

Faculty Enablement for Enhancing Industry Readiness by Leveraging Power of IT

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Abstract: This case study describes a five year real time implementation of projects that promoted developing problem solving abilities of engineering students with the help of faculty development programs, student training programs, sharing open educational resources, online contests and assessments. This was demonstrated through an innovative service delivery by effectively leveraging technology and collaboration. To solve problems successfully, the faculty and students used algorithmic thinking and logical reasoning, and demonstrated the solution in the context of technical, life skills, English language proficiency, quality, process, and business domain skills through team work. We found that the effective use of technology, people, and processes can create the desired impact and resulted in enhancing industry readiness. The main objective of this case study is to share a successful learning-teaching framework for effectively designing and conducting industry-relevant training programs to the faculty and students in colleges. The impact and results were measured and analyzed from June 2004 to April 2010.

Keywords: Faculty Development, Problem Solving Abilities, Employability Rate, Industry Readiness, Student Enablement.

1. Introduction

The suggested framework is two dimensional in nature and enjoys the following important characteristics - academic rigor and industry practices. The first dimension of the framework is focused on the learner's point of view. The second dimension of the framework is focused on enabler's point of view for the learner. The first dimension has seven key elements: Let me Understand and do, Let me Prepare and do, Let me Listen-Learn and do, , Let me See and do, Let me Try and do, Let me Check and do, Let me Network and do. The second dimension has three key enablers- people, process and system. Together, the matrix [Seven X Three] or [7 X 3] encodes the design and implementation of the development program from end-to-end, i.e. from defining the objective to achieving the same. Furthermore, the framework ensures that the measure-of-success of the faculty development programs is less dependent on factors such as subject, instructors, geography etc. This way the program is run consistently across a variety of target audience and in a variety of places with measurable and predictable outcome.

This case study demonstrates the implementation of learning-teaching framework for a variety of subject areas viz., project management, internet technologies, ERP, Problem solving techniques or any business domain courses. This case study is about an industry program, which has been rolled out over 25 times, to enable engineering college faculty for systematic implementation. The framework has helped improve the rollout rate by 48 % and reduce the lead time for rollout by 132 %.

Though the case study described is related to IT industry, this framework is generic enough to holds good for designing such learning and development programs for other industries. The application areas of

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this framework could include development of technical or behavioral aspects in any other core industry. Through our projects-

1. We have designed a scalable and sustainable service delivery model.
2. We have demonstrated a complete paperless, online digital content, leveraging technology and collaboration.
3. We have made an impact and demonstrated enhancements in industry readiness and employability rate.

2. Background

The "Effectiveness and Rigor Framework", clearly classifies the competencies into four levels, acquisition, application, assimilation and adaptation based on the knowledge and application continuums as two dimensions. Industry requires the students to be at the adaptation level, whereas the students from the current educational system are found to be at the acquisition level only. Hence, the transition from acquisition level to adaptation level is the requirement. The Effectiveness and rigor framework does not prescribe any approach to meet this requirement directly. There are at least two ways to deal:

1. Industry designing and executing training programs to the students - This approach may be effective but is not scalable and sustainable.
2. Industry reaching the students through the faculty - This approach involves enabling the faculty to develop the students. This is scalable and sustainable.

In this case study, the focus will be on effective faculty development approach (FDP). The scope of the FDP is referred in this case study is confined to the programs conducted by the industry to the college faculty in engineering. However, the proposed framework is generic and is applicable to the design of any education and training program.

3. Faculty-based Approach: Service System Description

Phase 1 – Packaging the content for delivery. This involves creation and organization of industry input in a way that allows for easier dissemination. Open educational resources framework has been leveraged for sharing industry content in successfully enabling the transition of engineering students from academia to corporate world. Effective methods, techniques and tools are adopted to put this into practice to address the challenges. The impact has been measured and analyzed.

Phase 2 – Capturing the process to help the faculty to roll this out to their students. Students' preference for learning technologies has seen a transformation from the traditional text mode to the technology based platforms such as internet based, CBT, e-learning and Webinars.

Phase 3 - Enabling the college faculty to handle content created in phase 1 following the processes documented in phase 2. This is done through the FDP.

Phase 4 – Faculty deploying the learning's to the students. Learning Management System (LMS) Moodle enables you to create powerful, flexible and engaging online learning experience to support traditional class room teaching or lecturing, or to provide complete online and distance learning course. Table 2 depicts learning-teaching model. We have focused on phase three in this case study.

4. A Framework to design effective FDP

Design Considerations: While designing faculty development programs, key drivers are, relationship management angle, collaborative or group learning, practice-based or hands on learning, pedagogical or methodology focus, process and systems orientation, metrics and measurability. The framework provides a platform as: faculty as the learner, faculty as enabler.

The "Extended Knowledge Continuum", from the learner's point of view is given in terms of the following seven steps in below Table-1.

Sl.No	Step	Description
1	Let me Understand and do	Learner wants to know the objective, the meta-content and other high level details like the duration, eligibility criteria
2	Let me Prepare and do	Learner wants to complete the preparatory work.
3	Let me Listen, Learn and do	Learner attends the class-room sessions and learns.
4	Let me See and do	Learner wants to see demonstrations of industry way of solving problems by the practitioners.
5	Let me Try and do	Learner wants to try out some case studies or hands-on assignments.
6	Let me Check and do	Learner wants to do two things in this step (a) assessing self, (b) how to assess students.
7	Let me Network and do	Learner wants to collaborate with other participants as well as industry experts to leverage their knowledge-base either formally or informally.

Table 1: Extended Knowledge Continuum

In this, the first 6 steps relate to the knowledge continuum proposed by Bloom. The later step, let me Network and do, is the additional step included to enable the faculty as a trainer. We would like to include one more step let me solve, let me prove and improve in future. For each of the above seven steps, “Enabler dimension” needs to be identified by the program designers. These are, people, process, and systems. Some of the important characteristics of this framework are scalability, consistency, framework re-use by participants.

5. FDP and Student Development Programs – A Case-study

The two week fulltime residential program focuses on teaching methodologies for fundamental courses of computer science, software engineering, and information technology subjects were shared with the faculty along with Industry practices. This set of courses form a strong basis on which, different technologies can be learned easily. Two faculty members per college, who were well versed in the subject areas, are eligible to attend the program. Table 2 gives the structure of the program in detail.

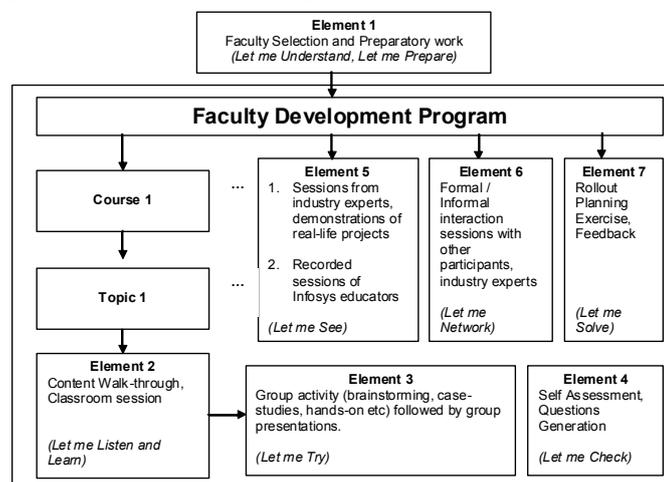


Table 2: FDP Structure

6. Results and discussion

1. From July 2004 to April 2010, 25 offerings of the technical, life skills faculty development programs have happened covering a total of 634 faculty members from 94 engineering colleges across the Andhra Pradesh. The educators and subject matter experts who participated in the 25 FDP programs were different. The event management was done by a different person each time.
2. The faculty members enabled through this program have rolled out the 110 Hour training program, spread typically over 2 or 3 semesters, to the students in their colleges. 16,111 students have completed the training in 94 colleges across the state so far.

3. The success of the program is measured in terms of several Key Performance Indicators. The description, unit of measurement, and frequency of measurement for these KPIs are given in Table 3.

Key Performance Indicator (KPI)	Description	Unit of measurement	Frequency of measurement
Consistency	Faculty feedback about the effectiveness, success of the program.	Rating over a scale of 1 - 5	Measured at the end of each FDP through a structured feedback form
Rollout / implementation Rate	Ratio of the number of colleges that rolled out this program to the students to the number of colleges that attended the program.	Percentage	Measured every 3 months after the FDP is completed.
Average Lead Time for Rollout or implementation	Average of the lead times of participating colleges for rolling out the program to students.	Months	Measured every 3 months after the FDP is completed. Main reasons for the lead time are college vacation times and their regular academic schedule.

TABLE 3: Key Performance Indicators

4. The framework matrix is detailed in Table 4. The Pre and Post Framework program success parameters are shown in Tables 5 and 6.

S. No	Step	People Elements	Process Elements	System Elements
1	Let Me Underst and & do	College Faculty and Educators to be identified and briefed	Educator Briefing and Program Announcement Document giving details such as the objective of the program, duration, meta content and faculty selection criteria.	Email, Speaker phone, Discussion Room, Video Conferencing, Portal
2	Let Me Prepare & do	Anchors, Identified faculty members from the colleges	Program Schedule and Preparatory work definition /communication	Portal for courseware access, Courseware CDs, Computers with internet facility
3	Let Me Listen , Learn & do	Educator plays the role of Subject Matter Expert	Content walkthrough guidelines for educators, Class Management practices (attendance, feedback, facilities etc)	Classrooms with Audio / Video conferencing facilities
4	Let Me See & do	Practitioners from projects	Guidelines for Real project demonstrations (demo-script etc)	Recorded videos of sessions taken by industry experts, Tools for demonstration
5	Let Me Try & do	Group work by faculty members, Educator plays the role of facilitator	Briefing on Focused Group Discussions, Lab Guides	Discussion rooms, Labs for hands-on assignments, Case-studies, Hands-on Assignments, ICT Equipment to prepare presentations
6	Let Me Check & do	Faculty, Students	Assessment framework for assessing students(Bloom's taxonomy), Guidelines for Questions, case-studies generation / review / sharing	Question bank for self-assessment, Discussion rooms / reference books for question bank creation, Online assessment system
7	Let Me Networ k & do	Faculty members, industry experts / practitioners	Program schedule with slots identified for socializing, Event Management Process	Email, Phone number and other contact details, Discussion Forum on Portal

TABLE 4: Framework Matrix for the Case-Study

FDPs	Program Date	No. of Colleges Attended	No. of Colleges Rolled out	Rollout Rate (In percentage)	Average Lead Time for Rollout(In months)	Feedback Rating for "Objectives Achieved" (in a scale of 1-5)
1	July-2004	11	7	63.6	13.5	4.02
2	July-2005	7	3	42.9	11.3	3.86
3	March-2006	31	20	64.5	4	4.48
4	July-2008	25	13	52	4.3	4.59
5	Dec-2009	7	3	42	3	4.24
6	Apr-2010	9	3	33.3	4	4.24
	Overall	90	49	54.4	6.68	4.24

TABLE 5 – FDP SUCCESS PARAMETERS PRE –FRAMEWORK

FDPs	Program Date	No. of Colleges Attended	No. of Colleges Rolled out	Rollout Rate (In percentage)	Average Lead Time for Rollout(In months)	Feedback Rating for "Objectives Achieved" (in a scale of 1-5)
1	April-2006	24	21	87.5	2.3	4.57
2	May-2007	28	18	64.3	4.2	4.35
3	June-2008	32	18	56.3	2.4	4.64
4	June-2009	30	24	80	3	4.11
5	Jan-2010	36	30	83.3	5	4.56
6	Apr-2010	24	21	87.5	1.4	4.45
	Overall	174	132	76.5	3.1	4.45

TABLE 6 – FDP SUCCESS PARAMETERS POST –FRAMEWORK

The average rollout rate has significantly improved from 54.4 % to 76.5 %. The average Lead time for rollout has come down from 6.68 months to 3.1 months, an improvement of 132 %. The average rating of the feedback parameter "Objectives Achieved" taken at the end of the program has increased from 4.24 to 4.45 regardless of the variations in program location, program anchors and participating faculty.

7. Statistical data, Feedback Analysis, Metrics and Measurement

Skills enhancement programs were conducted as per Table 13 from June2004 to April2010 in 94 colleges of Andhra Pradesh and the data points were obtained as per Table 14. Results were analyzed including employability enhancement from 81 colleges as shown in Table 7.

Details	Colleges#	Students benefited	Skills Areas
# of colleges implemented skills enhancement programs	91	12670	Technical, Life skills, English language proficiency skills, process and quality orientation skills, domain skills
# of colleges implemented only 3 skills areas	89	9640	Technical, Life skills, English language proficiency skills
# of colleges implemented all 5 skills as per Table VII	44	7455	Technical, Life skills, English language proficiency skills, process and quality orientation skills, domain skills

TABLE 7 – DATA ANALYSIS-METRICS-COLLEGES

Activity/ Skill areas	Results have shown percentage improvement per student	Students benefited	Remarks
Aptitude test related skills	Improvement of 18%	12341	Pre tests and post tests were conducted in all 3 years
Technical skills	Improvement of 14%	9872	Pre tests and post tests were conducted in all 3 years
Life skills	Improvement of 19%	13451	Pre tests and post tests were conducted in all 4 years
Mock interviews	Improvement of 16%	14411	Pre tests and post tests were conducted in all 3 years
English language proficiency skills	Improvement of 17%	16419	Pre tests and post tests were conducted in all 4 years

TABLE 8 – DATA ANALYSIS-METRICS-SKILLS

8. Conclusions and recommendations

1. This project is being delivered to undergraduates of engineering colleges as one of the levers to enhance employability of students by creating awareness of problem-solving skills to engineering students.
2. This program has set new benchmarks in raising the aspirations of faculty, students by leveraging technology for creating awareness of problem solving skills.
3. The project has enhanced the volume of activity for various offerings in industry-academia programs. Alternative channels such as online contests enrich student learning (awarded 4.24 on a scale of 5)

9. References

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