Scientific Research and Development in Indian Higher Education: Problems and Challenges

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ABSTRACT

India one of the fastest growing economies of the world, is riding on a wave of academic revolution, amidst its population almost reaching one and a half billion. Consequently, there is a fierce competition in good and useful education. With resources becoming scarce and costly, there are few choices left to the young generation in its quest for learning. And, we are at a time when science and technology is at crossroads, making decisions difficult for students to opt basic science or plunge into the state-of-the-art industry loving technology tools, giving quick revenues. In this communication, educational pitfalls, challenges, and opportunities are discussed in order to cope up with the advancement of science and technology. Unfortunately, one of the scariest problems is, the system of selection of highly qualified and deserving faculty in India's most of the colleges and universities. Of late, this has become a matter of great concern and redressal at the earliest. Those who once get selected in a dubious manner, remain nothing more than, academic parasites for rest of their career. Seldom, meritorious achievements, quality publications, research and development experience are taken into consideration. This has to be eliminated at the earliest so as to preserve the sanctity and high standards of our education system, set-up so painstakingly by our earlier generations.

KEY WORDS: Higher Education, Research, Development, Science and Technology ,

INTRODUCTION

Riding a wave of academic revolution, as a country of almost nearing one and a half billion, competition in Indian education is cutthroat. And, we are at a time when science and technology is at crossroads, making decisions difficult for students to opt basic science or plunge into the state-of-the-art industry loving technology tools, giving quick revenues. Be it some entrance exams, admission to a particular school or even getting into a particular college or a university – the children are pressed for time and they have to perform better than others in order to succeed; which ultimately proves to be detrimental not only to the health of the young generation, but is also a wrong approach towards the entire learning process.

Choosing science as a career for teaching and research in higher education is on a decline, as other fast-track job options with greater transparency are available in corporate areas. Recently, in the US a young brilliant academic, abruptly left her PhD to become a content provider on social media, earning millions.

The learning culture in the Indian education system is highly exam-oriented, academic success-driven as well as rote memorizing. On the one hand, where there are highly successful elements within the system such as Indian Institutes of Technology (IITs), and Indian Institutes of Management (IIMs), Indian Institute of Science and Research (IISERs), there is still an even larger gap in overall quality, dropout rates after primary education and ability to respond to the increasing skill intensity of the international labour markets demand.

Indias biggest educational disadvantages has been the lack of high quality government primary and secondary schools across the nation because, historically, out of all the sectors, in terms of funding, education has never been given much emphasis, the annual budgets speak of the tragedy, coupled with the fact that appointments in such institutions, followed by salaries and grants for developments, have always been questionable. Mainly for these reasons, the majority of the government schools lack basic infrastructure and amenities. This is more so prevalent in areas where most of the schools

are inadequately endowed with even the most basic facilities such as ideal classrooms, sufficient washrooms, libraries, and laboratories. This poor infrastructure has an impact on the learning of the students and their development all around.

On the other hand, higher education has become expensive, most often denying the students from the low-income earner's family a chance to pursue their education. These paradoxes are the most problematic of the whole educational system, staring from primary to higher, ending in a chaotic situation for the public. Consequently, everyone is left with no option but to take a big loan to pay for the fees, or abandon the dream of getting an education. According to the findings of Skill India Report, (2019), and other reports from industry, special-purpose committees formed over the years have only served to reinforce the challenges and negative perception of the broader education sector, (The Indian Higher Education 2022).

In my career of more than four decades as a teacher and a researcher, I have seen teaching and research in our colleges and universities quite well. Appointments of faculty in colleges and universities have been the most crucial and challenging aspects of institutional development. Weak and unqualified candidates using all sorts of extra educational resources can be academic parasites for ever, damaging the very foundation of any institution.

Unfortunately, Indian system of selection of good and deserving faculty has mostly been questionable. There are very few instances of fair selection by large. Selection proceedings have often been challenged with little justice or almost none, as those who can manage the selection committees can also influence judgments using similar strategies. This is unheard-of in developed countries who give more importance to highly qualified and deserving candidates irrespective of cast and creed. What are the reasons for this disturbing and alarming situation which our temples of learning are facing of late ? Qualifications, experience, and other basic educational requirements have not changed much since the inception of institutions. Rather the calibre and potential of the candidates of the recent generations have risen but not with matching standards.

There is an over production of talent but with few takers of it. Political and social interference often dilutes the quality of education where ultimately the students and their future generations are at loss. Programs in engineering, computer science, and nursing consistently show the highest return of investments (ROIs), with lifetime premium earnings. For example, computer engineering graduates from top programs can expect lifetime earnings up many more times than other graduates. Business administration and economics degrees typically generate strong returns, financial managers with even a graduation for instance, accountants and auditors earn much more than pursuers of science have to toil for years, until they get their doctorates. Education is a big wheel in meeting the socio-economic, cultural and developmental needs of the nation and its citizens (Weber, 2011).

Indian institutions have started to improve their international rankings, research papers are rapidly increasing in international indexing databases such as Web of Science and Scopus. It can be observed that India has nearly tripled its count of Scopus-indexed documents in the ten-year period from 2010-2020 outgrowing every other country in the world. This increase seems unnatural compared to the more organic growth observed across the world in the major countries which have mature research ecosystems. Despite this quantitative growth in research papers published, none of the Indian universities rank among the best in the world in terms of research and development. After 2020, the rate of research publications has accelerated even further. For instance, till 2022 India had contributed over 550,000 documents in Scopus compared to a lowly 30,000 documents compared to second placed USA, (Gupta and Sawhney 2023).

One emergent trend in the higher education sector, is increased focus on quantitative data by the accreditation and ranking agencies. This has spurred the sector into a competitive overdrive with institutions vying for rankings and awards. This has also resulted in malpractices, systemic erosion, and gamification of the system with long term repercussions. Gupta and Sawhney (2023) have strongly argued against adopting purely quantitative measures for institutional assessment, suggesting measures which are holistic, broad-based, and better serve the needs of a country as diverse as India.

The last many years have seen the larger institutions enhance their fees significantly (FICCI Report 2021). The FICCI Report on the "Higher Education in India: Vision 2040" states that the cost of general and higher education has increased significantly over the last 10 years making it difficult for middle class Indians to afford it. An important trend of charging excessive fees from the students and burdening them with loans, which are difficult to repay, there has been a significant rise in the culture of hiring consultants, ranging from individuals, firms and companies which are mostly foreigners and are happier in revenues and converting the entire system consultant driven.

These experts take care of international faculty hiring and training, students' admission, facilities like arranging loans, housing. They also lure the institutes of international cooperation and signing the superfluous memorandum of understandings, serving as white elephants for the deserving. This almost leads to a vicious cycle of heavy investments, resulting in students suffering and not achieving their goals. Research shows that such an artificial and superficial system of faking excellence leads to short-term successes, inculcating a sense of artificial achievements, which lose meaning after a while. Other negative impacts of badly designed accredited systems include declining effects, cheating the system, task quality and privacy, (Thiebs et al 2014).

Gupta and Sawhney (2023) have concluded that quantitative measures, statistics and analytics are great tools for uncovering trends, as indicators of progress and determinants of productivity and outcomes. However, when they become

absolute measures of quality and strong incentives are linked to them, the system connives and collaborates to game them, which is not suitable for higher education.

In presence of an ever-rising stiff competition in older institutes of excellence like the IITs, IIMs and recent IISERs, most of the corporate like functionaries of private players in education, have been able to use quantitative outcomes to consolidate their brand value, admit a disproportionately large number of students and charge premium fees, without significant deliverables worth of their claims. This has impacted access to education for students who aspire to get admitted to such institutions and ultimately ruin themselves in the long run. Thus, it is time to review the present dispensation of ranking and assessing institutions based on purely quantitative outcomes.

Innovative qualitative assessments, selecting the deserving faculties, giving more importance to research and development, hands on trainings, use of sophisticated equipment, patents, good quality research publications of reputed publishers, doing away with forced PhD publications in predatory journals must be made mandatory. Selection of outstanding faculty is like creating and building a strong future for the institute. India needs to prioritize its own research by creating appropriate platforms for its publication and dissemination.

Around 2014 and onwards, Current Science, Indias premier fortnightly journal of Indian Academy of Science, Bangalore India published a series of communications on quality of research and education in Indian universities, including the doctoral theses which are literally manufactured on a large scale. Gunasekaran (2014) Ali (2014) pointed out the issues of publication ethics in the subcontinent, highlighting the prevailing menace and misuse of the fake impact factor-index concept, predatory journals, and the journal membership editorial board criteria. Evaluation of one's research quality in Indian universities and colleges for academic promotions has always been a complicated issue, often swayed by academic politics, nepotism and favouritism, (Ali 2014).

We have to make revolutionary and sweeping changes in our research set-up, including colleges and universities. The suggestions made by Gunasekaran 2014, Zare (2012, 2014) and Ali (2014), be strictly followed in all academic appointments, promotions and other research benefits of Indian institutions.

Stanford professor Richard Zare, appalled at the misuse of citation data and journal impact factors (IFs) in academic circles in countries like China and India, emphasized the critical importance of enlightened peer opinion in matters of granting tenure in research institutions. According to Zare (2012) Stanford and most other American universities do not pay much attention to the number of papers published, impact factors or H-Index of journals in which they are published. They depend entirely on the opinion of their tenured faculty members and outside experts. The evaluation of every faculty member is done annually, based on grants obtained, publications in top journals, and research projects completed.

Despite the concerns expressed by several others, (Keyser 2013, Pulverer 2013, Balaram 2013, Xue Li et al 2014 and Wouters 2014), on using journal IFs for assessing an individual's work, many funding agencies, assessment boards, research and development laboratories in India and other countries still use them as a surrogate measure of the quality of research by individuals for the selection and promotion of scientists and research fellows. In countries like China, South Korea and Turkey, scientists are paid cash incentives when they publish in high IF journals.

Similarly, Gunasekharan, (2014) has recommended that funding agencies will do well to look at the quality of research performed / reported instead of counting the number of papers. Otherwise, predatory journals will have a field day. Researchers also should explore the background of any journal by its publisher, place of publication, peer-review process, editorial board members and the quality of articles published in that journal before sending a paper for publication or accepting to be on its editorial board.

Ali (2014) had suggested that august bodies like University Grants Commission / and State Higher Education Commissions / Departments and other such boards must consider giving more credit to the quality of a research paper, rather than accepting at par papers published anywhere. At present, such fake research papers published in predatory journals make one a college or a university professor, frustrating those who strive hard for quality and publish with reputed publishers like Cambridge, Oxford, Pergamon, Springer, Taylor and Francis and others. Such a measure will naturally perish the predatory journals soon. An important aspect of assessing the quality of a paper would be to use the double-blind method by tenured expert faculty.

In spite of all the issues apparent in the Indian education system; however, it still looks good and has the potential to build a strong and robust educational system for the country. This is due to the fact that the spending is very less on our education as compared to others. India spends only 0.66% of its GDP on research compared to 2.44% by China, 2.74% by USA, 3.26% by Japan, 4.81% by Korea or 5.44% by Israel, (World Bank Data 2022). The world average for R&D spending during 2022 is 2.63% of GDP, which has gone up over the last 3 years, while Indian spending has remained stagnant.

Secondly, we have no dearth of talent, it is well known that Indian students have been the dominating force world-wide, our top 15 to 20 % students are truly world-class. We need to be patient with the process of "institution building" and realistic expectations should be set for institutions. Therefore, one can conclude that thanks to changes in the curriculum, or to the application of technologies rather than expecting the delivery of more money for the growth of credits helps to raise the quality of learning and the learning process becomes more significant.

The goal justified should concentrate on more effective strategies assuring learner individual development, equity, and the least cost. It will be a big relief to learn that if the right policies, innovations and the necessary commitment from all the stake-holders are in the right place, the future of education in India could be enhanced, matching to the glorious past, it had in the field of education and research.

CONCLUSION

Being one of the fastest growing economies of the world, India is riding on a wave of academic revolution, amidst its population almost reaching one and a half billion. Consequently, there is a fierce competition in good and useful education. With resources becoming scarce and costly, there are few choices left to the young generation in its quest for learning. And, we are at a time when science and technology is at crossroads, making decisions difficult for students to opt basic science or plunge into the state-of-the-art industry loving technology tools, giving quick revenues. It is recommended that despite all flaws and problems in higher education research and development in colleges and universities, much can be done to improve the dwindling standards of education, and a consequent decline in interest of students. Fair selection of highly qualified faculty, sans any kind of influence, developing basic science and technology infrastructure with the help of trained faculty must be on top priority. Once, the high education and research standards have been developed, the use of quality accreditation can make us achieve the much-required standards of education, which the country is known for.

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