**Creating Sustainable and Outstanding Institutional Culture in Engineering Education in India to Develop High-Performing Institutions**

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***ABSTRACT-* Most of Indian engineering institutions have not updated their institutional culture even though many disruptive technologies have impacted engineering education. This has affected the development of the faculty members, modernization of outcome-based engineering programs, attributes of the graduates, human capital development, contributions to knowledge capital growth, and institutional development. The National Education Policy 2020 has envisaged the growth, development of many innovative programs, and award of degrees by the colleges in 2030 without any affiliation to the universities. The global competition in planning innovative products, design, product development, manufacturing, and maintenance has created many challenges in the institutional culture and institutional development. All of these, center around facilitating, mentoring, decentralizing, and empowering the high-performing faculty members. This research work provides a set of guidelines like a belief in faculty responsibility, autonomy, and scaffolding the high-performing faculty teams, a culture of continual training, interdisciplinary and industry-relevant courses and programs, a challenging research and development environment, mentoring the faculty members to bring excellence in human resource development, open communication, cooperation and collaboration, and super leadership to change the obstructive culture to high enabling culture of the engineering institutions which will facilitate the growth of institutions through interdisciplinary and high-performing faculty teams.**

***KEYWORDS:* Obstructive Culture, Cultural change, Organization Development (OD), Empowerment, Decentralization, Autonomy of the faculty members, High-performing institutions.**

1. **INTRODUCTION**

In this 21st century, the growth of disruptive technology challenges engineering education and global universities have continually updated their administrative culture by introducing autonomy, decentralization, empowering, scaffolding the high-performing faculty teams, eliminating the obstructive policies in recruitment, introducing equity, ethics, and integrity in facilitating the achievement of motivated faculty team members. They also focus on the recruitment of diverse faculty members and offering interdisciplinary programs. They support cooperation and collaboration among various global universities, transnational companies, and corporate universities. Institutional culture is similar to subsoil conditions and institutional development is similar to the superstructure. It is very difficult to build a strong superstructure on weak soil. In situ improvements are essential for bearing a strong superstructure. In India, such culture has been adopted by the institutes of national importance but many existing affiliated tier II and tier III institutes have not updated to supporting culture. They have yet to establish strategic planning with a vision and mission for creating high-performing institutions. They yet to focus on continual faculty development, academic audit, and establishing consultancy units, and research parks. The National Educational Policy 2020 has focused on: Quality Universities and Autonomous Colleges, Institutional Re-Structuring and Consolidation, Towards a More Holistic Education, Excellent Learning Environment, Selection and Development of Achievement Motivated High-performing Faculty Teams, Equity, Integrity, Ethics, Promoting High-Quality Interdisciplinary Research and Development Programs, Effective Governance and Leadership, and Continuously Transforming Regulatory System of Higher Education.

 **Current Scenario Observed by the Draft NEP2019:**

* Liberal education is lacking in higher education
* Optimal learning environments and support for students are not adequate
* Energized, engaged, and capable faculty are inadequate
* Professional education has to be improved
* Research capacity has to be expanded
* Multidisciplinary education has to be introduced
* Beneficial linkage among government, industry and researchers is not strong

All these have to be modified rapidly by adapting sustainable culture.

**Desired Improvements Suggested by NEP 2020**

* Quality universities and colleges are needed
* Existing institutions have to be restructured
* Motivated, energized, and capable faculty have to be supported
* Equity and inclusion in higher education are essential
* Effective governance and leadership for higher education institutions are urgently required
* High-quality research has to be promoted

All of these transformations are based on a high-performing culture. Without a supporting culture, it will be very difficult to achieve excellence in higher education.

1. **RESEARCH OBJECTIVES**
* To critically review the current scenario concerning the culture of engineering institutions in India
* To analyze the problems faced by the high-performing faculty teams in engineering institutions in developing global networks, planning diverse global faculty training and development programs, bidding for development programs under International Development Agencies, and getting nominations to undergo development programs offered through bilateral agreements with developed countries, participating in the international conferences, and offering interdisciplinary postgraduate and doctoral programs for the international faculty members.
* To suggest needed cultural changes to overcome the problems stated above.

**Research Methodology**

A snap study has been undertaken to identify the shortcomings of institutional culture in tier II and tier III engineering colleges in the southern region only. Affiliated government colleges, autonomous colleges, and affiliated self-financing in Andhra Pradesh, Karnataka, Kerala, and Tamil Nadu are considered. Guba’s naturalistic evaluation procedure was adapted.

Population and Sample: 92 middle-level faculty members from engineering and technology who attended at least two faculty development programs on Institutional Development, Creating Centers of Excellence, Offering Consultancy Services, Bidding for Training and Development Works, etc. All of those faculty members possessed at least 15 years of service. 61 men and 31 women faculty members are sampled. 55 members possessed master’s degrees and 36 members possessed doctoral degrees either through part-time or under the quality improvement programs of AICTE.

1. **LITERATURE SURVEY**

Culture refers to the ideas, customs, and social behavior of a set of administrators, faculty members, technical support staff, office staff, and students in an institution. The meaning of culture is the customary ethnic groups, beliefs, social forms, and material traits of diverse faculty teams in an institution. Peterson and Spencer (1991) define institutional culture as the deeply embedded patterns of organized behavior and shared values, assumptions, beliefs, or ideologies that members have about their organization or its work. Institutional culture blends ideas of organizational culture and the disciplines of the institution. This includes the way things are done, what exists, and how things should be done. This also enables the kind of reflexivity necessary to clarify an institution’s identity while highlighting its singular qualities (William Tierney and Michael Lanford, 2018). According to Swidler (1986), culture is the toolkit of habits, skills, and styles with which individuals construct, how they negotiate challenges, and how they would interact and behave. He also discusses beliefs: about the institution, these would be about its nature and what it means to exist within it. In recent years, colleges and universities throughout the world have engaged in an impressive number of institutional initiatives and activities (William and Michel, 2018). Eckel and Harley (2008) observed that universities courted private donors, forged alliances with dissimilar institutions, and cemented entrepreneurial partnerships with a variety of corporate entities to promote research and cultivate ties. Lanford and Tierney (2016) have stated that many prominent universities have explored the viability of building branch campuses in foreign countries to nurture global networks and recruit students. Jongbloed et al. (2008) have stated that many national governments focused on improving the skillsets of workers to meet the challenges of a knowledge economy have encouraged tertiary institutions to plan new degree programs and expand access to students from previously underrepresented ethnic and socioeconomic backgrounds. William and Michel (2018) concluded that the identity of a university campus is not often easily definable, especially since the culture of an institution is both subjective-depending on the perspectives and motivations of different individuals- and complex-moving beyond the descriptive clarity offered by organizational chart and quantitative measurements of institutional progress.

**Synthesis of Culture Advocated by Various Researchers**

The following statements have been synthesized based on the above research work:

* Institutional culture refers to the ideas, customs, and social behavior of administrators and other human resources
* Deeply embedded patterns of organizational behavior
* It reveals the shared values, assumptions, beliefs, or ideologists
* Blends the ideas of organizational culture and the disciplines of the institution
* Includes the way things are done, what exists and how things are to be done
* Culture is the toolkit of habits, skills, and styles with which individuals construct, how they negotiate changes, and how they interact and behave.
* It also indicates the processes adopted to generate additional revenue
* It focuses on planning various courses and programs for different clientele
* Culture focuses on the dynamics of institutional growth
* It exposes the shortcomings of the present culture
* It provides the dynamism in solving complex problems through blended programs
* It opens many innovations in planning industry-specific and interdisciplinary programs
1. **METHODOLOGY OF INCULCATING THE DESIRABLE INSTITUTIONAL CULTURE**

It is through the institutional performance, changes brought out, human capital created, knowledge capital developed, services offered, recognitions exhibited towards the high-performing faculty teams, steps taken in globalizing the engineering education, dissemination of research findings, etc. All these factors can be assessed through feedback from the achievement-faculty members who are highly qualified and contributed to their excellence and teamwork. They are the faculty who depend on excellent administrative culture.

**Research Questions**

The following research questions are used to assess the existing culture of tier II and III institutions.

1. Whether your institute established its vision and mission through strategic planning with the involvement of all faculty members?
2. Whether your institute encourages the faculty members to plan interdisciplinary postgraduate and doctoral programs in cutting-edge areas?
3. Whether the leadership of your institute established the culture as suggested by the NEP 2020 for the institute with the faculty and students?
4. Whether the administrator has shared the policies in encouraging the faculty members in undergoing training and development programs through bilateral agreements with some advanced countries?
5. Whether the leaders show any interest in global networks with advanced institutes in various developed countries?
6. Whether the leaders have followed good culture in identifying high-performing faculty members and offered a higher academic cadre?
7. Whether the administrator recognized the excellence of the faculty members in research, consultancy, and extension services?
8. Whether the institute has followed ethics in the recruitment of the faculty members?
9. Whether the leaders have promoted integrity, reputation, and high-performing culture of the institute?
10. Whether the leaders have jointly planned any innovative training and development programs with various funding agencies like Defence Research and Development Organization (DRDO), Council of Scientific Industrial Research (CSIR), All India Council of Technical Education (AICTE), Indian Society for Technical Education (ISTE), etc.?

**Table-1: FEEDBACK FROM THE PARTICIPANTS**

The participants have indicated their feedback through Kirkpatrick four-point scale and are presented in Table 1below:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| S. No. | Cultural Factor Description | Excellence% | Very good% | Good% | Fair% |
| 1 | Strategic Planning of the Institute | 9.78 | 17.39 | 22.83 | 50 |
| 2 | Encouragement for Interdisciplinary Programs | 8.70 | 20.65 | 24/92 | 44.57 |
| 3 | Leadership Culture | 14.13 | 22.83 | 22.92 | 39.13 |
| 4 | Policy Sharing and Encouragement to the Faculty | 7.66 | 11.95 | 22.83 | 57.60 |
| 5 | Focus on Global Network | 10.87 | 15.22 | 19.56 | 54.35 |
| 6 | Follow up of High-performing Faculty Members | 15.22 | 17.39 | 21.73 | 45.65 |
| 7 | Recognition of Excellence in Research, Consultancy, and Services Rendered by the Faculty | 15.22 | 15.22 | 26.01 | 51.09 |
| 8 | Ethics in Recruitment of the Faculty Members | 11.95 | 13.04 | 22.82 | 52.17 |
| 9 | Promotion of Integrity and Reputation | 16.30 | 22.83 | 21.74 | 39.13 |
| 10 | Offering Innovative Training Programs | 5.4 | 7.61 | 14.13 | 72.83 |

**Rank Order of Cultural Factors:**

* Promotion of Integrity and Reputation
* Follow-up of high-performing faculty and Recognition of Research, Consultancy, and Services rendered by the faculty members
* Leadership Culture
* Ethics in Recruitment of the Faculty Members
* Focus on Global Network
* Strategic Planning of the Institute
* Encouragement of Interdisciplinary Programs
* Policy Sharing and Encouragement of the faculty
* Offering Innovative Training Programs

The lowest four need greater attention. Without strategic planning, there can’t be any significant growth of interdisciplinary and outcome-based programs or institutional development. When many leaders don’t share the policy with the faculty members, then this will retard many planning programs like consultancy works, industry-specific research works, global networking, and globalization of engineering education.

**Leaders Displayed Culture to Outstanding Faculty Performance**

Many administrators don’t recognize the outstanding performance of the faculty at International Level since they fear that these faculty may replace them as administrative heads. The following questions are circulated to the faculty members to get their feedback:

1. Whether the administrative head ever recognized the faculty member who was selected by an international agency for serving an institution as a visiting faculty for a semester based on his/her outstanding performance?

2. Whether the administrator permitted the faculty who was offered a travel grant by an International Development Agency (IDA) to present a research paper at a conference?

3. Whether the leader provided leave at credit to a faculty to continue one more semester in an international university that will be of great use in the home country?

4. Whether the leader relieved the faculty who sent the application through a proper channel to undergo a medium-term development program offered by an international organization?

5. Whether the leader forward the application to participate in an international workshop well within the last date?

**Feedback from the Participants**

None of them had such a situation but one participant stated that his administrator refused to do the needful act like permitting, relieving, or sending the application in time. This act discouraged many outstanding faculty members from undertaking global projects, research, paper presentation, etc. It is due to the very limited culture of the leader.

**Discussion**

Most of the leaders don’t come with the required skills, attitudes, and experiences to govern the fast-growing engineering institute. They always carry their old viewpoints. They need to be exposed to desirable organizational behavior. They need to be developed as super leaders for creating many faculty members as leaders. The following set of suggestions is presented to enable them to guide the faculty members.

1. **LEADER’S CULTURE OF APPLICATION ON THE PERFORMANCE OF THE FACULTY MEMBERS**

Normally all leaders have to appreciate the excellent performances and Milestones Established by the faculty members and this will create an interest in other faculty members. Some of the questions to evaluate the current cultural practices posed to the faculty members are as follows:

1. Whether the leader appreciates the excellent research papers presented by the faculty members and awards received by them by including these in the Annual Report/Agenda for the meeting of the Board of Governors/ Newsletter of the Institute?

2. Whether the leader approves the presentation of curriculum vitae on the institute’s website?

3. Whether the leader permitted the faculty to offer online lectures to an international university?

4. Whether the leader permits to guide Ph.D. candidates through full-time or part-time mode as per the university norms?

5. Whether the leader appreciates the awards received by the faculty members for their textbooks etc.?

**Table 2. Feedback Received from the participants**

|  |  |  |  |
| --- | --- | --- | --- |
| **S. No.** | **Issue**  | **Appreciation** | **Discarding** |
| 1. | Appreciation for publishing excellent research papers and due recognition for awards | Grants a sum of Rs. 2000/- per paper and reimburses the expenditure. 10.87%of the faculty confirmed. | Total discard is confirmed by 89.13% of the faculty members. |
| 2. | Presentation of the faculty members’ Curriculum Vitae at the institute’s website | 22.82% confirmed but many were restricted to 2 pages. | 87.18% of the faculty expressed the omission. |
| 3. | Permission to offer online courses to international university programs | Only 5.43% of the faculty confirmed this activity. 16.30% stated that the Board has to approve based on the Ministry’s policy. | 78.27% of the faculty expressed that such actions were not approved. |
| 4. | Guiding Ph.D. scholars (Fulltime/parttime) | Only 21.73% of the faculty confirmed this. | The rest didn’t provide any feedback. |
| 5. | Appreciation for the awards received by the faculty members | Only 8.70% of the faculty confirmed. | The rest didn’t provide any feedback. |

**DISCUSSION**

The issues indicate the prevailing culture of leaders which indicates mentoring the faculty, scaffolding their efforts, focus on the excellent outcomes, and nurturing/coaching average faculty members. Many international universities have included these activities as a part of their pride performance. By adding the excellence of their faculty to the websites, they exhibit the strength of the university/ college. In the long run, they get more funds from the corporates, alumni, and government. Further, many newly recruited faculty get achievement motivation. This culture of appreciation for excellent performance is a must for institutional development.

1. **SUGGESTIONS TO IMPROVE THE INSTITUTIONAL CULTURE**

Bringing cultural change to the institutional administrators

Developing Service and Recruitment Rules

Provide needed exposures to institutional development for the Chairpersons of Governing Councils

Organize needed purposeful training and development programs for the Directors/Deans/Principals/ Registrars

Develop a Program of Action (POA) for translating the suggestions of NEP2020

Grant seed funding for preparing a detailed project report (DPR) for institutional development

Provide needed Grants-in-Aid based on the DPR for implementing the institutional developments

Provide curricula for Interdisciplinary Graduate, Postgraduate, and Doctoral Programs focused on Excellence

Provide Guidelines for Recruiting Motivated, Qualified, and High-performing Faculty Members

Expose leaders to Excellence in Institutional Change and Development Processes

Suggest conducting Periodical Auditing of the Academic Performance

Create a Standing Committee on Institutional Culture by the Governing Council

1. **CONCLUSION**

Appropriate institutional culture is the foundation for the development of the institutions, and relevant and transformational programs in engineering education. Most of the administrators lack needed outstanding culture to assist the institutional development. Without improving the culture, institutional development, creating high-performing faculty members, developing interdisciplinary programs, offering relevant technical services to industry, improving knowledge capital, etc. are not feasible. Only when the leaders and administrators utilize the appropriate culture, the institutional growth is feasible.

**REFERENCES**

1. Adam R. Carberry and Dale R. Baker. (2018). The Impact of Culture on Engineering and Engineering Education. DOI:10.1007/978-3-319-66659-4\_10 Corpus ID:189414510 In book: Cognition, Metacognition, and Culture in STEM Education pp 217-239. https://researchgate.net/321475949-The-Impact-of-Culture-on-Engineering-Education
2. Admin. (2022). Impact of Culture on Education. https://educationtoday.org/impact-of-culture-on-education/
3. Adrianna Kezar and Peter D. Eckel. (2002). The Effect of Institutional Culture on Change Strategies in Higher Education. The Journal of Higher Education.73(4):435-460. DOI:10.1353/jhe.2002.0038
4. D. Gallimore. (2021). It is time for Engineering to be Equity-Centered
5. Basavaraj Patil. (2013). Organizational Change and Development. Chapter 12. P:1-27. https://scrid.com/document/133662939/Organizational-Change-and-Development
6. Ben Sawa and Sonia Swift. (2013). Developing High-Performing Organizations: Keys to Recruiting, Retaining, and Developing People Who Make the Difference. Leadership and Management in Engineering, April 2013.p 96-100.
7. Chyung, Seung Youn. (2008). Foundations of Front-end-Analysis. Amherst, MA: HRD Press.
8. Claire Narum. (2018). Uncovering Performance Gaps with Front End Analysis. <https://dashe.com/blog/instructional>-design/front-end-analysis-improving-performance
9. E. Naphan- Kinery, Monica Miles, Amanda Brockman, Rachel McKane, and Portia Botchway. (2019). Investigation of an equity ethic in engineering and computing doctoral students. Journal of Engineering Education, 108(3).P:337-354. HTTPS://doi.org/10.1002.jee.20284
10. Diana Adela Martin, Eddie Conlon, and Brian Bowe. (2019). A Multi-level Review of Engineering Ethics Education: Towards a Socio-technical Orientation of Engineering Education for Ethics. Science and Engineering Ethics. (2021) 27-60. https://doi.org/10.1007/s11948-021-003336
11. EBRAY.NET. Institutional Change. https://ebray.net/164264/management/institutional-change
12. Eckel Peter. D and Mathew Hartley. (2008). Developing academic strategic alliance: Reconciling multiple institutional cultures, policies, and practices. Journal of Higher Education. 79(6): 613-637.
13. A. Cech. (2014). Culture of Disengagement in Engineering Education? Science, Technologies, & Human Values, 39 (1) p: 42-72. Published by Sage Publications. <https://www.jstor.org/stable/4371164>
14. Gary L. Neilson, Bruce A. Pasternack, and Decio Mendes. (2003). The Four Bases of Organizational DNA. Trait by Trait, companies can evolve their own execution cultures. Organization and People I/Winter2003/Issue 33, Booz & Company
15. Gray L. Neilson, Bruce A. Pasternack, and Decio Mendes. (2004). The 7 Types of O. June 1, 2004/Summer 2004/Issue 35, Booz & Companyrganizations DNA. An exclusive survey shows most companies possess traits that inhibit their ability to execute. Organizations and People
16. Haralampidest K, D MacIsaac, C. Diduch, B. Wilson. (2012). Engineering and Social Justice through an Accreditation Lens: Expectations and Learning Opportunities for Ethics and Equity. Proc. 2012 Canadian Engineering Education Association (CEEA12) Conf. Paper 076
17. Jonghloed Ben, Jurgen Enders, and Carlo Salermo. (2008). Higher Education and its Communities: Interconnections, Interdependencies, and a research agenda. Higher Education 56 (3):303-324.
18. Joseph Francis Mirabelli, Andrea J. Kunze, Julianna Ge, Kelly j., and Karin Jensen. (2020). Work in Progress: Identifying Factors that Impact Student Experience of Engineering Work Culture. ASEE Virtual Conference Content Access, <https://paper.asee.org/35645>. DOI:10.18260/1-2-35645
19. Kate McAlpine. (2021). Equity-centered engineering: A Q&D with Alec Gallimore, <https://aero.engin.urmich.edu/people/gallimore-alec-d/> Written by: Kate McAlpine (https://www.engin.edu/author/kmca/
20. Kezar, Adrianna, Eckel, and Peter. (2000). The Effect of Institutional Culture on Change Strategies in Higher Education: Universal Principles or Culturally Responsive Concepts? https://eric.ed.gov/?id=446719
21. Lanford Michael and Willian G. Tierney. (2016). The international branch campus: Cloistered community or agent of social change. In the Palgrave Handbook of Asia Pacific Higher Education. Deane Neubauer, et al. (Ed) 157-172, New York: Palgrave Macmillan.
22. Merriam-Webster. Culture Definition and Meaning. <https://www.meriam-webster.com>: dictionary>culture
23. Pershing, James (Ed). (2006). Handbook of Human Performance Technology: Principles, Practices, and Potential, 3rd Edition. San Francisco, CA: Pfeiffer
24. Robert Half. How Administrative Assistant Jobs and Skills have Changed? https://www.roberthalf.com/blog/evaluating-job-candidates/how-administrative-assistant-jobs-and-skills-have-changed
25. Swidler, H. (2003). Culture in Action: Symbols and Strategies. American Sociological Review, 273-286
26. Thornton, PH and Ocasio, W. (2008). Institutional-Logics. Sage Handbook of Organizational Institutionalism 840, 99-128
27. William G. Tierney and Michael Lanford. (2018). Institutional Culture in Higher Education, Springer Science+ Business Media Dordrecht 2018, Shin. P. Teixeira (Eds) Encyclopedia of International Higher Education Systems and Institutions, https://doi.org/10.1007/978-94-017-9553-1\_544-1
28. Zariff Chaudhuri, Ziarat Hossain, and E, Katherine Gordon. (2019). Cultural Diversity in Undergraduate Engineering Education, Published by Digital Commons @ University of South Florida, 2019.