

Paper Published on Performance Evaluation of Engineering Faculty

Browse Conferences > 2016 IEEE Eighth Internationa... ?

< Previous | Back to Results | Next >

Developing Key Performance Indicators Framework for Evaluating Performance of Engineering Faculty

Sign In or Purchase
to View Full Text

146
Full
Text Views

Related Articles

Virtual reality in engineering education: The future of creative learning

Intensifying learner's experience by incorporating the virtual theatre into engi...

Development of professional competencies in engineering education

[View All](#)

4

Author(s)

Sangeeta M. Joshi ; Shrabani B. Bhattacharjee ; Vishwas C. Deshpande ; Milind Tadvalkar

[View All Authors](#)

Abstract

Authors

Figures

References

Citations

Keywords

Metrics

Media



Abstract:

Engineering Education has undergone a profound transformation with a focus on reforming conventional educational practices to meet the developmental requirements across the globe. It is the utmost need today to develop a rigorous performance management system (PMS). This paper intends, firstly to categorize performance indicators into broad areas secondly to identify key performance indicators (KPIs) for evaluating performance of faculty. The new key performance indicator system encompasses all the minute parameters in academics. Authors believe that implementing such a PMS will certainly help Institutes to raise their quality standards.

Published in: 2016 IEEE Eighth International Conference on Technology for Education (T4E)

Date of Conference: 2-4 Dec. 2016

INSPEC Accession Number: 16615242

Date Added to IEEE *Xplore*: 16 January 2017

DOI: 10.1109/T4E.2016.053

► ISBN Information:

Publisher: IEEE

Conference Location: Mumbai, India

Developing Key Performance Indicators framework for evaluating performance of engineering faculty

Dr. Sangeeta M. Joshi
Professor and Technical Advisor,
Vidyalankar Institute of Technology,
Mumbai, India
Sangeeta.joshi@vit.edu.in

Vishwas C. Deshpande,
Trustee, Vidyalankar Dnyanpeeth Trust,
Mumbai, India
vishwas@vidyalankar.com

Dr. Shrabani B. Bhattacharjee
Assistant Professor
Vidyalankar Institute of Technology,
Mumbai, India
Shrabani7@gmail.com

Milind Tadvalkar
Director, Vidyalankar Dnyanpeeth Trust,
Mumbai, India
milind@vidyalankar.edu.in

Abstract—Engineering Education has undergone a profound transformation with a focus on reforming conventional educational practices to meet the developmental requirements across the globe. It is the utmost need today to develop a rigorous performance management system (PMS). This paper intends, firstly to categorize performance indicators into broad areas secondly to identify key performance indicators (KPIs) for evaluating performance of faculty. The new key performance indicator system encompasses all the minute parameters in academics. Authors believe that implementing such a PMS will certainly help Institutes to raise their quality standards.

Keywords—key performance indicator, education, faculty, appraisal

Engineering Education has undergone a profound transformation with a focus on reforming conventional educational practices to meet the developmental requirements across the globe. Along with research and technology up gradation, inculcating rigorous PMS has become an integral part of any Educational organization.

In 1950, India had only 25 universities and 700 colleges with 15,000 teachers and 100,000 students in them. By, 2016, there are total 10, 328 higher educational institute, 699023 teachers and 3835261 students taken [1]. This huge increase has given rise to resource scarcity required for these institutions.

The objective of this paper is, firstly to categorize performance indicators broadly in areas like academic involvement of faculty, efforts for student development, their professional development and hence for institutional development and secondly to identify KPIs along with criteria in each category for assessing the performance of the faculty. Proposed appraisal system is in the process of implementation at our Institute.

I. LITERATURE REVIEW

A. THE IDEA

Higher education needs Total Quality Management (TQM) in the present era as an emergency necessity. Overall good quality would pull in students thereby meeting the Malcolm Balridge Quality Model (MBQA) which was initiated in USA. The analogy of pull factor and education was first initiated by

Arif, et al(2005)[3], wherein the idea was to bring in education with the current market requirements for quality, survival and competence.

The ‘Pull’ period started from Pragmatic epoch. And continued mostly on Existentialist epoch. The MBQA model, which was studied in detail by Arif (2007)[4], gives a fair idea about the key performance indicators being studied. The MBQA model can be implemented by following eight simple steps- (i) Identification of stakeholders, (ii) definition of goals, (iii) proposal of KPIs, (iv) setting target of KPI values, (v) designing process, (vi) allocating resources, (vii) monitoring KPIs and (viii) revising goals.

The KPI’s are chartered out, in accordance to the MBQA model as prepared by Arif and Smiley (2004)[5]. A generic MBQA model, proposed by Arif (2007)[4], can be utilized by any educational institute. The model helps any educational institute to develop their own quality assessment or PMS. It has in detail explained the various parameters and has also shown the pathway for finding out the KPI.

Similarly, in European countries, a similar model named as European Foundation for Quality Management is prevalent for quality management in both industries and educational institutes [6]. This model was developed by keeping MBQA model as benchmark and has a strong result section comprising of people, customer, society and institute results.

B. THE FACTORS

A recent study by Sahney & Thakkar (2015)[7], reveals that performance can be measured with four parameters, viz., academic, research, teaching and consulting efficiency. These parameters are critical in understanding useful factors for policymakers, educational planners and administrators in designing a system based on various criteria that can help improve the overall efficiency and decide about benchmarking and funding strategies.

First, teaching quality is also an essential part of performance to be excellent in education. Adequate and appropriate proficiency in teaching quality becomes the face of the institution to cater to the clients, i.e., the students [8]. The

other factors that are considered in a student teacher learning platform are course delivery, course structure and student feedback. Along with that, implicit factors are treatment of students by staff and the overall environment of the institute which includes, staff behavior and many other minute factors [2]. Similarly, As studied by Yusoff, et. al (2013)[9], in higher education, student assessment and learning experiences, relationship with teaching staff, knowledgeable and responsive faculties, feedback etc. impacted on the overall performance of the institution as well. Effective management leadership brings in commitment which in turn brings in resource allocation for the necessary quality improvement [10].

II. PROPOSED KEY PERFORMANCE INDICATORS FOR FACULTY

Faculty is the backbone of the any Educational organization system. They are instrumental not only for students' academic development but also for the Institutional development. In view of this and above literature, a design of appraisal system based on the essential key performance indicators is proposed. It is comprised of Teachers' academic involvement, student development and professional development.

A. ACADEMIC INVOLVEMENT

At the heart of a strong and effective teaching profession there is a commitment to students and their learning. Teachers' academic involvement is based on many parameters like teaching courses of their choice, conducive work environment etc. Faculty members are expected to continually improve their teaching effectiveness. We propose to consider the following KPIs along with criteria which are customized for a typical Engineering Institute. These KPIs are used for evaluating teachers' academic involvement. Criteria for the indicators may change depending upon type of the Institutes w.r.t. age, status, infrastructure etc. Performance parameters in academic involvement and its mapping in the number of points along with criteria are shown in table number 3.

S.No	Performance Parameter along with Criteria	No. of Points
1.	Course Allotment (Difficulty level) <ol style="list-style-type: none"> Subject is newly introduced by University First time teaching (Fresh) Subject taught earlier (Repeat) If faculty has not engaged no. of lectures as per the syllabus then he/she is not entitled to seek these points	<ol style="list-style-type: none"> 40 30 20 Maximum 100
2.	No. of extra lectures : If x = no. of lectures as per syllabus & Y = No. of lectures as per the timetable <ol style="list-style-type: none"> $Y-X = 10\%$ of X $Y-X = 20\%$ of X $Y-X = 40\%$ of X 	<ol style="list-style-type: none"> 20 30 50
3.	Syllabus completion <ol style="list-style-type: none"> 100% above 80% below 80% 	<ol style="list-style-type: none"> 80 60 Zero

S.No	Performance Parameter along with Criteria	No. of Points
4.	Beyond Syllabus activities OR Innovation in subject <ul style="list-style-type: none"> Guest lecture by Industry expert or IIT personnel or an Entrepreneur Industrial visit Attempt for any Innovative learning technique Video demonstration Surprise Test Extempore 	10 per activity <ul style="list-style-type: none"> Max 30 for 1 subject Max 40 for 2 subjects
5.	Lab Work <ul style="list-style-type: none"> Design and development of New Experiments Use of New tools or simulators 	20 per activity <ul style="list-style-type: none"> Max 40 for 1 subject Max 50 for 2 subjects
6.	Course / Lab Outcome Attainment (Average of courses taught) <ul style="list-style-type: none"> 90% to 100% 80% to 90% 70% to 80% Below 70% (*Below 70 as per the review by RO / cluster mentor)	<ol style="list-style-type: none"> 200 150 100 70 *
7.	Innovation in Teaching : Describe any Novel / Innovative methods you have adopted to improve effectiveness of teaching	Maximum 40
8.	Contribution towards Learning Resources Development <ul style="list-style-type: none"> Preparation of course & get it validated in time Resource book /Lab manual Preparation of Theory Notes / Numericals /problems in tune with University Questions for each chapter of the syllabus and upload on V-live 	20 per attempt <ul style="list-style-type: none"> Max 50 for 1 subject Max 100 for 2 subjects
9.	No. of Projects (B.E. /M.E./PhD.) guided /co-guided	<ul style="list-style-type: none"> 25 /50/200 /project

Table 3: KPIs in Academic Involvement

B. STUDENT DEVELOPMENT

Developing a student holistically is the prime and foremost concern of a faculty. It is expected to have an educated student with a higher knowledge level is what the end result should be. Faculties adopt various means and ways to satisfy their commitment and also develop themselves continuously to keep up to the present changes, developments and needs. Then only they can cater to the students' requirements and their development. According to Finelli et. al(2008)[12],the quality of student-teacher instruction depends or can be assessed by student feedback or videotaped classroom session. KPIs indicating course attendance, course results along with range of marks, Co-curricular activities organized by that faculty etc are considered for evaluating faculty performance in this category. Performance parameters in student development and parameters are shown in table 4.

S.No	Performance Parameter along with Criteria	No. of Points
1	Average student attendance 1. 80% and above 2. 80% to 70% 3. 70% to 60% 4. Below 60%	1. 200 2. 150 3. 100 4. Zero
2	Course results 1. 90% above 2. 90% to 80% 3. 80% to 70% 4. 70% to 60% 5. Below 60%	1. 1000 2. 800 3. 700 4. 500 5. Zero
3	Topper Marks 1. 90% above 2. 90% to 80% 3. 80% to 70% 4. 70% to 60% 5. Below 60% M/S = Marks / Student	Maximum 400 1. 20 M/S 2. 15 M/S 3. 10 M/S 4. 05 M/S 5. Zero
4	Students feedback 1. Score above 3 2. Score between 2.5 and 3 3. Score below 2.5	1. 100 2. 50 3. Zero
5	Co-curricular Activities organized by faculty: Part-I • Technical Paper contest • Project exhibition • Awards /Recognitions for the project /paper • Extension and Field based activities such as external work with NCC/NSS and through other channel • Any service to community 1. 3 Activities 2. 2 Activities 3. 1 Activity	1. 50 2. 40 3. 30
6	Co-curricular Activities organized by faculty: Part-II • Technical Workshops /Seminars arranged for students • Finishing schools / Value added Courses 1. One Week or more (summer /winter) 2. Three Days / 16 Hrs 3. One Day / 6 Hrs	1. 50 2. 30 3. 20

Table 4: KPIs in Student Development

S. No	Performance Parameter along with Criteria	No. of Points
1.	Organization of International /National Conferences /Symposiums 1. General Chair /Co-chair 2. Program Chair /Co- chair 3. Chair /co-chair (specific portfolios) 4. Member	1. 100 2. 70 3. 50 4. 30 (Maximum 200)
2.	Organization of STTPs/ FDPs/ Workshops /Seminars 1. 2 weeks 2. 1 week 3. 3 Days 4. 1 Day (Maximum 200 points)	For Convenor & Co-convenor 1. 100 2. 70 3. 50 4. 30 For organising member 1. 50 2. 30 3. 20 4. 10

3.	Participation in STTPs/ FDPs/ Workshops /Seminars/ Symposiums/Conferences 1. 2 weeks 2. 1 week 3. 3 Days	1. 30 2. 20 3. 10 (Maximum 100)
4.	Departmental & Institutional committee /Role Activities including admission work 1. Activity Convener 2. Organising member Evaluate on the basis of • Leadership skills • Teamwork / pro-activeness • Completion of given task • Additional efforts	1. 40 2. 20 (Maximum 100)
	Technical Presentation given by faculty within the Institute. Evaluate on the basis of • New /emerging / cutting edge topic • Technical Content • Literature survey • Research aspects • Presentation skills • Audience interaction	Maximum 40
6	Exam related work (University / Institute) • Paper setting • Paper assessment • Paper solutions • Invigilation (04 as one activity)	(20/activity/course) Maximum 160

Table 5: KPIs in Institutional Development

C. INSTITUTIONAL DEVELOPMENT

Developing an Institute holistically is the prime concern of all the stakeholders. Faculty and their proactive involvement for organizing various events like Faculty Development Programmes, workshops for Hands on for emerging technologies, Conferences etc. lead to sustainability and development of the Institute to reach to the apex is essential. Based on these aspects, KPIs are defined for evaluating faculty performance in this category. It's worth mentioning here that all these and similar indicators are required to be satisfied while accrediting the Institute by agencies like National Board of Accreditation (NBA), National Assessment and Accreditation Council (NAAC) etc.

D. PROFESSIONAL DEVELOPMENT

In India, higher and technical educational bodies like AICTE, UGC, NBA, NAAC etc has laid out several parameters for faculties to develop professionally which in turn will contribute to the education system. Faculties are expected to excel in teaching and are expected to develop and maintain a sustained research program. this in turn will add on to their performance scores. In order to cope up with recent technological advancements, it has become essential to interact with industry personnel through various means. Teachers are also accountable for societal services and development. Membership of professional bodies helps in gaining knowledge because of the conglomeration of peers or people from same domain and thereby disseminating knowledge.

S. N.	Performance Parameter along with Criteria	No. of Points
1.	Publications	Maximum 300
	1. National / International Conference (by State Colleges) 2. National / International Conference (by IEEE/Springer/ACM equivalent) 3. National Journal (with impact factor >1.0) or with ISSN /ISBN no. 4. International Journal (Print) (IEEE/Springer/ACM equivalent with impact factor >1.2) 5. POSTER presentation 6. Online International e-journal	Author (co-author) 1. 30(20)/50(30) 2. 60(40)/80(60) 3. 100(80) 4. 150(100) 5. 40(20) 6. 60/40
2.	Patents /Designs/ Copyrights filed or Technologies commercialized OR Engineering / Technology Books Published/ Chapters in book (evaluation based on publication agency)	Maximum 200
3.	Internal Revenue Generation (IRG) Through Testing, Consultancy, Trainings, workshops & Research projects etc. 1. 50K 2. 1lac 3. above 1lac	1. 50 2. 100 3. Maximum 200
4.	Funding received Through AICTE, ISRO, DST, BRNS etc 1. 5lacs 2. 10 lacks 3. above 10 lacs	Submitted 50 Ongoing 1. 100 2. 200 3. 300 Completed 1. 200 2. 400 3. 500
5.	Service to community or product development (Evaluation based on the utility of activity or product, efforts involved etc.)	Maximum 50
6.	Qualification upgradation • Professional certification (PG /Ph.D.) • Value addition or Certificate courses (claim only once at the time of receipt of Certificate /Degree)	1. 60 (M.E.) / 100(Ph.D.) 2. 30 (Certificate courses)
7.	Special Honours / Awards	Maximum 100
8.	Faculty Interaction with outside world	
	1) Interaction with a reputed institution /labs at abroad & in India, for any academic / community/ research project	Maximum 50
	2) Interaction with Industry for any academic/community/ research project / training to students	Maximum 50
	3) Joint efforts in publication of books/research paper, pursuing externally funded R&D/ consultancy projects &/or development of semester-long course/teaching modules	Maximum 50
	4) Membership of Professional Bodies	Maximum 50
	5) Resource person in two week /one week STTP/FDP	• 50 /event Maximum 100
	6) Session Chair in International Conference / Symposium or 7) Reviewer for a conference /Journal	• 40 /event • 20/conference Maximum 80
	8) AICTE /NBA Expert/keynote speaker for conference	• 70 /event Maximum 140

Table5: KPIs in Professional Development

III. CONCLUSION

Faculties have a huge task of taking each student as an individual entity as finalizing on the end result. Therefore, KPI for faculties are to be considered very minutely and all round inclusions need to be done. This paper has tried to put in such an effort to filter on the KPIs for faculty of technical institutes. Authors have tried to develop a framework for KPIs taking into consideration development of students, faculty and Institution. Implementing such a PMS will help to create faculty ranking, satisfy stake holder's expectations and will also assist for sustaining the ever increasing competition. Authors have a strong belief that implementing such a PMS through e-Governance will certainly help Institutes to raise their quality standards.

IV. REFERENCES

- [HTTP://WWW.AICTE.NDIA.ORG/DASHBOARD/PAGES/DASHBOARD.AICTE.PHP](http://www.aicte.ndia.org/dashboard/pages/dashboardaicte.php). ACCESSED ON 30 JUNE, 2016.
- Sakthivel, P.B. (2007). "Top management commitment and overall engineering education excellence." The TQM Magazine, Vol. 19, No. 3, pp. 259-273.
- Arif, M., Smiley, F.M. and Kulonda, D.J. (2005), "Business and education as push-pull processes: an alliance of philosophy and practice". Education, Vol. 125 No. 4, pp. 602-614.
- Arif, M. (2007). "Balridge theory into practice: a generic model". International Journal of Educational Management, Vol. 21, No.2, pp. 114-125.
- Arif, M. and Smiley, F.M. (2004). "Balridge theory into practice: a working model", International Journal of Educational Management, Vol. 18 No. 5, pp. 324-328.
- Burli, S., Bagodi, V. and Kotturshettar, B. (2102). "TQM dimensions and their interrelationships in ISO certified engineering institutes in India". Benchmarking: An International Journal, Vol. 19, No.2, pp. 177-192.
- Sahney, S., and Thakkar, J. (2015). "A comparative assessment of the performance of select higher education institutes in India". Quality Assurance in Education, Vol.24, No.2, pp. 278-302.
- Elton, L. (1998). "Dimensions of excellence in university teaching", International Journal for Academic Development, Vol. 3 No. 1, pp. 3-11.
- Yusoff, M., McLeay, F. and Burton, Helen, W. (2013). "Dimensions driving business student's satisfaction in higher education". Quality Assurance in Education, Vol. 23, No.1, pp. 86-104.
- Karuppusami, G. and Gandhinathan, R. (2006), "Pareto analysis of critical success factors of total quality management: a literature review and analysis", The TQM Magazine, Vol. 18 No. 4, pp. 372-85.
- Cave, M., Hanney, S., and Kogan, M. (1997). The use of performance indicators in higher education-The challenges of the quality Management. Jessica Kingsley, London.
- Finelli, C., et al (2008). "Utilizing instructional consultations to enhance the teaching performance of engineering faculty". Journal of Engineering Education, October, pp. 397-411.