



announced prize for 2018, an Australian mathematician, Akshay Venkatesh, was awarded. He too happens to be of Indian origin.

## Unpleasant questions

Some Indians might take pride in the ancestry of these latter two winners, but has the country contributed anything to their growth as mathematicians? Would Prof. Bhargava and Prof. Venkatesh have produced the work that won these prizes if they had studied and worked in India? This is not a pleasant question to ask, but parents are increasingly confronting similar questions when it comes to their children's education.

This problem is not unique to mathematics. It is the same case with respect to the Nobel Prizes in science. Indian-origin scientists have won the Nobel in physics, chemistry and medicine, but post-Independence, work done in India has not led to a science Nobel. What really is the problem? If Indians studying and working abroad can have a great impact, then obviously the problem has to do with our systems of education and research. While it is true that being abroad brings greater visibility to one's work, it is also the case that for a country which claims to have the third largest scientific manpower in the world, our creative contribution to science has been way below par.

This is a paradox considering the many brilliant scientists who work in Indian institutions, including the universities. Would these individuals have contributed more if they had worked outside the country?

In contrast, we can look at other fields in which we have produced world beaters. Chess and badminton are paradigmatic examples of how a whole generation of youngsters not only took to these sports, but under intense, and many time brutal, competition succeeded in coming to the top. These are not isolated cases; there is a systematic creation of groups of individuals who are reaching the pinnacle in these sports.

Similarly, we have global leaders in music, arts and literature. How is it that we have managed to be so original, creative and productive in the global domain in fields which have had very little support either from the government or the corporate sector? How is it that having invested all our energy in science education right from early schooling, we have only managed to produce collective mediocrity in these fields year after year?

## Reasons for mediocrity

The revolution in chess and badminton was possible through great personal sacrifices of

the players and their families. In many cases, securing even minimal funds from government or the private sector was difficult and the perseverance of parents, as well as the hard work of the children and the coaches, made this revolution possible. In contrast, the training for science begins from a state-sponsored and socially sanctioned education system right from primary school. At every step there are numerous scholarships, cash awards and incentives given to **students** to excel in these subjects. Although achieving greatness in science is not like that in sports or music, it is nevertheless important to understand why our contribution in science does not match this enormous cultural capital (in addition to significant funding) invested in science. I believe that there are three reasons that contribute to this culture of mediocrity. First is the nature of school education, second is the state of science administration, and third is our cultural response to the idea of excellence.

While all over the world, **children** are becoming more independent in terms of their intellectual practices, our students are becoming more and more like little soldiers marching from one class to another tuition. Right from their homes to their schools, it is one indoctrination after another. Science education is not egalitarian and is designed to keep people out rather than embrace diversity and multiplicity of background, language and talents. This is done in the name of merit, and yet it is precisely this merit that we lack on the global stage.

Science administration in India does not help. Given the amount of support from successive governments, it is remarkable that very little has changed in the excessive power invested in individuals in Indian science. Funding agencies like the Department of **Science and Technology** and a host of others which disburse hundreds of crores of rupees for research in science are not held accountable to the results of that funding. So many projects worth crores end up with some minor publications. Worse, scientists know best how personal contacts and networks are still so important in securing funds and other incentives in science in India today.

Perhaps not so surprisingly, the school system as well as science administration are both linked together by a common problem: the inability to understand and deal with excellence. In academic institutions across the country, it is far more difficult for a person to stand out in terms of high quality work since the system has little support for excellence. Part of the reason is that we do not have confidence in our own judgment of quality. Is it that we are embarrassed about greatness and much prefer to deal with mediocrity and ordinariness? As an institutional culture, is it that we prefer to discover

greatness 'outside' rather than acknowledge it amongst ourselves?

## Nothing in isolation

Finally, we have not understood another important aspect of greatness. Great work in any domain is not produced in isolation. Greatness is deeply cultural and arises from a particular attitude and not subject competence alone. For great work to be possible in science, the larger society has to produce great work in art, literature, humanities and so on. But we have produced a science ecosystem which does not seem to understand this, nor recognise how this insularity has only contributed to mediocre science.

Our education system has reduced the notions of competence and merit only to that of science, thereby denying the greatness inherent in so many other domains. Children who could have excelled in so many other disciplines and activities end up being forced to do science or being in education systems which put very little premium on other disciplines. At the same time, countless artists and musicians struggle to survive in spite of creating great work. There is no monthly salary, provident fund and pension for some of the greatest artists, performers, writers and others, yet they continue to produce work of greater quality than the average academic institutions in India.

Great science will only arise in a culture which celebrates great music, art, literature, philosophy, sports and so on. As long as this myopic vision of science, the hegemony of science education and the unprofessional cult of Indian science administration continue, we are not going to win Fields medal or Nobel prizes in science any time soon.

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