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

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## Abstract

Most 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 (NEP2020) 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, testing, improving, manufacturing, and maintenance has created many challenges in the institutional culture and institutional development. All of these, center around facilitating, mentoring, decentralizing, and empowering 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 superb 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. This approach largely enables to create outstanding institutional culture in engineering institutions.

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## 1. Introduction

In this 21$^{st}$ 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 and intrinsically 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 whereas tier I institutions have grown by following outstanding culture. They have yet to establish strategic planning with a vision and mission for creating high-performing institutions. They have yet to focus on continual faculty development, academic audit, establishing consultancy units, and research parks. The National Educational Policy 2020 has focused on: Quality Universities and Autonomous Colleges. This paper recommends Institutional Radical Change and Development and Quick Consolidation, a More Outcome-based Education, Excellent Learning Environment, Selection and Development of Achievement Oriented High-Performing Faculty Teams, Equity, Integrity, Ethics, Facilitating High-Quality Interdisciplinary Research and Development Programs, Effective Governance and Leadership, and Continuously Transforming Regulatory System of Higher Education. These are essentially needed ingredients of the desired academic culture of engineering institutions. The management of institutions should ensure a positive culture of appreciation for excellence, high-performance, creation of cutting-edge programs, global leadership of the faculty members, and the best return on investments, services rendered to industries and diverse global faculty members. Without these, the sustainability will be lost. Productivity will be reduced. Reputation will be lost.

### Current Cultural Scenario Observed by the Draft National Education Policy 2019 (Draft NEP2019)

- Liberal education is lacking in higher education
- Optimal learning environments and support for students are not adequate
- Energized, engaged, and capable faculty members 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 adopting sustainable institutional 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.

## 2. Research Objectives

The following are three research objectives of this research:

1. To critically review the current scenario concerning the culture of engineering institutions in India

2. 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 (IDAs), 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.

3. To suggest needed cultural changes to overcome the problems stated above.

## 3. 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). Chaffee and Tierney (1988) stated that through a hierarchical structure, a select group of leaders chart a path for the institution, setting necessary rules and guidelines, while faculty and staff assiduously followed. 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. According to them, an institutional culture framework enables the kind of reflexivity necessary for administrators to clarify an institution's identity while highlighting its singular qualities. Colleges and universities have engaged in many institutional initiatives and activities like online education, international consultancy, new interdisciplinary graduate and doctoral programs, etc. Peterson and Spencer (1990) defined culture as the deeply embedded patterns of organizational behavior and the shared values, assumptions, beliefs, or ideologies that members have about their organization or its work. Hence, institutional culture does not rely entirely on agreement among individuals. It acknowledges the pluralistic, occasionally cacophonous, landscape of the contemporary university, where experts are brought together from a wide range of backgrounds and disciplines. These individuals are likely to perceive vigorous debate as a necessary activity for deeper understanding, rather than as a barrier to progress. Danuta Mierzwa and Dominika Mierzwa (2021) explored the current and desired organizational culture in the selected universities in Poland. They are following the American model towards the culture of market and hierarchy. The management style of the organization and human resources is also aimed at the market, which involves accountability, reporting, and bureaucracy.

According to UNESCO (1982), "Culture" is the whole complex of distinctive spiritual, material, intellectual, and emotional features that characterize a community, society, or social group. It includes not only arts and literature but also modes of life, the fundamental rights of the human being, value systems, traditions, and beliefs. Culture encompasses the living or contemporary characteristics and values of the community as well as those that have survived the past. Cultural rights protect the rights of each faculty, individually and in community with others, as well as groups of faculty members, to develop and express their humanity, their world view and the meanings they give to their development through, inter alia, values, beliefs, convictions, languages, knowledge and resources that allow such identification and development processes to take place. This approach has to be implemented in all higher education institutions for the growth of human capital and knowledge capital.

**Desired Sustainable and Outstanding Institutional Culture in Engineering Education:** Continuous improvement is the process of ongoing development of an engineering institutions educational development process, human capital, consultancy services, leadership models, and always how the faculty members and technical support staff are treated. A culture of continuous improvement throughout the entire faculty members, technical support staff, ministerial staff, learners of all kinds, and clients. A key factor of which is important from the bottom up. Where an institution's decision

making process is top-heavy and management-led, the resulting feeling of powerlessness felt by the faculty members can result in a negative culture that does not fulfill its productivity potential. Seeking to improve an institution through the combined effort and ideas of the entire faculty members, support staff, regardless of their role or level of seniority, has come to be recognized as an effective way to create a sustainable educational transformation. This acceptance of ideas from all faculty members, not just those in administrative roles, has been shown to improve faculty engagement and generally create a positive educational transformation.

## 3.1. Synthesis of Culture Advocated by Various Researchers

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

- 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

## 4. 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: 621 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. 546 men and 175 women faculty members are sampled. 34 % possessed only master's degrees and 66% possessed doctoral degrees either through part-time or under the quality improvement programs (QIP) of All India Councill for Technical Education (AICTE).

## 4.1. 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 offered to the high-performing faculty teams, steps taken in globalizing engineering education, dissemination of research findings, etc. All these factors can be assessed through feedback from the achievement oriented-faculty members who are highly qualified and contributed by their excellence and succeeded in team works. They are the faculty who depend on excellent administrative culture. The leaders, administrators, and members of the governing council have to establish the desired outstanding academic culture. There is a need for getting feedback from the faculty members, technical support staff, and students every semester. The weak areas are to be identified and improved.

## 4.2. Research Questions

The following research questions are used to assess the existing culture of tier II and III institutions. Likert's four- point scale has been used to indicate the quality of feedback.

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 desired culture as suggested by the NEP 2020 for the institute with the faculty and students?
4. Whether the administrator has shared the policies for 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 based on their outstanding performances?
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 well-accomplished 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.?

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

**Table 1.** Feedback from the participants

| S. No. | Cultural Factor Description | Excellent % | Very good % | Good % | Fair % |
|---|---|---|---|---|---|
| 1 | Strategic Planning of the Institute | 9.78 | 17.39 | 22.83 | 50.00 |
| 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 |

## 4.3. Rank Order of Cultural Factors based on the Feedback

- 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 projects, industry-specific research works, global networking, and globalization of engineering education. An open culture will alone assist the growth of the faculty members which will contribute to the gaining of the industry-specific attributes of the graduates.

## 4.4. Expected and Desired Culture to Enable Outstanding Faculty Performance

Many administrators don't recognize the outstanding performance of the faculty at the 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 the 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 institute?

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?

## 4.5. 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 for international fellowships, internships, and participation in international conferences. He supported only his coteries and created new fellowships and promotions for them. 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.

## 4.6. 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 experiences and viewpoints. They need to be exposed to desirable organizational behavior and 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.

# 5. 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 agenda for the meeting of the Board of Governors/ Newsletter of the Institute/Annual Report?

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. (1 US $ = INR 82.50) | Total discard is confirmed by 89.13% of the faculty members. |
| 2. | Presentation of the faculty members' Curriculum Vitae on 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 (Full-time/part-time) | 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. |

## 5.1. Discussion

The issues indicate the prevailing culture of leaders which indicates mentoring the faculty, scaffolding their efforts, focusing 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 corporates, alumni, and the government. Further, many newly recruited faculty get achievement motivation. This culture of appreciation for excellent performance is a must for institutional development.

## 6. Suggestions to Improve the Institutional Culture

1. Bringing cultural change to the institutional administrators
2. Developing and following the 'Service and Recruitment Rules'
3. Providing needed exposures to institutional development for the chairpersons, members of the governing council.
4. Organizing needed purposeful training and development programs for the directors/deans/principals/ registrars.
5. Developing a 'Program of Action (POA)' for translating the suggestions of NEP2020.
6. Granting seed funding for preparing and implementing a 'Detailed Project Report (DPR)' for institutional development.
7. Developing curricula for interdisciplinary graduate, postgraduate, and doctoral programs focused on excellence.
8. Providing flawless guidelines for recruiting motivated, qualified, and high-performing faculty members.
9. Exposing leaders to excellence in 'Institutional Change and Development Processes'
10. Suggesting and conducting periodical auditing of the academic performance
11. Creating a 'Standing Committee' on implementation of the 'Institutional Culture' by the Governing Council.

### 6.1. Validation of the Suggestions

A team of three senior faculty members from well-performing tier I institutions have been invited and review the suggestions. They expressed that there may be some resistance from the faculty members to undertaking additional

work. According to them, the leaders have to explain the long-term benefits like institutional growth, excellent employment of the graduates, and preventing faculty burnout. Necessary additional funds, resources, periodical in-house training of the faculty members, and rewards for outstanding contributions will ensure their cooperation.

## 6.2. Suggestion for Future Research

A state-wise research project can be launched and a larger sample of faculty members from various types of institutions can be included in the sample. The results will provide in-depth suggestions for improving the culture.

## 7. Conclusions

Appropriate institutional culture is the foundation for the development of the institutions, and relevant and transformational programs in engineering education. Most administrators need outstanding culture to assist 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.

Strategic planning has to be formulated through the active participation of the administrator, faculty members, and support staff. Once the strategic planning has been completed, steps are to be taken to implement it. Considering the impact of disruptive technologies on human and knowledge capital, necessary empowerment, and delegation are to be offered to the departments to plan industry-specific interdisciplinary programs at all levels. Institutional development policies are to be linked to strategic planning. There is a need to periodically check the relevance of strategic planning against the market demand for human and knowledge capital. There is an urgent need for recruiting, developing, scaffolding, and mentoring high-performing faculty members who can undertake all development programs and projects. A periodical review has to be undertaken to check the adequacy of resources, programs, and projects. Further, the high-performing faculty team has to be mentored by a team of in-house mentors. Institutional culture has to be linked to equity, ethics, and scaffolding of the dedicated and intrinsically motivated faculty and technical support staff. Globalization of engineering programs and global networking is very much needed in this 21$^{st}$ century. All these aspects should reflect the institutional culture.

## Limitations of this Study

Linked research studies on the envisaged future development through organizational change and development and the method of improving the attitudes of the stakeholders. Further in-depth studies are required to develop outstanding change management.

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