Indian Technical Education Service (ITES) and Its Organization Structure - A Proposal to Improve Quality of Engineering Education

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***Abstract*—Engineering education in India is going through several quality issues such as increased un-employability among the passed graduates, unscientific selection processes which fail to find the right students with engineering aptitude, lack of availability of quality teachers in colleges etc. Of which, lack of quality teachers in engineering colleges is of primary concern among researchers in academia. However, the efforts to deal the quality issues by non-governmental organizations and researchers both at the social and engineering circles give some rays of hope. One such study is a proposal for training budding engineering teaching aspirants under the domain of a service titled Indian Technical Education Service (ITES), in line with the three All India Services viz. Indian Administrative Service (IAS), Indian Police Service (IPS) and Indian Foreign Service (IFS). The objective of this paper is to suggest a structure for a national academy for ITES.**

Keywords— ***Quality, Engineering Education, Indian Technical Education Service (ITES), National Academy, Research***

I. INTRODUCTION

Education is the acquisition of knowledge and skills; it also involves character formation and implicit transition of habits from one generation to the next. Higher education or tertiary education is an optional final stage of formal learning that occurs after secondary education. According to a study included in Global Innovation Index Report 2014 [2], higher education in India has grown over the last thirty years and this growth has occurred in teaching rather than research. It is interesting to note that the major share of this growth is limited to the fields of engineering, management and technology. This report also says that the public research in India is highly concentrated in autonomous research institutes instead of universities.

In India, the general perception of higher education is centered on engineering colleges or technical institutions and medical colleges. There are many issues in our engineering education system. Engineering education is the process that involves teaching and learning of knowledge and principles related to the professional practices of engineering. A disciplined and supervised learning is pivotal in engineering education because, it is to equip a person with the proper mix of scientific knowledge, mathematics and ingenuity capable to meet challenging problems.

Having said that supervised learning is important for creating capable engineers, a natural extension of this thought is the acute shortage of quality engineering teachers. Quality of teachers may be improved especially in engineering institutions if selfless efforts are taken by teachers themselves. For this, they need to be curious about what is happening around their field of study [5]. Another parameter that decides the quality of teachers is their access to good quality research. For the effective implementation of this, universities need to be transformed into institutions offering cutting-edge and quality doctoral programmes.

A recent study [1] conducted by the same authors dealt this important theme of improving the quality of engineering educators. We have proposed an innovative idea of forming a special service for young engineering graduates who are desirous to teach in engineering institutions. The service was named as Indian Technical Education Service (ITES). The paper also proposed certain guidelines for the effective realization of ITES.

The objective of this paper is to augment the ITES proposal and to present an organizational structure for an academy for ITES training. The remainder of this paper is organized as follows: Section 2 gives an account of the Higher Education scenario in India for the last thirty years with emphasis on Engineering Education. Section 3 provides a description on ITES and gives major guidelines to implement ITES as reported in [1]. Section 4 is the proposed organizational structure of ITES board and section 5 concludes the paper.

II. Higher Education In india

Though India is successful in reaching out to the orbit of the Mars using indigenously developed equipments with high degree of accuracy, designed by the scientists and engineers of Indian Space Research Organization, such laudable efforts cannot be cited from the Indian academia. It is an alarming situation that no Indian universities or institutes are able to make an entry either into the world university ranking or the world reputation ranking or the top 100 universities for engineering and technology ranking, according to data available from Times Higher Education [6].

There are a number of reasons that can be mentioned for the never-ending problems in Higher Education in India. Some of these reasons to be noted are given here.

a) Shortage of quality faculty in higher education
b) Declining standards of research
c) Complicated affiliating system
d) Too much regulations
e) Inflexible academic structure

It is high time that the policy makers and academic experts take emergency steps to fill the posts of quality teachers in universities and institutions of national importance across the country. One suggestion to improve the quality of technical education is the proposal of an ambitious programme like ITES [1]. As part of this service, certain important guidelines have already been framed, considering the grave situation of academics pertaining to technical education in the country.

In India, public funded research is limited within autonomous research institutions and privately run deemed universities [2]. Time has come to reorganize the university system in such a way so as, to convert them into full – service universities capable of undertaking quality research. It is imperative to note that, India must build true research universities by moving public research funding from the autonomous institutions to universities. This in turn is an impetus for the growth of graduate programmes helping both the education sector and the industry by providing good faculty and trained researchers [2]. With the introduction of more number of doctoral programmes having good quality that are at par with international standards, quality of higher education will increase automatically.

Another drawback of the Indian Higher education is the complicated university affiliating system of institutions. This makes the close observation of students and their grading somewhat a distant dream for teachers. Instead, if more autonomy is given to the institutions of higher education to assess their students to cope up with the growing challenges outside, the competency of the students may increase dramatically. Also, it is equally important that the teachers are adaptable to the volatility of market situations and are able to switch their teaching strategies accordingly with new skill sets.

Excessive regulations by existing regulatory framework like, University Grants Commission (UGC) and All India Council for Technical Education (AICTE), are not conducive to innovation or creativity in higher education, as per a note on Higher Education by the National Knowledge Commission of India [4]. The note also says that, currently the higher education system as a whole in India, is over-regulated but under-governed. This system has to change for more autonomy as in the case of premier institutions like Indian Institute of Technology (IIT), Indian Institute of Management (IIM), and, National Institute of Technology (NIT).

Lack of flexibility in academic structure, in response to changing requirements of industry, makes students obsolete in fast pacing technical courses. For instance, in the case of Indian School of Business (ISB), it is not accredited by the statutory body All India Commission for Technical Education (AICTE) [3]. This is because, ISB is not at all giving away any diploma or degree as well as it wants to retain the flexibility in running its programmes like Post Graduate Programme in Management in response to changing industry needs.

A. Engineering Education in India

Engineering education is also not insulated properly from the systemic problems stated already. It is to be noted that, this sector is the most badly affected in terms of the quality being offered in the country since the last two decades. According to Banerjee and Muley [7], India produces a large number of engineers every year, but of poor quality. In addition, the World Economic Forum in its Global Talent Risks Report 2011 [8] says that, only 25% of Indian professionals are directly recruitable by multi-national companies. Due to the eroding quality of engineering education, industrial houses are reluctant to recruit graduating students into their premises directly but have adopted a valid Graduate Aptitude Test in Engineering (GATE) score as the new benchmark of quality.

If the situation is closely watched, one can find many numbers of reasons in regards to the wear out of quality. The quality of the current engineering graduates is not at all comparable with the quality that was available some thirty years back [2]. One of the major reasons is the widespread nod for starting technical institutes and courses by the accreditation agencies and respective state governments.

This explosion of colleges led to recruitments of teachers at the entry level without much experience to teaching. It is also worth noting that, a certain percentage of the teachers are coming to this profession not mere out of real passion but out of certain compulsions. Majority of the teachers are directly recruited after their under-graduation without knowing much about what education is, particularly about the pedagogical aspects of engineering education, what values need to be there in an educator to shape the future generation of engineers, what professional skill sets are required as a teacher etc.

Therefore, if quality education is to be ensured, quality of teachers must be ensured first. For the new recruits in engineering colleges, currently, there is no major training programme like train the trainer. Motivation is also an important factor that leverages the best performance out of teachers. Motivation comes in different ways and one of them is the availability of decent salary and perks that are at par with the industry.

Thus to have quality teachers in this sector, a service has been proposed, which is called Indian Technical Education Service (ITES) in line with the three All India Services viz. Indian Administrative Service (IAS), Indian Police Service (IPS) and Indian Foreign Service (IFS) [1].

III. Indian Technical Education Service (ITES)

The Indian Technical Education Service is a noble suggestion [1] open to serious discussion among the academic fraternity because of the prevailing engineering educational scenario.

Currently there is no real benchmark for measuring the quality of engineering teachers, other than those performance indicators by the AICTE. However, these norms are not at all intellectually challenging. These norms help a teacher who completes a certain period of years in a particular cadre with just a handful of conference publications to be promoted to the next cadre without much scrutiny. It does not take into account, factors such as enthusiasm of the teacher towards his/her profession, dedication, passion in mentoring the students, depth of knowledge of the teacher in his/her chosen field of study, curiosity in research, quality publications both at the national and international levels, number of training courses and refresher courses attended etc.

Thus ITES in its current form can be considered as a stack of well-founded performance indicators in order to preserve the quality of teachers. Not only the quality, but also the suggestions for teacher recruitment, promotion, remuneration etc. are made part of ITES. These indicators are compiled as the guidelines of ITES [1]. Some key clauses of the guidelines are included here.

A. Guidelines for ITES

The important guidelines pertaining to the ITES includes are listed as follows.

- ITES should be the highest privileged and paid service in the Civil Service tier in the country for aspirants of engineering educators.
- A constitutional apex body having semi-judicial powers called ITES board should be set up for the selection, training and, tracking of the ITES professional.
- The structure of ITES needs to have different training academies - for pedagogy, for subject research and for civics. It is also proposed to have these three training academies situated at three geographically different locations.
- A multilayered training needs to be done for each ITES professional, with equal weightage on pedagogical skills, subject research and civics.
- Administration of the higher education department in state and central levels should come under ITES.
- All the engineering college teachers including private college teachers should come within the purview of ITES.
- Appraisal of ITES professionals based on strict performance indicators should be done for promotion and related support. Some of the performance indicators are teaching skills and aptitude towards research.
- The ITES qualifying test must be giving a unique identification number to each of the candidate who is passing this.
- The ITES should be appreciable to Indian nationals who are expatriates working as Professors in world–famous institutions like MIT, Stanford, University of California etc.

IV. National Academies For ITES Training

Each of the academies coming under the aegis of ITES needs to have separate governing councils with independent autonomy for functioning. Further guidelines regarding the faculty, strategy for training and about the courses are briefed below.

A. Faculty

- At the administrative level of the academy directory staff are maintained.
- The directory staff shall comprise of a Director, enough number of Additional Directors properly assisted by enough number of Joint Directors and Deputy Directors.
- All the directory staff for the academy should be drawn from the ranks of serving ITES professionals from various educational services (at the central or state levels) including state-controlled universities or central universities.
- Director and Additional Director(s) should be a senior officer of the rank of an Additional Secretary to the central government in the ministry of HRD or ministry of education at the state level.
- Joint Director is of the rank of a Joint Secretary to the central government in the ministry of HRD or ministry of education at the state level.
- Deputy Director is of the rank of Deputy Secretary/Director to the central government in the ministry of HRD or ministry of education at the state level.
- The directing staffs are concerned with the organization of training courses and the overall administration of the academy. They are responsible for guiding the probationers and helping them to develop as good engineering teachers. In addition to this, they also do a considerable amount of teaching in the field of general engineering pedagogy. This includes delivering lectures and holding discussions with small groups of probationers. They also exercise general supervision over the running of the academy and various extra-curricular activities in the academy.

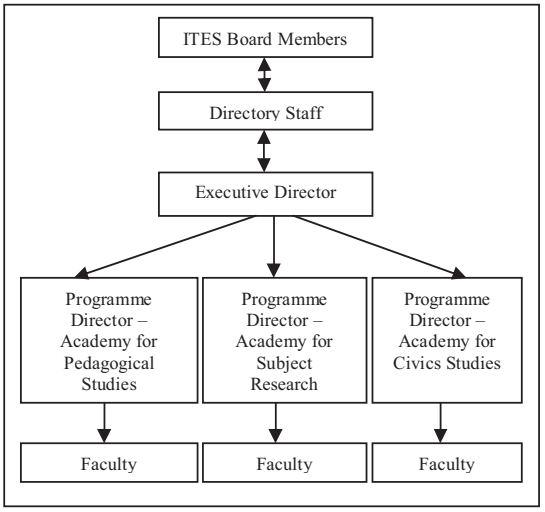

Fig.1. ITES Organization Structure

- The teaching staff at the academy shall consist of Professors and Readers. They are drawn partly from Universities and partly from among the ranks of ITES professionals. Majority of the posts are filled either by taking them directly onto the pool of academy staff or by drawing people for limited periods on deputation from educational institutions of national eminence or from universities.
- Recruitments to the ranks of the teaching staff are done through the Union Public Service Commission.
- It is mandatory that teaching staff should also be serving as counselors according to their trades similar to cadres of IAS like Kerala cadre, Bihar cadre etc.
- Teaching staff should be serving as coordinators of different faculties too.
- The academy should be maintaining a number of clubs and societies for which primary in-charges and secondary in-charges among the teaching staff should be selected. The clubs and societies are necessary for maintaining tranquility of the mind of probationers. They can organize cultural programmes, informal healthy debates and discussions etc.
- The constitution of this academy should be having an ITES board to continuously evaluating the ITES professionals across the country based on some performance indicators; strategy for which needs to be formulated too.

B. Strategy for training

The objective of the ITES academy is to build engineering professionals for teaching with exceptional pedagogical skills, good psychological skills and sharpened problem solving skills. High moral standards, exceptional professional competence and good humane behavior are some of the additional outcomes expected out of the training at the academy.

C. About the courses

A dynamic set of courses are required to be taught in the academy for shaping up good engineering teachers with a strong inclination towards research. Courses are to be framed even to enhance policy formulation capabilities with regard to education at the university level and even at the Government level. This ensures that a typical ITES professional after a few years of service may be considered to the post of Secretary or Additional Secretary or Joint Secretary to the education ministry. Further study is required to finalize the set of courses to be offered in the proposed academy.

V. CONCLUSION

The proposition of a National Academy for ITES training is an extension to the study conducted by the authors. In this paper, the authors propose an organizational structure to the national academy for ITES. The administrative layout of the academy, the strategy for training and the mainstreams of the courses to be included in the training are also discussed. This is not an exhaustive study on the structure of the national academy for ITES professionals. More clarity needs to be drawn on the responsibilities of the people involved and about the courses to be included for the probationers. The authors suggest that the implementation of ITES may increase the quality of engineering educators across the country. Discussions regarding ITES, its structure, difficulty with which this can be implemented etc. need to be subjected to scrutiny.

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