Is world ranking a mirage for Indian universities?

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Education in the post-independent India for 70 years now has largely been focused on earning a livelihood. The country as a whole, thanks to the meticulous planning and execution, has earned a name in space research at much less project costs compared to the developed countries. Where has the country failed in placing itself vis-à-vis higher education on a global scale and what ails our Science and Technology (S&T) falling short of global standards? Dearth of resources and lack of competence of the stakeholders cannot be the limitations. Central and State governments make budgetary provisions and the allocation has only increased over the years with due allowance for inflation. Our top-ranking scientists collaborate with world-class institutions and there is constant exchange of activities and knowledge. It appears all essential inputs are in place. Our school education which is so fundamental has taught us how to only succeed. The school system has become too intimidating that a child is not able to experiment differently on his/her own, fail and learn from his/her mistakes. The passion for a particular subject, art, skill or talent has to be nurtured with commitment. The right to education in the field of interest and excel has to be guaranteed by the constitution.

Virk[1] in a letter on Shangai rankings 2016 has expressed concern about the below-par performance by Indian universities. According to the rankings, institutions like IISc, IITs and Panjab University have achieved some recognition. Transformation by winning global recognition requires thoughtful planning, appropriateness and operational execution. This is possible only if the sturdy seeds are nurtured, planted and cultivated. The society as it is evolving should be conscious about its commitment. However, with the visible and wide economic disparity, a social commitment and investment in the future generation is a far cry. This note attempts to understand the challenges and suggest doable solutions.

The solutions come from personal experience. To the extent the present author loved his subject in a specialized field, his understanding of its negative side was not adequate; this resulted in a major accident in which he almost lost his left-hand fingers. That was the learning from failure and it has strengthened his resolve to continue to pursue his career in the specialized field. He is able to contribute considerably in the mainstream academic part of social empowerment thanks to such learning from failure.

Description of problem

In an issue of *Scientific American* there was mention about India lagging behind China at least by 20 years in STEM (science, technology, engineering and management). Plain truth. Until 1990s Indian economy was considered protected and owning a car was considered a luxury. The liberalization and economic scale of operation, resulted in job opportunities and global exposure for a limited population. During the tenure of A. B. Vajpayee as Prime Minister, sensing the opportunities in information technology (IT) and computer-based operations there was a clarion call from the concerned minister to all educational institutions to start offering courses in the related subjects. Like two sides of a coin, the odds were equally loaded in that transformation in education. Jobs were available easily for computer-educated young graduates; the earning was good and most of them were given on-site assignments. The widespread global exposure proved to be a game changer.

This gesture from the IT employers lured the best lot, including IIT graduates[2]. The demand for computer science still continues. Unconcerned about this exodus, the policy makers (fund providers like MHRD, UGC and state governments) and implementing academic bodies like senate and syndicate encouraged proliferation of IT and computer science programmes. This mass preference for a particular field of study affected other fields of science and engineering. Science was the worst affected. Early in 1993, Mashelkar and Rao[3] discussed about S&T in the post-liberalization period. The essay lists 26 recommendations mostly targeting publicly funded institutions. After 23 years that the country has not attained a respectable position in the global rankings shows that those 26 recommendations have not been well inculcated into the social structure.

The scientific achievement of a progressive country is measured in various metrics and predominantly in terms of publications. India has been able to publish only 100 highly cited papers in S&T in 11 years (1997–2007)[4]. The publishing agencies elsewhere have their own filtering mechanisms going mostly by the author's affiliation, application of precision equipment and analytical instruments of foreign origin, etc. Not every field of research or study would afford that luxury. The widening gap between India and the advanced countries in terms of research facility, including scientifically designed building infrastructure primarily with water and electricity needs to be taken note of[5]. As a result, however novel an idea or new knowledge generated enduring all challenges by a research teams, if it is not disseminated through publication the enthusiasm is killed. The equivalent Indian journals also suffer from similar prejudices.

The disproportionate importance given to IT and the apathy towards cultivation of conventional science form two core issues. Thirdly, fighting against all odds, the knowledgeable and skilled graduates that the country produces, at the end, take up research careers elsewhere. This problem exists in other countries like China and Korea as well. However, there is a mechanism in place in getting them back to associate themselves with research establishments in their country. Such initiative is yet to take shape in India. We only talk about nationalism. The change in policy with the change in regime at the centre and state levels affects the net output. However, establishments like nuclear, space and defence research teams which consume a major chunk of financial outlay remain insulated from this regime change.

The bureaucratic wrangles, particularly in the large number of state-funded institutions make an enthusiastic researcher helpless and de-motivated. In 2003 the S. K. Joshi Committee found that certain institutes (seven college

universities) under various state governments could not be upgraded due to various political and administrative or technical difficulties[6]. The purchase norms are archaic, and simplified and transparent procedures like e-governance have not yet taken any shape. As a result, there is always fear among the researchers in timely spending of research grants and in fulfilling the objectives for which the fund was sanctioned.

Our style of state involvement in S&T is unique. The officers (secretary level) connecting the institutions with the law makers (ruling government) take their positions always assuming that they would be shifted out anytime. As a result, however well meaning the individual officers and the academics are, there is uncertainty about continuity of any initiative. Therefore, it is always status quo; go by the rule book. The rule book may have been drafted when the institute was formed decades ago; and is no longer relevant.

Finally, the juggle in any academic institution like prioritizing the primary activities: teaching, research, extensional, popularizing research in science and engineering among the not-so-fortunate institutions and colleges. A handful of scientists seem to be getting a major share of all these activities and naturally when they are away on a particular activity, the remaining commitments suffer. Basically it is a one-man show. If the individual scientist is occupied elsewhere, then there is no show. This problem may be present in other countries. In India, decision making rests with only powerful individuals and the problem is acute. We work in silos and the concept of pooling the facility is being discussed now[7]; at the ground level very little progress has been made; the genuinely committed researchers are left to languish and forced to fall prey to poor quality of publishing in predatory journals[8].

What are the solutions?

The solution calls for cultural transformation. Concerted efforts are needed like meticulously identifying potential indi-

viduals and nurturing them. If the country's performance in the recent Olympics imparts any lesson, then it would imply that the individuals with grit and fire in the belly win laurels. Culturally, the fear of failure (diffidence) curtails our linear growth in any field and particularly in proving our worth in science and engineering. In the absence of social security, we have always been concerned about economic viability. There is no policy across the country in place to address minimum livelihood requirements. At the operational level, focus should have been about learning outcomes. Instead, it has been about buildings and budgets[9]. There has to be a constitutional provision. Instead, what is happening is mostly short-term solutions with the next round of elections in mind. This is not a conducive atmosphere for those who want to push themselves beyond boundaries and win global recognition.

Let me conclude by making the following points.

(1) The feeling of oneness and interest in the country as a whole must be the priority. Those qualified in their respective fields of interest and displaying sincerity of purpose in working on the objectives need be given leadership positions. Their personal needs must be fulfiled and it must come with immunity. A committed teacher can transform into an acclaimed researcher.

(2) There has to be a countrywide drive in identifying young and creative minds from schools, preferably when they are in class IX. These students are to be groomed as creative scientists and they must have a flair for studying in their mother tongue. After their class X, they must be put in science academy and allowed to explore what their interests are and how they can demonstrate them in terms of models, concepts, ideas, etc. There need not be any time-frame. However, the young scientists can always be given the option to submit themselves for a qualifying exam. In order to sustain their interest, they must be imparted state-of-the-art skills and talents. It is good to have one such academy in every state. There is no question of community-based preference.

(3) After passing the exam, they will be put in institutions of advanced studies in various disciplines and inter-disciplinary fields. Here the prospective scientists must be trained to draft technical reports in addition to pursuing their research activities.

(4) These initiatives must be given shape from the scratch and no question of mentoring from the present institutions so that the idea of global standard is inculcated right from conceptualizing the infrastructure.

(5) Courage and competence are vital to achieving the desired results and are nurtured by a sense of commitment. With constitutional provision, synergism can be created. Unlike the social engineering features based on community consideration, the right to excellence has to be individual-centric going beyond metrics based on economic and social strata. The democracy must allow every citizen the best opportunity to blossom, flourish and give back to the society.

The trigger for cultural transformation has to be ordained in the constitution.

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