

The timing factor!

Working hours are an important factor in the research output of any institute. Most of the central institutes and CSIR laboratories are open 24 h a day for research, which means the students in those institutes get more time for experimentation. Normally, a university has its working hours from 10 am to 5 pm, after which everyone is forced to leave the campus. This 'office culture' should not be applied to research institutions as it certainly affects the output of an institution. Even a researcher who wants to work for more time has to leave because, officially, the time is up. Although some institutions do have arrangements for

researchers who want to work after office hours, this is not a common practice. And during official holidays most institutions are totally closed, which means experiments also take a break during those days. I think that universities have to grow up and make necessary changes in their working hours to differentiate between research and administrative work. Closing down institutions early, acts as a slow poison and directly affects working efficiency. The author had been a part of one CSIR laboratory (CCMB) for two months and feels that the working efficiency was doubled during that period just because of the tim-

ings. Apart from factors like funds, infrastructure and intelligentsia, timing is important factor in the research output of institutions, especially universities, as is evident from the quality of publications coming out from them, although exceptions are always there. I hope someone from the UGC reads, this!

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Will e-journals serve the purpose of library journals?

Sumitra (*Curr. Sci.*, 2002, **82**, 1309) tells us about the use of e-journals on the Internet. It is an accepted fact that most of the Indian university libraries are poorly maintained and lack useful Indian and foreign journals. The least expensive journal in USA is not affordable in India due to the low value of our rupee against the US dollar. Hence it is becoming a difficult task for the Indian universities to subscribe to foreign journals, reviews and books due to inadequate funds.

Though we are said to be high-tech in the IT field, it can be realized only in major cities of the country, leaving behind the towns and rural areas. Access to the Internet and services of the Internet Service Providers (ISPs) and our telecommunication network are weak in the towns and rural areas of our country. Due to this, access to the Internet is very slow in a few cities and in most of the towns and rural areas. Moreover, the browsing centres in India collect more

money from the clients. Hence, it becomes difficult for the students to access on-line e-journals. In fact, only a few journals are free for downloading and most of the scientific journals need to be subscribed to get the on-line material, or the client should become a member of the society that publishes the journal, by paying a membership fee. The back volumes are also not available for many e-journals.

After downloading any article from the Internet, a computer and a printer are essential for the student to view and to take a printout; this requires more money and time. A minimum amount of Rs 10 per page of an article is needed for accessing and printing, which could be taken up by spending only 50 paise for a photocopy, if a hard copy of the journal is available.

Only reputed scientific institutes have Internet facilities annexed with computers and printers for usage by students.

It will be a novel approach if the same facilities could be kept in the libraries of scientific institutes all over the country and students can be allowed to browse free-of-cost. It is mandatory and need of the hour that the funding agencies of the state and union governments must allocate adequate funds to university libraries for subscribing to journals, reviews and books and to accelerate the Internet facilities with good infrastructure. If immediate action is not taken, the practicability of future research will be a question mark.

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Indian science coming of age

If we consider attaining independence as a significant phase transition in the country's life and affairs, Indian science too

is 50 plus and that is a substantial period of time on human scale. It is therefore pertinent to reflect on the path and pro-

gress we have made in this very important sphere of life. We have the third largest scientific and technical manpower

in the world. We have very strong space and atomic energy programmes. Demonstratively, we can make and launch satellites and are talking of putting man on the moon, and can produce atomic power and also explode atom bombs.

All this is some feat of sorts. How have we fared in terms of achievements against what was projected? When we began the atomic energy programme in the mid 1950s, the projection was for 20% of the total power by the turn of the century; it has barely touched a dismal 2%. That is, we do things, but not quite up to the mark. Hitting the mark is the new challenge.

We have crossed the preliminary stage of spread and infrastructural build up in our scientific development. Now comes the next stage of depth and consolidation as well as of strict scrutiny.

Right from the 1920s, we have had some share of internationally recognized scientists in J. C. Bose, Ramanujam, Raman, S. N. Bose, Saha, Homi Bhabha, Shanti Swarup Bhatnagar, Mahalonobis, P. C. Ray, Birbal Sahni, Vikram Sarabhai and others. With Nehru's enthusiasm for science and technology, there was an organized and concerted effort put into action. Bhabha championed the cause of atomic energy, Bhatnagar organized the Council of Scientific and Industrial Research (CSIR) by setting up laboratories and Vikram Sarabhai initiated the space programme. All of them got full support from Nehru and his successors. Any inadequacy in performance would therefore have to be attributed to scientific leadership and management.

All the major research facilities were established outside the university sector and were supported adequately. For instance, an institute like TIFR has world-class facilities comparable to the best anywhere. On the other hand, the universities were let to slip into academic slumhood, the phrase used by one of the leading scientists of the country to describe the factual situation some years ago. Naturally, the institutes are the first choice of a talented young scientist. There is little in the university sector to attract talent.

The conditions in the universities are precarious. Nearly 70% of the universities may not get even a single research journal, their laboratories are obsolete and depleted, the infrastructure is non-existent, and the faculty is indifferent, incompetent and faction-ridden. How-

ever, no university goes without a convocation function with much pomp and show at considerable cost, once or twice a year. The economy measures are only effected tightly on the library, laboratories and other academic facilities, while the acrimonious and meaningless meetings go unabated.

Good faculty recruitment seems to be the least of the concerns of today's vice-chancellors, deans and the department chairs. In the present environment of all roads leading to courts, it is not unthinkable that wooing of good candidates by a well-meaning university academic may as well be construed unfair. Further, there is the issue of reservations, which has completely paralysed the recruitment in many universities. If one takes the overall stock, a good 30% of the positions may have remained vacant over more than 5 years. When professorial positions are being reserved, the intention is clearly not to help the underprivileged, but rather just to block positions. It is time that the beneficiaries of the reservation should raise their voice against such blocking. Reserve only those positions where competent candidates are available.

Plagued with all this, it is therefore no surprise that universities are starved both of good people and facilities. There is, however, a good latent pool of students which could and should be activated. There are, however, some glorious exceptions, where people have chosen a job in a university/college in preference to an institute. They are few and far between.

On the average, institutes on the other hand have good faculty and excellent facilities, and are free to recruit good people as and when they find them, but are starved of young students. In most advanced countries like the US and UK, there are no or very few separate research institutes; they are integral parts of the universities. This is a healthy situation where there is an interaction among talented people, both young and experienced. A fair amount of teaching is always good, as it provides an opportunity to refresh one's perception and understanding of the basics which feeds in positively to research and above all one's intellectual build up. This divide between teaching and research, and between students and the best minds is most unfortunate, and is nothing short of an educational crime.

It is therefore necessary to do something radical to bring together research and teaching and thereby bringing together the excellent scientists and talented young students. Without this, there is no future for science in particular and academic pursuit in general. This has been realized and talked about for quite a while, but no perceptible action has come forth. The only honourable exception is UGC's experiment of inter-university centers. That is, to create world-class facilities at a given place for the use of university scientists and students. NSC (Delhi), IUCAA (Pune) and IUC-DAEF (Indore) are such common facilities, and their intervention is quite visible in the research being done in these fields by the university/college academics.

A new and courageous scientific as well as political leadership is urgently required to bring back universities in the centre stage of academic activity.

Some institutes (IISc and S. N. Bose Centre for Basic Sciences) have taken up inducting students after B Sc for the Ph D programme. This is no substitute for a full-fledged undergraduate teaching programme. What we need to do is to persuade all research institutes to have undergraduate programmes.

Secondly, we should facilitate closer interaction between universities and institutes through exchange of faculty. University faculty should be able to come for sabbatical to any institute, and similarly one semester of three months of teaching must be made obligatory for institute faculty. It is now quite doable with easy access to internet on-line communication.

Thirdly, from over 250 universities and 8000 colleges, we would have to select, say about 100 which could sustain a good graduate programme; they should be super-critically supported. The rest of them could concentrate on good teaching programmes.

Fourthly, all the university faculty should be assessed periodically and graded according to their performance. Based on this grading, a faculty could be allotted a subsistence research grant to support research student(s), postdoc(s), visitors and travel for the group.

The most important thing is to adopt stricter scrutiny of the work. Rarely has a project been completed and performed to the required specification and in the given time-frame. Scrutiny is key to doing good science.

We should now graduate from the problem-solving (from being good students) to the problem-posing stage, and particularly problems which are relevant to us. We are excellent in creating structures which are solely export-oriented, like our IITs. There is scope for major reorientation there. We still focus on the West for recognition. The true sign of coming of age would be when we attain confidence in our own capability and merit that we do not have to look for recognition outside.

I find it astounding to read proclamations like 'one good result, one hydrogen bomb, superpower by 2025', and so on by the most respected scientists of the country. No one great individual or no one profound result could change the overall ambience. It is the ambience that matters and determines progress.

In this regard, two events are worth mentioning. One, the revolution in telecommunication: From an interior tribal

village one can call an equally isolated place on the other side of the globe effortlessly. This was achieved by Sam Pitroda about 15 years ago and was by all means remarkable. Second, the recent IT super power phenomenon has happened without any committed efforts of a Pitroda-like. This has happened because over 50-odd years we have built up a large pool of scientifically and technically trained young women and men. It could not have happened because of a Raman or Bose alone. The former event shows that given a right kind of leadership and mission, we have the capability to achieve the best. The latter shows that we have latent potential which could emerge spontaneously whenever an opportunity crops up.

Finally, I would like to appeal to all my fellow scientists that we must, as persons of learning and scientific training, take part in discourses on issues of wider social concern. It is our duty and

responsibility to give educated, informed and wise counsel to people at large, who have been supporting our upkeep and facilities adequately, for letting us do what we like. One does not see many of us participating in debates on wider issues like atomic bomb and power, big dams, and overall development paradigm. It is not enough just to pursue one's own specific discipline dexterously, which one must do at any rate. We are part of a larger intellectual community and as intellectuals our concerns must not entirely remain within the narrow confines of our disciplines.

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Scientific research and academic developments crave for new lease of life

The state of academic developments, in general, and in science and technology (S&T) in particular, has undergone a deep decline making resurrection improbable in the country. Reference is often made that we badly need a Nehru and a Bhabha to promote S&T in India¹. In addition to establishing a series of research laboratories under the purview of Council of Scientific and Industrial Research, and also founding five Indian Institutes of Technology (IITs) considered to be miraculous feats, Nehru convinced Bhabha to meet Indian astronomers working abroad and ask them to establish observatories in India. The response was overwhelming and the outcome is that the country today enjoys the unique global reputation for its facilities in the field of radio astronomy in particular.

Whatever be the written policy of the government², the testing ground is the execution and its practice, where we have failed miserably. Universities are

worst affected and the effect is also seen on the academic commitment and research output of IITs. Pointing out some of the glaring disparities in the recruitment system, Virk¹ argues for better salaries to NET-qualified scholars. But how many of these scholars are dedicated to pursuing an academic career. Those who are serious and dedicated in carrying out quality research hardly complain about fellowships and contingent grants.

Some novel and daring action is certainly needed for rejuvenating the academic atmosphere in the country. Our active and brilliant scientists should be called for an open debate to settle the issue. I wish to pen down a suggestion for breaking the ice and launching a system of contractual appointment with higher emoluments in the country. Once we succeed in launching such a programme, we will be able to attract many of the Indian scientists and engineers working abroad to come home and put

their might in toning up the sinking morale of dedicated teachers and researchers. A forewarning or caution is that launching such a system may encounter resistance and opposition from majority of our own teachers who have developed expertise in settling scores with the government departments. An alternative is the development of private universities and institutes that could compare with Harvard, Stanford, Cornell and the like. Any delay in taking such an action may cost the country heavily.

1. Virk, H. S., *Curr. Sci.*, 2002, **82**, 1308.
2. Lavakare, P. J., *ibid*, 2002, **82**, 613-614.

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