ली के छात्र देश से जितने सिफर ऑनलाइन एवजाम
* बीआई/अन्य उपलब्ध का एवजाम होगा सिफर ऑफलाइन
* पहला पेपर 9 से 12 और दूसरा 2 से 5 बजे तक होगा।

* कई शहरों के छात्र होंगे प्रभावित एआईईई की परीक्षा में शामिल होने वाले पूर्ववर्ती व विद्यार्थी और मैट्रिक्स के छात्रों को भी अंतिम परीक्षा देने की जरूरत है।

* कंप्यूटर साइंस वालों को भी मौका ऑल इंडिया कॉलेजल पोर्ट