the students. Almost all professional educational institutes offer personality development or HR skills courses that hone the soft skills of the students. Further, the institutes also allow organization of student-led symposia and events which inculcate leadership and team work in the students and provide an opportunity for the students to function effectively. In the context of development of enhanced mental capability, from a student's perspective, the teachers have a major role to play (I think many of the teachers, who were also once students, will agree to having had such a notion). A student, who is at the receiving end, expects a teacher to 'mould' him/her. While it is indeed a legitimate expectation, what we fail to realize as a student is that education is a two-way process. Despite the fact that the student is at the receiving end, unless he/she puts in efforts not just to learn but to cherish a subject, he/she cannot fully achieve the purpose of education. Cherishing a subject requires thorough knowledge of the basic facts in the subject and thence creatively applying it to various situations without loss of rationality. To hone such higher-order cognitive abilities requires conscious dedication. Thus, a student needs to be proactive. Teachers play a vital role in facilitating this development of higher-order cognitive abilities via the techniques they employ in teaching (e.g. discussion of open-ended questions and coming up with possible strategies, etc.). Parents act as pillars of support for the students. The confidence and support they provide students to overcome the hurdles in the progress of cherishing the subjects is quintessential. Particularly, students face adolescent-related, time management-related, prioritization-related issues. Parents play a vital role in helping the students overcome these issues.

Thus, the clear understanding of the purpose of education by all the stakeholders, awareness of the limitations and difficulties of students, the creative abilities of the teachers and parents to help the students hone their higher-order cognitive abilities and overcome their difficulties, and the academic policies of institutes together constitute a successful institutionalized education.

1. http://www.iiserpune.ac.in/~mohanan/educated/ingred.htm
2. Adapted from http://www.iiserpune.ac.in/~mohanan/educated/edthi.htm

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Attracting undergraduate students to scientific research: limited openings in national laboratories

Ananth[1] has once again drawn the attention of scientific community by highlighting the importance of attracting young undergraduates to the environment of scientific research at an early phase of their science education. He has suggested that every research institute in the country should admit 30 undergraduate students every year. In this seemingly modest suggestion, he has entrusted a huge responsibility on the research institutes in the country – a responsibility that the research institutions and national laboratories in the country have carefully avoided over the decades.

The fact that we need to attract students to pursue a career in science has been well established, particularly as one sees the dwindling admissions for science stream courses in a large number of colleges. A degree in science is not considered to be useful in the Indian job market. In spite of the fact that many young students are attracted by science subjects in high school, they do not see their curiosity and interest being fulfiled in the portals of the undergraduate colleges they enter. They do not get to see their teachers engaged in exciting research and sharing their excitement with young students who show a great deal of curiosity at that stage of their undergraduate education. They do not get to see the attractive atmosphere of laboratories where people are working at odd hours, handling sophisticated laboratory equipment that could enthral the young minds and challenge their curiosity. They are experiencing science only in their textbooks, on the blackboards of their lecture halls and in the examination papers that they answer at the end of the year. This kind of science does not excite them.

When India decided to enter the field of atomic energy, Homi Bhabha had realized the importance of tapping the potential of undergraduate students to enter this area of science. It was not offered then in traditional universities. He therefore embarked on starting a Training School like the Bhabha Atomic Research Centre, full of working scientists and engineers, who took the responsibility of teaching the young students, while pursuing their own research. The training school students were, in a sense, 'immersed' in the culture where they could not only see their own curiosity satisfied, but at the same time could see the careers they could pursue once their training was completed. Unfortunately our large numbers of colleges, offering science degree courses, do not excite the scientific minds, which we lose out at an early stage in the life of a potential working scientist of the future.

For a long period after independence in 1947, the Indian higher education system continued to be isolated from the culture of scientific research. The national laboratories were set up exclusively for carrying out research, with no responsibility for teaching, especially undergraduate students, who could be the fountain head for the future pool of scientists. Undergraduate teaching and research continued to be isolated from each other.

It is precisely this concern that had triggered the movement started by late V. G. Bhide, then Vice Chancellor of Pune University and Govind Swarup, the world renowned radio astronomer from the Tata Institute of Fundamental Research (note the workplace of each), who started the movement of integrating science education and research in India. The result of this unique movement is what we see now with the initiation of several

Indian Institutes of Science Education and Research (IISERs), from where Ananth is now appealing again for a new initiative involving the research institutes of India. Teaching undergraduate students in our national research institutions is not an easy undertaking, even though it may be for a small intake of 30 students in a year. Further, as suggested by Ananth[1], it has to include teaching of humanities and ancillary courses as well. The character of our national research institutes would necessarily have to change for a good cause.

Some of our large universities and degree-awarding institutions do have an excellent track record for doing research. However, in majority of our university system of education, the undergraduate colleges are isolated from the research atmosphere of our university campuses. As mentioned earlier, undergraduate students do get registered under large universities, but do not get the benefit of seeing the research being done by the university professors or even get to listen to the lectures given by some of these outstanding researchers in our university system. Our undergraduate students do not get to see their role-model research scientists at work. How can they be motivated for taking up a scientific research career, when they do not see researchers at work around them? They do not get the opportunities of walking into any of the research laboratories of their senior research professors to get the flavour of research.

Over the years, the Indian universities and colleges must enrich the research culture in their locations and this will take a long time, but in the meantime, the national research institutions must selectively open their doors to the undergraduate science students as suggested by Ananth.

1. Ananth, S., *Curr. Sci.*, 2014, **106**(7), 913.

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Shanti Swarup Bhatnagar Prize: an inspiration for international recognitions

The Shanti Swarup Bhatnagar Prize for Science and Technology, popularly known as Bhatnagar Award, was instituted in 1957 with the objective to recognize conspicuously important and outstanding contribution to human knowledge and progress – fundamental and applied – through work done primarily in India during the five years preceding the year of the Prize in seven disciplines, viz. (i) Biological Sciences, (ii) Chemical Sciences, (iii) Earth, Atmosphere, Ocean and Planetary Sciences, (iv) Engineering Sciences, (v) Mathematical Sciences, (vi) Medical Sciences and (vii) Physical Sciences. A person has to be less than 45 years of age to be nominated for the Bhatnagar Award. From 2010, Persons of Indian Origin (PIO) and Overseas Citizens of India (OCI) are also eligible to be nominated for the award[1]. Over the years, the Bhatnagar Awardees have acquired a unique status among the scientific community and serve as role models for younger scientists to emulate. It is, therefore, a great responsibility on the part of Bhatnagar Awardees to live up to the standards of the Award and bring glory to India through International recognition.

The Royal Society of London, established in 1660, is one of the oldest scientific societies in the world. It has around 1450 Fellows and Foreign Members drawn from all areas of science, engineering and medicine, including more than 80 Nobel laureates[2]. Data indicate that 39 scientists of Indian origin, who obtained their tertiary-level education from India, have been elected as Fellows of the Royal Society (FRS), London since the inception of the Bhatnagar Award, and out of these 23 are Bhatnagar Awardees (Table 1). The educational qualification of these 39 FRS indicates

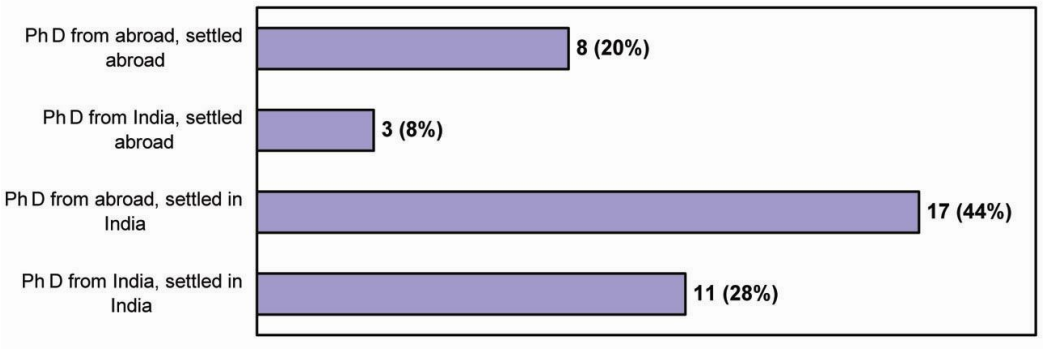

Figure 1. Educational background of Indian-origin Fellows of the Royal Society who obtained their tertiary-level education in India (1958–2014).