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Transforming technical education: Initiatives for implementing faculty training

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ABSTRACT

The teaching and learning ecosystem is undergoing a massive transformation, hence it is increasingly becoming challenging for the faculty to effectively interact and teach students. With rapid changes, evolution, and augmentation in technology, the undergraduate courses are predominantly diversified with emphasis on specialization. As a matter of fact, the prominence of technology as a part of human education cannot be denied. From the ancient days when technology was just going through its teething phase, till today, when most students are equipped with several portable technological devices at any given time, technology continues to drive educational competence to newer intellectual levels. The methods for all domains of education are also altering, newer ones are introduced while older ones being obsolete. This paper reviews the various aspects of training needs for faculty engaged in technical education. It concludes that today's scenario demands technical faculties, with leadership qualities, enhanced soft-skills, able to face work pressures and new challenges, all this along with their domain knowledge as well as interdisciplinary exposure. This necessitates strategic initiatives for implementing faculty training and will surely enable us to witness a superior standard in technical education in the immediate future.

Keywords— Faculty, Technical education, Technology, Engineering, Soft-skills, Leadership, Pedagogy

1. INTRODUCTION

The environment of the teaching and learning process is undergoing a substantial change, hence under the challenges thrown up by this constant change, the faculty-student interaction also is witnessing a massive transformation. The job of the faculty is now more demanding. Since the undergraduate courses are predominantly diversified with emphasis on specialization and significant evolution and augmentation in technology, the scenario has altered to a newer height. As a perpetual fact, the prominence of technology as a part of human education cannot be denied. Today's students have easy access to several portable technological devices at any given time, hence technology has totally driven educational competence to newer intellectual levels. The educational means and methodology for all disciplines of education are constantly changing, newer mechanisms and processes are being introduced while previous ones turning obsolete. In the context of technological education, the role of technology seems more pertinent, valid and evident now more than ever. The present generation of students is fascinated by alternative teaching techniques and learning tools, in the wake of ICT tools, educational apps, online access to libraries and the like. Moreover, for the engineering domain, this passion for turning towards technology-driven learning devices is furthermore. In such conditions, the job of the faculty has inevitably become extremely demanding as compared to their predecessors. Here arises the ultimate need for an enormous metamorphosis of the teaching community, which can only be accomplished by effectively and continuously training our faculty to exceed and to proficiently assuage the technical acumen of students. Eventually, the dire need for training the faculty does come to the forefront and is incessantly appearing to be an urgent need of an institution or university. Faculty Development programs certainly transform faculty members to update their teaching skills pertaining to their domains, even interdisciplinary exposure, and facilitate innovative approaches to develop the appropriate pedagogical tools for the teaching-learning process.

2. BACKGROUND

Tracing back the history of technical education in India the impulse of which came from the British Raj rulers, in pursuance of the Government policy, three Engineering Colleges were started by about 1856 in the three Presidencies. Calcutta College of Civil Engineering was started in the year 1856 in Bengal Presidency, which came to be known as the Indian Institute of Engineering Science and Technology, Shibpur. [1] In the Bombay Presidency, the Overseers' School at Pune which was later known as the College of Engineering, Pune and was affiliated to the Bombay University in 1858. In the Madras Presidency, the Industrial school attached to the Gun Carriage Factory became ultimately the College of Engineering, affiliated to the Madras University in the year

1858. [1]Technology education from back then to now has witnessed the enormous transformation. Today in the age of globalization and our perception in the global perspective, the American system has also witnessed an evolution in engineering education. [2] Since it began in the 19th century through World War II, which consisted almost exclusively of the shop, drafting, and laboratory courses asserting mainly on needs for industrial practice. Post World War II there was a major shift from a practical approach toward scientific and mathematical fundamentals. Later by the early 1960s majority of the old hands-on courses witnessed an intensive replacement by lectures. In the context of the Indian technical education a similar metamorphosis took place, wherein the practical hands-on approach were pushed to back stage while classroom lectures took centerstage. Everything said and done, we all unanimously agree that in this age of easy access to advanced learning tools for the student community, constant training for the faculty for the upgradation of their knowledge and to chisel their skills is a must. This seems to be the only approach for the teaching community to be one up to students to facilitate the flow of knowledge further and maintain their grace and grandeur, to leave a lasting impact on the lives of students.

3. LITERATURE REVIEW

A study conducted in North Carolina State University discusses a model for engineering faculty development. [2] It outlines the faculty development program structure and summarizes the program assessment data and discusses possible implications for reform of engineering education. The primary challenges facing the SUCCEED faculty development program at its inception were first, the traditional reluctance of faculty members to participate in professional development. A study states that there is a direct correlation between the Emotional Intelligence and teaching performance of faculty members at both medical and engineering colleges.[3] This, therefore, suggests that a constant upgradation or training and assessment of the Emotional intelligence of faculty members is a must for benchmarking engineering education for any professional institute or university. A journal article titled “A Makeover for Engineering Education” published states that the changing nature of international trade and restructuring of the industry demands new materials and methods for engineering education, and in this scenario, it is not able to keep pace with the demands of changing trends.[4] Now obviously in such dynamics, it is crucial for the engineering faculty to be regularly upgraded to match the demands of the constantly changing technology and the needs of the corporate and the industry. A paper discusses the teaching culture at the University of Illinois at Urbana-Champaign which is transformed under the message of “teach like we do research.” [5] This is done to stimulate innovation and excellence. Under this model of change, they organized faculties into course-focused so called (CoPs) Communities of Practices, which would integrate and sustain the use of RBIS that is Research-Based Instructional Strategies, into their courses. A research-based study discusses Barriers to Faculty Pedagogical Change due to lack of training, time and incentives, leading to tensions with professional identity.[6] An American Society for Engineering Education initiative in 2006 discusses the emerging gap between the vision for how engineering education should be and the actual, they attempted to bridge this gap by engaging faculty, chairs, and deans in the discussion of change in engineering education.[7] In terms of the scenario in India steps taken by The All India Council for Technical Education have been outlined in details in its manual for a Comprehensive Training Policy for Technical Teachers April 2018.[8] This discusses at length the training requirements for technical faculties. It goes on to discuss that the “rapidly changing technological scenario and ever-increasing global connectivity as well as competitiveness in modern times, the role of technical education in development has become very significant and challenging. Also, as a consequence of intensive technological developments, the concerns of sustainability, environmental degradation, resource depletion and inclusive growth have become more relevant. The need for well-qualified engineers/professionals is more critical with complex problems that affect the quality of life of everyone everywhere, and also for businesses seeking well-rounded engineers and professionals who can take on leadership roles.” It, further states that “The teaching professionals or teachers join this profession immediately after the completion of their post- graduate or research degrees and then progress in their career. As of now, there is no training, which prepares them to take on the role in the teaching profession.” The AICTE council in its 49th meeting held in March 2017 approved a proposal of improving the quality of technical education in the country. The strategies include an extensive revision in the current curricula, training of teachers, and student orientation program at the time of induction, examination reforms, etc. But pertaining to our discussion, the most important among these was to formulate a comprehensive ‘training policy for technical teachers’. In a paper presented in Proceedings Frontiers in Education discusses future engineering faculty, that is an engineering graduate who wishes to pursue teaching as their career, on how they think about teaching.[9] An article discusses a faculty development program at the University of Cincinnati, where the developmental grant proposals were for individual faculty, groups of faculty and departments and more than 800 faculty members applied over a three-year period out of which nearly 400 faculty were funded.[10] A paper concludes “ The vision of Preparing Future Faculty—to prepare graduate students for academic life while providing the tools for students to choose the best fit in the diverse arena of colleges and universities—can be easily adopted as a vision for any engineering department that includes a doctoral program.” [11]

4. ADOPTING NEW TECHNOLOGY

In today’s competitive culture, it is increasingly becoming challenging to teach at professional institutes. When it comes to engineering institutes, technical faculty must deal with a lot of different issues at the same time. Achieving meaningful technical education obviously revolves round many factors, the most pivotal roles are obviously that of the faculty of the institute and their knowledge delivery systems. The role of the Faculty, especially in an engineering college, is quite pivotal as they are accountable for multitasking like planning and implementing the new things, they are expected to be managers, counsellors, psychologists. To make the lectures effective, classrooms must have a learner-friendly atmosphere, the usage of ICT teaching tools with students and teachers entering into a mutual alliance with technology to promote, endorse, nurture and embrace the learning process. Thus, adopting technology in education transforms ideas and sources to make the finest of the learning environment. Apart from this, technology can make education affordable.

5. CHANGING SCENARIO IN PEDAGOGICAL METHODS

In such a case a constant strategizing of the pedagogical approach needs to be done at the institutional or university level to standardize the system. For thi, the constant development of the faculty members needs to be undertaken to upgrade and update

their skills. The teaching community has been known since ages for inspiring hope, igniting the imagination, instilling the desire for learning, in turn shaping the society. Teachers often deal with students from multiple cultural, racial, economic and social backgrounds. This can sometimes result in conflicts amongst each other causing commotion and disturbance.

This implies that apart from technical knowledge the teaching fraternity must be adept with multidisciplinary skills specifically those pertaining to emotional intelligence, to be able to handle interpersonal relationships judiciously and empathetically. A study in a healthcare institute states that “Communication is the most important part of any educational process, the aim of which is to transfer or exchange ideas and thoughts [12]. It would be provided appropriately if academic members had communication skills. Considering the important role of academic members in the educational process, in this study, the knowledge, attitude and performance of academic members.” Hence not only communication skills but developing a positive attitude amongst other interpersonal skills often assists to enhance performance. Carrying a positive attitude is very important for a teacher. It affects the students in multiple ways and can shape their learning classroom experience, which often leads to the impact created by the teachers in classroom performance which makes the student retain the knowledge imparted. In most of the cases, attentive students sense the teacher's moods and attitude, and hence their behavior in the classroom changes accordingly. As a faculty, we often experience stress that weighs us down all throughout the day. This can surely affect our classroom performance if we cannot deal with stress in the most logical way. Hence stress management should be an imperative part of a faculty development program.

6. EXISTING NITTTR

The National Institute of Technical Teachers Training and Research (NITTTR) was established as an autonomous Institute as an initiative by the Ministry of Human Resource Development, Government of India in the year 1964 in Chennai, to improve the quality of Engineering Education system in India Within this mandate, initiatives were taken to offer need-based Human Resource Development programmes through appropriate means at the same time develop curricula and instructional resources. This programme boosts research in the inter disciplinary area of Engineering Education and also offers consultancy and extension services for the total development of Engineering Colleges, Polytechnic Colleges, Vocational institutions, Industry, Service sector and the Community at large. NITTTRs are also situated at Kolkata, Chandigarh and Bhopal.

7. TRANSFORMING TECHNICAL TEACHERS

7.1 Leadership qualities for teachers

By now having great leadership skills has been established as one of the greatest attributes in workplace culture. This is not only recognized in corporates or business organizations but in other sectors too. Individuals with a vision, who can take initiative, can strategize, plan, and accomplish goals to achieve their vision are considered as good leaders. They demonstrate leadership skills while working in teams for effective organizational outcomes. An important attribute of great leaders is that they are approachable and the same holds true for teachers too. Great teachers must be easily approachable so that the students feel a comfort level to get their queries solved. Apart from this attribute, we know that the other leadership skills are also highly important for faculty members to excel in in their educational arenas. We know that teachers too come from various cultural, societal and economic backgrounds, wherein many find it difficult to adapt to the institutional standards, though being very sound in their academic values. In such cases, it is rather imperative to include these skills in their training modules. In a research leadership capability levels of teachers were determined by a certain scale [13]. As a conclusion, they found that leadership quality was not subject to age or gender specific. Critical thinking which an important leadership quality is is an attribute required for faculty too. In the changing educational setups, it is mandatory to work in teams, to practice critical thinking so that the same can be propagated amongst the students. In this competitive age, students need to master various additional skills to complement their educational portfolios so that they can be successfully placed in life. They surely look up to the teaching faculty for accruing this value. Hence it is mandatory for us to first excel in these skills to propagate or instil the same in our students.

7.2 Soft skill development

Possessing Soft skills or having higher Emotional Intelligence enables professionals to be worthy employees having personal qualities such as a positive attitude, superior communication, planning and organizing, critical thinking, interpersonal skills and much more. Hence in today's scenario, these attributes are a must for the Faculties. This improves their personal and social competencies, which promotes a better teacher-student relationship to stimulate a superior learning environment.

7.3 Domain expertise

The rapid and constant change of technology, on one hand, improves our lifestyle but on the other hand, this very pace of technology creates the need for updating the knowledge on a regular basis, as the rate at which it gets updated, it gets outdated as well. The education industry must adapt to the challenges propelled by global competition. Being updated in domain expertise at all times is a must for technical faculty. In today's times, it is rather needed to have exposure of interdisciplinary knowledge too.

7.4 Challenges for faculty development programs

We all know that the teaching profession is not sufficiently rewarding in terms of monetary gains hence to keep this fraternity constantly motivated is the biggest challenge. Achieving meaningful engineering educational reform on a national scale would call for massive upheaval. A challenge worth mention, for conducting faculty training programs would lie with experienced faculty members, as most seasoned professors would resent being told that their teaching techniques need to be improvised. Hence initiating with the fresh and lesser experienced professoriate could fetch greater results. Training programs would definitely mean investing in both time and material resources. Hence implementation of such programs would need focus. The AICTE in its Comprehensive Training Policy for Technical Teachers 2018 has outlined the need and mandate for teachers training in technical institutions. This document outlines that in our country, we have observed that in the past few decades there has been a spectacular increase in the number of technical institutions. However, the thrust on improving the quality of education in such a wide spectrum of institutions

has been lagging. A large number of technical institutions exist in the country where a huge number of teachers are employed and being recruited [Numbers available in AICTE website]. It is estimated that at present, around 30,000 teachers are being recruited afresh every year in these institutions.” They have also outlined that technical teaching profession now no longer attracts the best academic performers rather most of the times it is the last choice, hence, to motivate academically brilliant candidates to take up the teaching profession and groom them for coping up with the quality of education is indeed a challenging job. All this is indeed a vicious cycle and often leads to degradation of the quality of education. The AICTE in its 49th meeting held in March 2017 comprehensively deliberate don these issues and after several discussions held with stakeholders in technical education, approved a package of effective measures for improving the quality of technical education in the country. One of the measures includes training of teachers as mandatory though implementation of the same would need careful follow-up and will surely be an uphill task but would fetch great results. In most of the countries across the globe colleges are run as government funded, private run, non-profit or for-profit and the like, hence standardization of any educational process is a challenge. In such scenarios, the faculty development programs must be rendered due weight by the authorities to take technical education to higher levels.

8. DEVELOPING RESEARCH SKILLS

While investigating the status of research done by Indian scholars, we often conclude that most of the researchers of Indian origin are from universities of advanced countries like the United States, the UK [14]. India is not yet a major player in the global player as far as research is concerned. Our publications generate fewer citations on an average than do those of nations, including advanced and emerging countries too. The reasons for such underrated outcomes are due to lack of funds, trained faculty or exposure to advanced research opportunities. This often reflects in the overall research scenario and the number of faculties with PhD degrees, to match the global profile. Hence a suitable culture of research must be developed by constantly focusing on this aspect. To recognize the increasing importance of having a research culture in an institution, the Faculty members must be expected to maintain scholarly activities, including conducting research and publishing scholarly works.

9. NEXT STEPS

The education industry needs to gain new ideas, perspectives, and strategies based on current studies to identify the training needs of their faculties, that could improve their in- classroom performance and effectiveness. Training for faculty should be granted top priority and a clear-cut strategy must be chalked out to implement the same from time to time. Though the AICTE has approved a package of effective measures for improving the quality of technical education in the country but implementing the same on a massive scale will require constant monitoring by the competent authority.

10. CONCLUSION

Under this existing scenario with the teaching and learning ecosystem undergoing a complete revolutionary transformation, the teaching community is facing multiple challenges to effectively interact and teach students. The reasons are many and inevitable with rapid changes, evolution and augmentation in technology, the faculty especially of technical institutions need to be constantly and continuously trained in various aspects. Apart from subject knowledge, there are various other attributes which can entirely change their performance in the education industry. Many of these attributes are now mandatory. Everything said and done, today’s scenario demands technical faculties, with leadership qualities, enhanced soft-skills, able to face work pressures and new challenges. All this along with their domain knowledge as well as interdisciplinary exposure. For the same obviously, strategic initiatives for implementing Faculty Training programmes will surely enable us to witness a superior standard in technical education in the times to come.

11. REFERENCES

- [1] https://en.wikipedia.org/wiki/Engineering_education_in_India.
- [2] Rebecca Brent; Richard M. Felder; A Model For Engineering Faculty Development; Intl. Journal of Engr. Education, 19(2), 234–240 (2003).
- [3] Ajeya Jhaa, Indoo Singh, Teacher Effectiveness in Relation to Emotional Intelligence Among Medical and Engineering Faculty Members; Europe’s Journal of Psychology, 2012, Vol. 8(4), 667–685.
- [4] Wulf, Wm. A., and George M. C. Fisher. “A Makeover for Engineering Education.” Issues in Science and Technology 18, no. 3 (Spring 2002), pp. 35-39.
- [5] Prof. Matthew West; Dr Geoffrey L Herman; Mapping the Spread of Collaborative Learning Methods in Gateway STEM Courses via Communities of Practice; 122 ASEE Annual Conference and Exposition 2015 6 American Society for Engineering Education, 2015.
- [6] Sara E. Brownell, Kimberly D. Tanner, Barriers to Faculty Pedagogical Change: Lack of Training, Time, Incentives, and Tensions with Professional Identity? CBE—Life Sciences Education Vol. 11, No. 4 13 Oct 2017.
- [7] Mary Besterfield-Sacre, Monica F. Cox, Maura Borrego, Kacey Beddoes, Jiabin Zhu; Changing Engineering Education: Views of U.S. Faculty, Chairs, and Deans; The Research Journal for Engineering Education, 25 April 2014.
- [8] AICTE; A Comprehensive Training Policy for Technical Teachers, April 2018.
- [9] J. R. Mountain and A. D. Riddick, "Determining the Age for Engineering," Proceedings Frontiers in Education 35th Annual Conference, Indianapolis, IN, 2005, pp. S1F-S1F. doi: 10.1109/FIE.2005.1612182 IEEE Xplore: 03 April 2006.
- [10] Lathan D. Camblin Jr., Joseph A. Steger, Rethinking faculty development, Higher Education (2000) 39: 1.
- [11] Doris R. Brodeur, Peter W. Young, Kim B. Blair, Problem-Based Learning in Aerospace Engineering Education; Proceedings of the 2002 American Society for Engineering Education Annual Conference & Exposition Copyright 2002, American Society for Engineering Education.
- [12] Gholam R. Sharifirad, Mohsen Rezaeian, Akram Jazini, and Zinat S. Etemadi; Knowledge, attitude and performance of academic members regarding effective communication skills in education; J Educ Health Promot. 2012; 1: 42.

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