Newspaper Clips
October 7, 2010

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52% of 8-11-year-olds spend over 5 hrs online daily

Priya M Menon | TNN

Chennai: Five-plus. That's the number of hours a large number of children in India are spending on internet and experts say this could be a sign of addiction.

A recent Associated Chambers of Commerce and Industry of India (ASSOCHAM) survey concludes that Internet addiction is on the rise in metros, with Mumbai having the most number of children online for hours followed by Delhi, Bangalore and Chennai.

About 52% of children in the eight to 11 age group spent over five hours daily online, chatting and playing games. In the same age group, 30% spent between one to five hours a day on the net while 18% said they didn't surf daily.

The usage was higher among 12-15 year olds, 58% of who fell into the "excessive use" category. Only 10% of these children didn't surf daily; 32% spent up to five hours a day on Internet.

Among 16-18 year olds, only 4% didn't go online daily. While 56% spent more than five hours on Internet, 40% were online for less than five hours. Boys reported excessive Internet browsing than girls and all the older children used the net mostly for social networking, chatting and to help them with school work.

Children of working parents were found to be more addicted, due to lack of parental supervision.

"It's a problem that arises with urbanisation. With both parents working, children are left unsupervised for long periods and see Internet as a friend," said Bangalore's National Institute of Mental Health and Neuro Sciences neuropsychiatry department consultant Dr S V Srikanteswar.

The survey, which defined over five hours of daily internet usage as excessive, says this can cause social isolation, insomnia and obesity. It can also affect eyesight and mental health.

"The survey was done to ascertain the extent of internet overuse, especially by children aged eight to 18 as they are most vulnerable," said Dr Srikanteswar.

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US in a fight for future with India, China: Obama

Washington: Slamming Republicans for their two-point economic plan which would cut spending on education, President Barack Obama has said the US is in "a fight for future" with countries like India and China which are not slashing their budget in the key sector detrimental to shaping lives of millions of students.

"Think about it. China isn't slashing education (budget) by 20% right now. India is not slashing education by 20%. We are in a fight for the future — a fight that depends on education," Obama said at a White House summit on community colleges.

"Cutting aid for 8 million students, or scaling back our commitment to community colleges, that's like unilaterally disarming our troops right as they head to the frontlines," he said. Obama said he strongly disagrees with the economic plan that was released last week by the Republican leaders in Congress, which would actually cut education spendings by 20% as well as affect the healthcare sector budget.

Republicans' two-point plan is aimed at creating jobs which would freeze tax rates at current rates and cut spending. "It would reduce or eliminate financial aid for 8 million college students. And it would leave community colleges without the resources they need to meet the goals we've talked about today," Obama argued.

STRESS ON EDUCATION

"Instead, this money would help pay for a $700 billion tax cut that only 2% of the wealthiest Americans would ever see — an average of $100,000 for every millionaire and billionaire in the country. And that just doesn't make sense — not for students, not for our economy," he observed. "We can't accept less investment in our young people if our country is going to move forward. It would mean giving up on the promise of so many people who might not be able to pursue an education," Obama said. PTI

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Atom-binding tool helps trio win Nobel prize for chemistry

Stockholm: An American and two Japanese scientists won the 2010 Nobel Prize in chemistry on Wednesday for developing chemical methods widely used to make potential cancer drugs and other medicines, as well as slimmed-down computer screens.

Richard Heck, Ei-ichi Negishi and Akira Suzuki were honored for their development four decades ago of one of the most sophisticated tools available to chemists, called palladium-catalyzed cross couplings.

It lets chemists join carbon atoms together, a key step in the process of building complex molecules.

Their methods are now used worldwide in commercial production of pharmaceuticals and molecules used to make electronics, the Royal Swedish Academy of Sciences said.

Heck, 79, is a professor emeritus at the University of Delaware, now living in the Philippines. Negishi, 75, is a chemistry professor at Purdue University in West Lafayette and 80-year-old Suzuki is a retired professor from Hokkaido University in Sapporo, Japan.

WINNING FORMULA: Suzuki, Negishi and Heck's technique is used in pharma and electronic industries

Negishi told reporters in Stockholm by telephone from Indiana that he was excited to be awakened by a call early on Wednesday from the Nobel committee, saying he started dreaming about winning the prize half a century ago.

"The Nobel became a realistic dream of mine when I was in my 20s," he said, adding he would use his third of the $1.5 million award to continue doing research.

"I may have accomplished maybe half of my goals and I definitely would like to work for at least a couple of more years," Negishi said.

Heck said from his home in the Philippines that the importance of his work wasn't clear initially.

"It sort of grew as we worked on it," he said. "As I worked on it longer it appeared it was pretty important and it has developed well since then."

In a televised news conference from Hokkaido University, Suzuki said he was honored by the prize and hoped that it would inspire Japanese youngsters to explore chemistry.

"To my disappointment, not many young people seem to be interested in science, especially chemistry," said Suzuki. AP

Times Of India ND 07/10/2010 P-21

Noise in office can be deadly for your heart

London: Constant noise at workplace can significantly increase your risk of serious heart problems and also make you weigh and smoke more, says a new study published in the British Medical Journal.

Researchers have found that working in a consistently noisy environment more than doubles the risk of serious heart problems — in the under-50s, the risk increases to fourfold, and young male smokers are particularly affected by noise.

For the study, the researchers studied more than 6,000 employees over a five-year period, dividing them into those who endured persistent loud noise at work for at least three months and those who did not.

They found that those in noisy environments tended to weigh and smoke more than those who worked in quiet offices.

Among workers under 50 the link with noise was particularly strong. They were between three and four times as likely to have angina or coronary artery disease or to have had a heart attack.

"Loud noise day after day may be as strong an external stressor as sudden strong emotion or physical exertion, the effect of which is to prompt various chemical messengers to constrict blood flow through the coronary arteries.

NEED FOR PEACE: Working in a noisy environment more than doubles the risk of serious heart problems and in under-50s, the risk increases four-fold

"This study suggests that excess noise exposure in the workplace is an important occupational health issue," British newspaper the Daily Mail quoted the researchers as saying.

June Davison of the British Heart Foundation said, "Some people find sustained noise very taxing and stressful and that could explain this link between noisy workplaces and an increased risk of heart disease. "For people who already have heart disease, occasionally stress can trigger chest pains or even a heart attack." PTI

Times Of India ND 07/10/2010 P-21

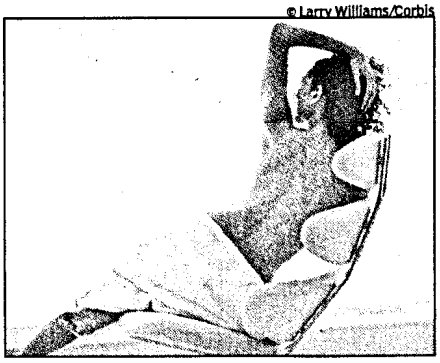
Slouching? Smart chair to give warning

Berlin: Getting back pain from sitting still for too long or in a bad position could be a thing of the past thanks to a chair developed by a German scientist which makes noises to tell users when they need to move.

Risto Koiva invented the "Intelli Chair" after researching "sonification" — the use of noise to convey information — with his colleagues at Bielefeld University in northwestern Germany.

"Four touch-sensitive sensors in the seat of the chair and another four in the back of the chair detect how the user is sitting," Koiva said in a statement.

"The data they collect is sent to a computer via a bluetooth module."



POSTURE PERFECT

If the chair detects that its occupant is sitting in the wrong position or has remained seated for too long, it makes a noise to tell the user it is time to change position.

Physicist and computer scientist Thomas Hermann said the Intelli Chair was mainly intended for use in a home office, but could be useful elsewhere.

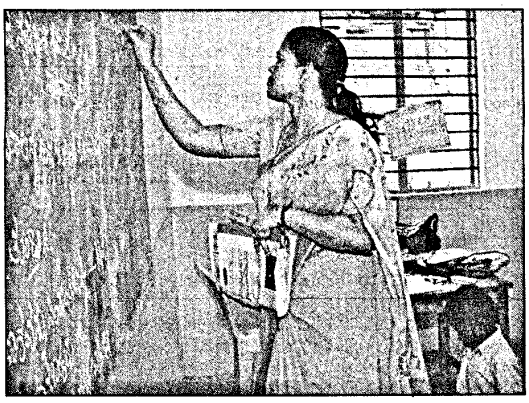
"It could be used in school classrooms, or in big offices to optimise workflows by determining when employees need to take a break," the 40-year-old said. Experts agree the chair is perhaps the most important component of a healthy working environment. AGENCIES

Times of India ND 07/10/2010 P-15

Naac will grade teachers too

Darshana Chaturvedi | TNN

Vadodara: It's time teachers in all colleges and universities in the country pull up their socks and make the best use of the blackboard and chalk. Teachers, who have been assessing students, may soon be graded too. Until now, it was only the universities and colleges that were accredited by the National Assessment and Accreditation Council (Naac), but the body will soon start giving grades or accreditation to the teachers as well.


TESTING TIMES FOR TEACHERS NOW

The idea was floated by the vice-chancellor of University of Rajasthan professor A D Sawant to Naac. The idea has struck a chord with Naac and it plans to discuss its implementation during a meeting in Bangalore on November 30. "I had made a presentation to NAAC on the need to start accreditation of teachers in higher education institutions. They liked the idea and will discuss ways to implement the same in colleges and universities," said Sawant during his visit to the city to attend the two-day west zone vice-chancellor conference hosted by M S University.

If the idea gets implemented, teachers' performance will be assessed and they will be graded accordingly. "Just like universities are accredited by a committee instituted by NAAC, teachers too will be assessed. Committee members will take stock of the entire teaching career and contributions made to both university and society," said Sawant, who will be attending the Bangalore meeting.

Talking about the parameters that will be assessed, Sawant said that research, impact of the research, contribution in forming curriculum, conducting examination and attending international and national conferences will be looked into.

"The committee will take into account the overall results of the class, projects given to students, innovative experiments, the teachers' relationship with students as well as the extension of their services to the society," said Sawant.

Highlighting the benefits of teachers' accreditation, Sawant said that it will serve two purposes – that of motivating teachers to perform and helping teachers get promotions based on their grades.

SWOT Analysis

- The idea was floated by the VC of University of Rajasthan professor Sawant to Naac
- If the idea gets implemented, teachers' performance will be assessed and they will be graded accordingly
- Members will take stock of the entire teaching career and contributions made to both university and society
- The move will motivate teachers to perform and help them get promotions based on their grades

Times of India ND 07/10/2010 P-18

US linguists find 'hidden' language in Arunachal

Koro Could Be The Latest Addition To The 6,909 Known Tongues

Chidanand Rajghatta | TNN

Washington: Say "kaplaye" to a hidden language that's emerged from remoteness of India's famed diversity — the word means "hello" in Koro, a previously unknown language that linguists say they have identified and recorded in Arunachal Pradesh.

At a time of rapid globalization, when languages are dying at the rate of one every fortnight, Koro could be the latest addition to the 6,909 known tongues recorded in "Ethnologue", a journal that chronicles languages of the world. The hitherto unrecognized vernacular, initially mistaken for a dialect of a language called Aka because of the cultural similarities of its speakers, was identified during a 2008 expedition conducted as part of National Geographic's "Enduring Voices" project.

In a conference call in Washington DC on Tuesday, researchers who stumbled on the latest hidden language said Koro, spoken by only 800-1,200 people, could soon face extinction in the same way as Bo, the Andamanese language, whose last speaker died earlier this year.

Younger speakers are abandoning Koro for more dominant and widely used languages like English or Hindi, the researchers said, citing the example of a father, Katia Yame, who was a torchbearer for the language, while his son, Sunil Yame, had taken to Hindi.

DYING DIALECT: Researchers say Koro, spoken by only 800-1,200 people, is headed down the extinction road

The researchers, linguists David Harrison of Swarthmore College in Pennsylvania and Gregory Anderson of the Living Tongues Institute for Endangered Languages in Oregon, recounted how they came across Koro by chance during an expedition with their Indian colleague, tribal language specialist Ganesh Murmu, to Arunachal Pradesh, a state with some 120 languages which they had previously identified as a linguistic hotspot.

They were initially led to believe Koro was a dialect of the more dominant Aka (spoken by 4,000-6,000 people) because speakers of both languages dressed similarly, had similar dietary preferences, and they intermarried.

But when they sat down to record the 'dialect' they found it had a different word for everything. "It is a distant sister language but quite distinct... like English and Russian," Harrison, who has documented dying languages in his book "The Last Speakers", said.

In terms of classification, Koro belongs to the Tibeto-Burman language family, a group of some 400 languages of which more than 100 are spoken in India alone.

The researchers said Koro had not been included in the Indian census or in any study of languages in India. In part, this may be because the area is isolated and not much linguistic work has been done here; even Indian nationals need special permits to visit the region.

The researchers said they will be publishing their findings in the journal "Indan Linguistics" and hope to have it listed in "Ethnologue", which continues to document new hidden languages ever as half of the world's 6,900 pus languages are considered endangered and expected to die in this century.

"We hope it will be accepted in Indian and international charters," Anderson said, adding that the demise of Bo had highlighted the fragilty of languages and identifed India as a language hotspot.

An area is considered a linguage hotspot when it has a high degree of language liversity with high endangerment and low level of scintific record.

The researchers said endangered languages need technological support (they plan to put Koro on YouTube) for their survival, so that the knowledge base on everything from medicine to cuisine passed down through the language could be preserved. Koro, incidentally, only has an oral tradition; no script.

"New languages are noticed and documented from time to time; it is rarely considered to be newsworthy," Harrison said. "But we are in the middle of a language crisis. Unless the trend is reversed, we will lose our diversity in the next century." "Preserving languages contributes to human history," he added.

Hindustan Times ND 07-Oct-10 p-17

DRIVE EFFICIENTLY

Uranium to fuel cars soon: Scientists

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WASHINGTON: Scientists have discovered a new form of uranium that could lead to a nuclear power plant small enough to fit in your car and eventually even power it.

Scientists from the Los Alamos National Laboratory have created a long-sought molecule known as uranium nitride. Besides offering cheaper and safer nuclear fuel, the new molecule could extract more energy from fossil fuels, making cars more fuel-efficient, and could also lead to cheaper drugs.

"Actinide nitrides are candidate nuclear fuels of the future," Discovery News quoted Jaqueline Kiplinger, a scientist at the Los Alamos National Laboratory who led the team of researchers on the recent *Nature Chemistry* paper, as saying.

"But they can also break carbon-hydrogen bonds, which are very strong."

Uranium nitride rips the hydrogen atoms off a carbon atom — no easy task.

If the two atoms could be split apart without losing all that energy, gasoline could be used much more effectively not only to fuel a car, but also to improve a whole variety of petroleum-related products, from plastics to drugs.

Unfortunately the new molecule is destroyed when it rips hydrogen atoms off a carbon atom. For uranium nitride to become commercially viable, it would have to knock one hydrogen atom after another and not destroy itself in the process.

THINKSTOCK PHOTO

Hindustan Times ND 07-Oct-10 p-11

A CLOSE LOOK AT ISSUES THAT MATTER

A test for CAT

SCREEN BLIPS Last year, the first computerised IIM admission test was a fiasco because of technical glitches. *HT* took a mock test recently to check if the rough edges have been ironed out

testingtimes

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The atmosphere was grim and the men heading the Indian Institutes of Management were in an intense discussion. At stake was the credibility of the admission process of India's premier B-schools, said an IIM director, recalling a crucial December 13, 2009, meeting where the institutes had to decide whether to conduct a pencil-paper retest.

The first computerised Common Aptitude Test (CAT) had finished less than a week earlier amid glitches at various test centres, and the IIMs faced demands from several students and faculty for a pencil-paper retest. The students were in danger of missing the IIM tag and the career prospects it opens up.

The only occasion the IIMs had conducted a retest was in 2003, when the question paper was leaked. "Eventually, we decided to offer the affected students a computerised retest but stayed away from testing everyone all over again," the director said, reliving those anxious moments on condition of anonymity.

"But we also swore to ourselves... this kind of chaos can never be allowed to happen again."

The 2010 CAT – to be held over a 20-day window, between October 27 and November 24 (with intervening holidays) – is as much a test for the IIMs and service provider Prometric as it is for the more than 200,000 students who have registered for it.

About 8,000 students across the country had to take a computerised retest in January this year because of the glitches. This delayed the results and – for some – put a question mark on this year's batch.

"I may sound like sour grapes but anyone who appeared last year knows that the standard of questions varied across test slots. Many of the questions were repeated. And psyching yourself up for the big day is never as easy the second time," said Ashutosh Verma, one of those who took the January retest.

Prometric has this year incorporated measures aimed at reducing the chances of a replay of last year's problems. (See the boxes for the glitches and what organisers have done to avoid a repeat.)

"I want to assure the students that we will try our very best to ensure that no student has to return home from the test centre without satisfactorily completing his test," Prometric India Managing Director Soumitra Roy told HT.

Three weeks from now, all the preparation – of the CAT organisers as much as that of students – will be put to test.

UNDOING THE CAT DAMAGE

PROBLEM 1: Computer terminals of students crashed, allegedly because of virus attacks.
What's been done: Added more cyber security, will start sanitising all computers early this time.

PROBLEM 2: Different computers – at the same centre and across test centres – worked at different speeds (some were older-generation computers), which meant that the test effectively lasted longer for some students as compared to others.
What's been done: Unlike last year, all computers to be used will have a common speed.

PROBLEM 3: A lack of back-up computers meant students who could not take the test satisfactorily because of glitches had to return home and reappear at a later date.
What's been done: Back-up computers at each centre to ensure that students can be re-assigned another computer if glitches occur.

PROBLEM 4: A cramped examination window – 240,000 students in 10 days with two shifts a day – meant that most students who suffered because of glitches could not be reassigned test dates within that 10-day window. They had to take the test in January this year.
What's been done: The test window has been spread over 20 days with a large number of vacant test slots to compensate for any retests during the examination window itself.

PROBLEM 5: The test itself had instructions that misled nervous students into accidentally quitting the exam midway.
What's been done: The instructions are much clearer and the organisers are putting out a practice CAT for students to test the instructions before the examination.

WHAT TO DO

- They need to arrive two hours before the test starts at 10 a.m. in the morning slot and 3:30 p.m. in the afternoon slot.
- They will not be allowed to take in mobile phones, wristwatches, pens, calculators and other personal items.
- Paper and pencil will be given for rough calculations. The paper can't leave the exam hall.
- The test will start with a 15-minute tutorial on how to take the examination.
- There will be a confidentiality clause that they will not reveal questions after the test.
- The tutorial will automatically be followed by the test – of 2 hours 15 minutes. The test will be on quantitative, verbal, and logical & data interpretation abilities.

IIMs aspirants in Navi Mumbai in November last year. The institutes had to take a retest in January this year. FILE PHOTO

The test that *HT* appeared in

Commitments by the Indian Institutes of Management and service providers Prometric to prevent the hardware glitches that rocked the examination last year may remain untested till the CAT (Common Aptitude Test) later this month.

But the test – once it starts on the computer screen – will also need to provide clearer instructions for students than there were in 2009, to address complaints that came last year.

HT took the practice CAT 2.0 – which Prometric and the IIMs are making available for aspirants – to try and verify claims by the organisers that they had incorporated solutions to last year's complaints.

The tutorial before the test is detailed and explains how to go traverse the test clearly – except that I chose to ignore paying attention the first time I attempted the practice test. This was deliberate and aimed at verifying whether students – many of whom often don't pay attention to pre-examination tutorials – could successfully navigate the test.

Once the questions started streaming on to the screen, I looked at the answer options and clicked the mouse on the one I thought most appropriate, only to realise seconds later that I had erred. In a pencil-paper test, I would have had to erase the "incorrect" pencil mark from the Optical Mark Reader answer sheet, indicate the "correct" option and then pray that the OMR would not pick up the remnants on the incorrect option as my reply.

Here I could change my answers as many times as I wanted.

A combination of the "previous" and "next" options below every question allowed me to surf the entire question paper effortlessly and gauge which questions I should focus on answering first.

I saw a "review" option at the bottom of the screen and clicked it. I had access to my entire answer-script, with clear marks indicating which questions I had answered and which were "incomplete".

Another option – also below each question – allowed me to "mark" questions I wanted to return to. The "marked" status also showed up on the "review" sheet.

At the bottom of the "review" sheet I found the option that was the most controversial for test organisers – the option of quitting the test. Last year, the "quit" option misled many students into accidentally ending their test midway when they thought they were merely quitting that particular screen.

The option this year is clearly marked "quit test". But the warnings don't stop there. I had attempted all questions and clicked on the "quit test" option to be greeted by a prompt asking me specifically whether I wanted to end my test.

I wanted to see how the test would react I had indeed accidentally clicked the "quit test" option without attempting all the questions. So I went back to the test, unmarked some answers and clicked the "quit test".

The prompt that appeared now was more detailed in its warning – informing me that I had unanswered questions that I would not be able to return to if I quit the test. Satisfied, I finally clicked the "okay" option.

Hindustan Times ND 07-Oct-10

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DU likely to get first woman V-C

Charu Sudan Kasturi
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NEW DELHI: If all goes well, Delhi University (DU) may soon get its first woman vice-chancellor. According to sources from the selection panel, the race for a new VC has boiled down to a contest between two veterans — Meenakshi Gopinath, principal of Lady Sriram College, and South Campus Director Dinesh Singh.

A human resource development ministry selection panel has shortlisted the names of Singh and Gopinath, besides VC Syed Hasnain of Hyderabad University and BS Chimni of Jawaharlal Nehru University (JNU), for the top post.

The four names were finalised after several meetings on Monday, sources said. The government is likely to announce a new VC soon, especially after the intense opposition in recent weeks from within the university community faced by the outgoing VC, Deepak Pental.

Sources in the office of the President — the Visitor to DU whose approval is must for the new VC's appointment — confirmed that the HRD ministry is yet to send them the list of four candidates. This suggests that HRD minister Kapil Sibal may not have officially given a go-ahead to the government's choice from among the four candidates.

Although HRD ministry officials refused to comment, administrative credentials of the four left in the race suggest that Singh and Gopinath have a definite edge.

Singh alone has the experience of handling the administration of various colleges and university departments.

Gopinath, on the other hand, is an eminent administrator and is the only woman candidate to be shortlisted.

If selected, she will become the first woman VC of India's biggest university — another feather in the cap of a government that gave India its first woman President and first woman Speaker.

Mint ND 07/10/2010 P-5

SOLAR RESEARCH

Study casts doubts on greenhouse heating

Earth should have cooled not heated up between 2004 and 2007, according to accepted models

By Jacob P. Koshy
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NEW DELHI

In data-based research that can influence the understanding of climate change, scientists have raised doubts about accepted theories on the extent to which solar activity heats up the earth's atmosphere.

Solar activity, astronomers have long held, waxes and wanes over roughly 11-year cycles. Increased activity heats up the earth's atmosphere at a faster rate.

But an analysis published in the journal *Nature* by scientists from Imperial College, London, using satellite data of solar radiation between 2004 and 2007, says that if accepted models that relate solar activity and Earth's temperature are accurate, Earth's climate should have cooled in these years.

Observations, on the other hand, say that over the past decade, temperatures on Earth have steadily increased and are believed to be the key drivers of long-term and large-scale changes in climate.

While many scientists and multilateral bodies such as the United Nation's Intergovernmental Panel on Climate Change (IPCC) hold that the release of industrial gases into the atmosphere is mainly responsible for the rise in temperatue, the extent to which solar activity influences the process is not clear. Estimates on the role of solar activity in raising temperatures on earth range from 2% to 25%.

> The study also says that key kinds of radiation differently affect various layers of atmosphere

It is only since 1978 that scientists have been able to observe the solar radiation spectrum via satellites and model how each radiation affects various levels of the atmosphere.

'These observations were made during the declining phase of the previous solar cycle," said Joanna Haigh, an atmospheric physicist at Imperial College and the lead author of the study.

In a telephone interview, Haigh said her team's observations could be a one-off case. It will take more than a decade—when solar activity is waning again—before the same measuresments can be made and compared.

"But if this not an anomaly and a trend," she added, "it could significantly alter our understanding of how solar variability affects earth's climate."

The study also found that key kinds of radiation—ultraviolet, infrared and visible—differently affected various layers of the atmosphere and didn't, as was supposed, heat all the layers uniformly.

Current models that extrapolate climate trends into the future do account for solar variability, but don't account for how different wavelengths of radiation affect sections of the atmosphere.

"There's a lot more complexity that isn't being accounted for in current IPCC models," said Haigh.

She added that despite the anomalous observations, "fluctuations in solar radiation was unlikely to significantly account for global warming."

According to a research paper by the Stanford Solar Center, the variation in energy emitted by the sun through the 11-year cycle is only about 10%. Past studies have said that when the solar cycle is at a maximum, it puts out a larger percentage of high-energy radiation, which increases the amount of ozone in the upper atmosphere.

The increased ozone warms the upper atmosphere and the warm air affects winds all the way from the stratosphere—the atmospheric layer at 6-30 miles from earth. Changes in wind strength and direction lead to different climate patterns around the globe.

Rolando Garcia, atmospheric scientist at the National Center for Atmospheric Research in Boulder, US, said it was too early for researchers to revise their solar variability theories and models.

Several independent observations over 20 years had borne out the mechanism between solar variability and climate, he said, and more observations are needed to cancel the effects of "instrument drift", when satellites give erroneous readings as they wobble out of orbit.

Mint ND 07/10/2010

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US varsity keen on partnering with innovation universities

By Prashant K. Nanda
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NEW DELHI

India's plan to enlist international institutes to partner its proposed innovation universities has received a boost, with the University of Illinois from the US expressing interest.

The university's interim chancellor Robert A. Easter and three of his colleagues, including assistant vice chancellor for public engagement Pradeep Khanna, met human resource development (HRD) minister Kapil Sibal on Monday to discuss a partnership, according to two ministry officials.

India has decided to set up 14 innovation universities, which will be research-oriented campuses that will not be controlled by the University Grants Commission (UGC), the university regulator. Each university will have a theme to focus on.

"Illinois University is interested for partnering with an innovation university with bioscience and agriculture (as its focus theme)," said one of the two officials cited above.

The official, who didn't want to be named, said although Sibal had received some positive signals from US educational institutes during his visit to that country last month, this is the first time that a leading university had sent a delegation to India to discuss the proposal.

The second official said foreign collaboration and funding will "boost higher education through a research-oriented mindset", adding that Easter was told to be in touch with the government's department of biotechnology for a detailed discussion. He also didn't want to be named.

As reported by *Mint* on 3 August, the draft bill to set up the innovation institutions allows each university to set its own policy to attract faculty members from India and abroad and hire them directly, offering wages and perks that it deems fit.

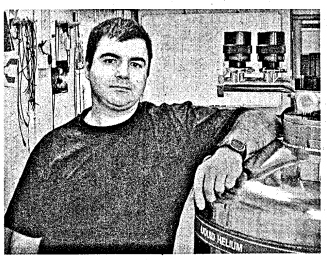
The proposed innovation universities will have the potential to develop into leading research hubs, making them attractive to foreign educational institutions, said Narayanan Ramaswamy, executive director (education) at consulting firm KPMG India.

"Hence, these are the right place to invest (in)," he said.

Hindu ND 07/10/2010 P-13

Graphene: a novel material with myriad uses

Graphene is an ultimately thin, mechanically very strong, transparent, flexible conductor, and can be used in touch screens, light panels and solar cells



Andre Geim (left) and Konstantin Novoselov from the University of Manchester. – PHOTOS: AP, REUTERS

After the discovery of one form of carbon – fullerenes – was awarded the Nobel Prize in Chemistry in 1996, this year's Nobel Prize for Physics was awarded to Andre K. Geim and Konstantin S. Novoselov, both at the University of Manchester, U.K., for succeeding in producing, isolating, identifying and characterizing another form of carbon – graphene.

Anyone who has used an ordinary pencil has probably produced graphene-like structures, but without knowing it. A pencil contains graphite, and when it is moved on a piece of paper, the graphite is cleaved into thin layers that end up on the paper and make up the text or drawing that we are trying to produce. A small fraction of these thin layers will contain only a few layers or even a single layer of graphite, *i.e.* graphene.

Graphene, a single atomic layer of carbon, is the first two-dimensional (2D) crystalline material that has been identified and analyzed. This new material has a number of unique properties, which makes it interesting for both fundamental studies and future applications.

It is a transparent conductor which is one atom thin. It also gives rise to analogies with particle physics, including an exotic type of tunnelling. In addition, graphene has a number of remarkable mechanical and electrical properties. It is more than 100 times stronger than the strongest steel, and is very stretchable.

The thermal and electrical conductivity is very high and it can be used as a flexible conductor. For instance, the electrical conductivity is somewhat higher than the conductivity of copper. And on the thermal conductivity front, graphene conducts heat 10 times better than copper, and much higher than that of silver.

Different forms

Carbon can exist in several different forms. The most common form of carbon is graphite, which consists of stacked sheets of carbon with a hexagonal structure. Under high pressure, diamond is formed.

A new form of molecular carbon is the so called fullerenes. The most common, called C60, contains 60 carbon atoms and looks like a football (soccer ball) made up from 20 hexagons and 12 pentagons which allow the surface to form a sphere. The discovery of fullerenes was awarded the Nobel Prize in Chemistry in 1996.

A related quasi-one-dimensional form of carbon, carbon nanotubes, has been known for several decades and the single walled nanotubes since 1993. The electronic and mechanical properties of metallic single walled nanotubes have many similarities with graphene.

It was well known that graphite consists of hexagonal carbon sheets that are stacked on top of each other, but it was believed that a single such sheet could not be produced in isolated form.

NOBEL PRIZE - PHYSICS

But in 2004, the two scientists showed that such a single layer called grapheme could be isolated and that it was stable.

Though the existence of grapheme-like structures was already known in the 1960s, isolating single layers proved difficult.

But the difficulty was not to fabricate the graphene structures, but to isolate sufficiently large individual sheets and to verify its unique 2D properties. This is what Geim, Novoselov, and their collaborators succeeded in doing.

What is graphene?

The electronic structure of grapheme, a single layer of carbon packed in a hexagonal (honeycomb) lattice, is rather different from usual three-dimensional materials. Its Fermi surface is characterized by six double cones. In intrinsic (undoped) graphene the Fermi level is situated at the connection points of these cones.

The electrical conductivity of intrinsic graphene is quite low, as density of states of the material is zero at the connection points of these cones.

But the Fermi level can however be changed by an electric field so that the material becomes either n-doped (with electrons) or p-doped (with holes) depending on the polarity of the applied field. Graphene can also be doped by adsorbing, for example, water or ammonia on its surface. The electrical conductivity for doped graphene is potentially quite high.

Graphene is practically transparent. In the optical region it absorbs only 2.3 per cent of the light. In contrast to low temperature 2D systems based on semiconductors, graphene maintains its 2D properties at room temperature.

The discovery

Before 2004, the isolation of stable sheets of graphene was not thought possible.

It was therefore a complete surprise when Andre Geim, Konstantin Novoselov and their collaborators from the University of Manchester (UK), and the Institute for Microelectronics Technology in Chernogolovka (Russia), succeeded in doing precisely this. They published their results in October of 2004 in *Science*.

They used a simple but effective mechanical exfoliation method for extracting thin layers of graphite from a graphite crystal with Scotch tape and then transferred these layers to a silicon substrate.

This method was first suggested and tried by another group (R. Ruoff's), but they were not able to identify any monolayers. The Manchester group was able to even identify flakes made up of a single layer, *i.e.* grapheme. Furthermore, they managed to pattern the graphene into a Hall bar and connect electrodes to it.

In this way they were able to measure both the (longitudinal) resistance and the Hall resistance.

An important piece of data was the ambipolar field effect where the resistance was measured as a function of an electric field applied perpendicular to the sample.

Once the technology to fabricate, identify, and attach electrodes to the graphene layers was established, both the Manchester group and other groups quickly made a large number of new experiments.

Apart from the exfoliation method, different ways of growing very thin carbon films were also studied. In particular, a group lead by W.A. de Heer at Georgia Tech was refining a method to burn off silicon from a Silicon Carbide (SiC) surface, leaving a thin layer of carbon behind.

A group at the University of Columbia lead by P. Kim investigated an alternative approach for making thin carbon layers. They attached a graphite crystal to the tip of an atomic force microscope and dragged it along a surface. In this way they were able to produce thin layers of graphite down to approximately 10 layers.

Research explosion

Since 2005, development in this research area has literally exploded, producing an increasingly growing number of papers concerning graphene and its properties. Double layers of graphene, which have different properties compared to (single layer) grapheme, have been studied thoroughly.

Apart from studying the mechanical strength, scientists discovered that light absorption in graphene is related to the fine structure constant as mentioned above.

Future applications

Graphene has a number of properties which makes it interesting for several different applications. It is an ultimately thin, mechanically very strong, transparent and flexible conductor.

Its conductivity can be modified over a large range either by chemical doping or by an electric field. The mobility of graphene is very high, which makes the material very interesting for electronic high frequency applications.

Recently it has become possible to fabricate large sheets of graphene. Using near-industrial methods, sheets with a width of 70 cm have been produced.

Since graphene is a transparent conductor it can be used in applications such as touch screens, light panels and solar cells, where it can replace the rather fragile and expensive Indium-Tin-Oxide (ITO). Flexible electronics and gas sensors are other potential applications.

The quantum Hall effect in graphene could also possibly contribute to an even more accurate resistance standard in metrology.

New types of composite materials based on graphene with great strength and low weight could also become interesting for use in satellites and aircraft. (*Excerpts from '2010 Nobel Prize Physics - Advanced Information' at www. nobelprize.org*)

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US-based Indian plans cool houses without ACs

MAMTA SEN
MUMBAI

An Indian student based in Texas is designing houses that can be cooled without the use of air-conditioners. Rohan Shirodkar, 22, an undergraduate student with the College of Architecture, University of Texas, has been working on the project for over a year and says he will unveil a real life model soon.

"I am currently working under Dr Stephen Caffey on Climate Responsive Design (CRD) and Vernacular Architecture. CRD is all about carefully designing buildings with climate in mind or designing the building for the climate. My current project involves investigating two areas related to environmental design, architecture and urban topography," he says, stating that his efforts are aimed at creating new age eco-friendly designs. "Vernacular architecture is a very important element in the topic of CRD, as it serves the basic need for human comfort; and, therefore, vernacular designs, in a sense, are climatic. They are also low-tech and considered to be the best in maintenance as they are minimal, affordable and sustainable in the long run," adds Shirodkar. He says that his hobby of photographing unique houses has metamorphosed into a passion for designing them.

"The goal of this research

Rohan Shirodkar

is to evaluate the climate control and sustainability features in commercial and residential structures in South Asia from the medieval period to the present day. First we examine the effect of the Partition on patterns of urban planning in South Asia from 1947 to the present day. Second, we evaluate climate control and sustainability features in commercial and residential structures in constructed during the medieval times in South Asia. These derived concepts will be used to develop a model for Bryan College Station area," he says. He adds that many experiments were conducted in various South Asian countries, including in Indian cities like Kolkata and Ahmedabad. "We were particularly interested in the monuments of Indore, Islamabad and Kathmandu as the climate, soil type and altitude matched closest to the Bryan College Station where plans are on to set up the initial model."

The whole idea behind the research is to reduce cost and use locally available material.

Shirodkar, who grew up in Mumbai and shifted to the US in 2005, says that as a teenager he would gawk at the marvellous urban constructions while travelling around the city, fascinated by the degree of planning involved in making them. "From an early childhood, I developed a yearning for the development field," he says. He has also worked on another invention with a professor from the Department of Architecture at his university, the Solar Light which won the EPA P3 Award at the National Sustainable Design Expo in the US.

With the real estate market booming in Indian urban cities, Shirodkar, who heads the Indian Students Association at Texas University, points out that there is a tremendous opportunity for growth in India and that he wants to set up his own property business. "But my initial dream is to construct affordable low cost hospitals. In 1991, there were an estimated 10 hospital beds for every 10,000 citizens in India. I want to change that."