

Practices on One Credit Courses: A Case Study through SAP LAP

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ABSTRACT

This paper proposes to share the practices on Industry Interaction and the innovative approaches being followed in an autonomous engineering institution. It discusses through a novel approach Situation-Actor-Process-Learning-Action-Performance (SAP-LAP) enquiry study. This paper investigates the quality issues in the Industry Interaction of an autonomous institution from the stake holder's point of view.

The purpose of the case study is to understand an individual institution on this novel approach. The study deals with the development over a period of time and it probes deeply and intensively analyses interaction between the factors that produce change. Finally, the learning issues and influences of industry interaction in autonomous institution are summarized.

Keywords: SAP-LAP, Engineering Education, Industry Interaction.

INTRODUCTION

Establishing and sustaining a quality process in an autonomous engineering institution is a great challenge in the present context. Stakeholders are more concerned on the employability of the graduates passing out from these institutions. The autonomous engineering colleges realises their responsibilities and supports the flexibility and change management with Industry Interaction in the change environment. The flexibility in teaching and learning operates through Industry interaction which leads to student's performance based on multiple perspectives of faculty and students.

Institutions are striving to approach the industries for faculty and student internships, projects, faculty and student training. But, industries do not have much confidence with the institutions and feel that it is a burden for them due to their timeline on various processes in their business. This paper covered the features such as collaborative industrial alliances and its strategy, inter-disciplinary study, innovation and flexibility in learning and productivity, relationship with industries. The roles played by various individuals and associated people involved are described. The learning issues are charted out, possible actions are suggested, and expected performance is also visualized.

CHALLENGES IN INDUSTRY INTERACTION

It is observed that the industry stakeholders are unhappy with graduates passing out from the engineering institutions in the past years. There are several factors influences their requirements and some of the vital factors are listed below:

- Knowledge up-date and its relevance by faculty and students
- Exposure and application of knowledge to real life problems by faculty and students
- Solving of Large scale complex problems due to internationalisation
- Concurrent Problem solving with their various partners
- Lack of on hand practical training on contemporary software and its applications (eg. PLM Software, Project Management software...)
- Understanding of Financial implications of a project.

Still, most of the autonomous institutions are predominantly following the affiliated university syllabus for their curriculum. It slowdown the student knowledge up gradation and it leads to the lack of technical skills. Solving the real life problems is questionable through the acquired knowledge during their study. The industries are facing competitive challenges on their problems mainly due to the geographical locations of its operations. Their global partners and large scale issues need to be sorted out with in the shorter span of time. Cultural and behavioural issues are playing a major role in providing the solutions.

METHODOLOGY

Background of Thiagarajar College of Engineering

The Thiagarajar College of Engineering (TCE) has been in the forefront in engineering education in Tamil Nadu in southern part of the state in India. Thiagarajar College of Engineering came into existence in 1957 and began its philanthropic work on teaching and learning. Today, TCE is in a position of leadership with an annual turn out of 750 undergraduate and 250 postgraduate students. Statewide it ranks among the top five in engineering colleges in engineering education. To maintain a high level of harmony between faculty, students and management, TCE innovate its own processes of collaboration and development for faculty and students (TCE Annual report, 2015).

TCE stands not just for producing graduates – but practices a contemporary style of participative management. The concept of management, for TCE, includes faculty development through cross-functional training and strategic collaborations. Success in today's competitive environment demands meaningful collaborations and work processes that are results oriented. Incorporating these collaborations and process management into all teaching and learning processes, TCE has focused their strategy on developing world class facilities with high level of commitment.

One Credit Course Process

The process of one credit course being offered in TCE is charted in Figure 1.

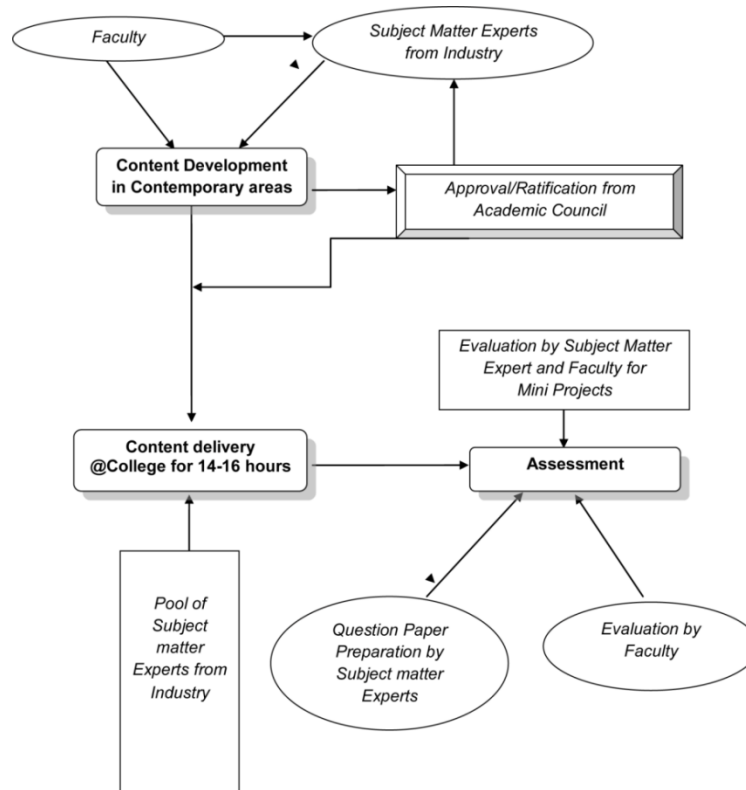


Fig. 1: One Credit Course Process

Situation Actor Process Learning Action Performance (SAP LAP)

This case study introduces the Situation-Actor-Process (SAP) - Learning-Action- Performance (LAP) (SAP-LAP) as the framework for the managerial inquiry. In the past, a case study was conducted using SAP-LAP analysis about the technology management strategy on three Indian automobile industries (Husain et al., 2002). However, the SAP-LAP methodology helps to analyse the change and flexible situations in an organization.

The main difference between the SWOT (Strengths-Weaknesses-Opportunities-Threats) and SAP-LAP analysis is that latter comes out with possible suggestions and expected performance of a system through the key learning issues. e.g. In an autonomous engineering college, there may be more doctoral degree holders and it may be claimed as a major strength, but in reality there may not be any further research contributions from the doctoral degree faculty members. This issue is highlighted with expected performance in SAP-LAP analysis.

Stakeholders

Students, Parents, Industries and Society in general are the important stakeholders for the institution. Students are come from rural, semi-urban and urban areas. Students are joining through single-window-counselling, an established procedure adopted by the Anna University for

uniform and meritorious admissions in the college. Parents are mostly literates, but predominantly hail from the rural areas. Reputed engineering Industries are periodically visit the campus for placements, training, student and staff internships, project work etc.

The objective of this case study is to assess Industry Interactive practices with special focus on

- Industry participation in Curriculum development
- Course content development for one credit courses
- Capability of introducing contemporary subjects
- Implementation of innovative teaching methodologies
- Industrial collaborations – One credit courses leading to
- Student projects, testing, internship, training
- Building competencies/Skills on students
- Innovations in Continuous improvement.

SAP analysis has been carried out during the period 2012–2015.

Situation

- Introduction of contemporary areas/subjects is made more effective by way of consultation with industrial experts, alumni and academicians through the academic council. The contemporary subjects are introduced as one credit courses. (E.g. Cloud Computing, Internet of Things, Big Data, PLM, Value Engineering, Cyber security, Smart Grid, Missile Technologies etc.)
- Collaborative tie ups with leading industries (Honeywell, TVS Motors, TCS, CTS, IBM, Intel, Amada Soft India etc.) ensuring availability of state of art knowledge in terms of technology and management practices.
- Leading industrial partners ensures long term relationship with the institution for their business solutions vide training, faculty and student internships, technical competitions, sponsored projects and research tie-ups.
- Harmonious relations exist with stakeholders. Stakeholders (Parents, Students, Industrialists...) demand better institutional performance in terms of placements, skill.

Actors

Development, etc.; funds are mobilized as corpus donations for scholarships from alumni, with the exploration of new sources.

The syllabus is continuously updated in *Academic Council* in tune with modern need of industries and feed back received from the council members. Also, this Council deals with all other academic related matters including student discipline and malpractices.

- Head of Institution sustain the teaching and learning process, forecasted industrial grievances, alleviated the student issues, draft the policies and implement effective procedures.
- Faculty acts as a facilitator for the students and mentoring them to learn fundamentals and newer technologies. He also acts as an agent for behavior modification. Faculty explores the industries and form Special Interest Groups to synergise their efforts in the specified domain.
- Students are actively involved in asynchronous learning of modern technologies.

- They are associated and involved with Special Interest Groups. Students participate in innovative design contest, mini projects and various professional activities.

Process

- Industry interaction resulted in signing of Memorandum of understanding (MoU) with a multinational company in the campus. Honeywell (Fortune 500 Company) Technology Solutions Ltd. is housed in TCE campus with around 800 employees.
- The industry institute interactions are multifold. The activities mutually benefited are as student internships, student exclusive contests, (e.g. Wireless sensor contest) faculty exposed to specific training (for instance motion tracking and detection, Supply Chain Management etc.).
- The institution has prepared blueprint for every activity associated and in respect of one credit courses being offered in all the departments.
- The institution involves in Planning and administration, quality systems, Enterprise resource planning for education systems and support, faculty development activities, Academic enhancement through Industry Institute Interaction (Faculty and students).

Learning Issues

- Top level management commitment for translating strategies into action has helped the institution in institutionalizing many collaborative initiatives (e.g. Honeywell, TVS Motors etc.).
- Study revealed that awareness about the importance of faculty and their collaboration with industries to share the knowledge is recognized. However, the institution needs to develop more focused approaches and strategy to harness and upgrade the knowledge more vigorously.
- Collaborative work place has proved to be the most effective in transfer of tacit knowledge in the contemporary areas and development.
- Financial performance is under pressure to maintain at par with world class institutions (20% of the annual income goes to corpus fund maintained for the purpose).
- Feedback from alumni needs formal mechanism and structuring. Alumni are enthused to participate in the institutional activities and more efforts should be taken to tap their interest towards one credit courses.

Action

- Training schedule for recent knowledge in the respective field and skills is prepared. More electronic support shall be provided for effective teaching and learning.
- Industry case studies are presented to have more practical experience to the students. More In-house case studies shall be prepared by the students.
- Identification of domain companies for student and faculty training, projects and research areas. At present, decision on courses to the students is decided by the concerned faculty in consultation with the domain experts. College shall take steps to formalise it.
- The growth of various technologies is in fast pace. Institution should capture the recent trends with the present capabilities to accommodate by consulting their Special Interest Groups and relevant consortiums so as to adopt the recent trends and enhance the capabilities of the department.

- Alumni meet is being organized once in a year by every department. More involvement of alumni is required to tap the potential know how from the alumni. Mechanism for involvement of alumni (for instance Video conferencing mentoring, Project reviews, Syllabus up-gradation, industrial trends, mentoring leadership qualities) should be evolved.

Expected Performance

- Institution has Industry Interactive capabilities to emerge as a model for higher learning institution.
- Explore new industries to suit the special interest group and makes them knowledge transfer leads to product development.
- Extent to which the new one credit course model copes with current industrial environment.
- Proper mechanism to be evolved to tap the industry leading to supported research & development projects.
- More involvement is required in Consultancy and Testing for all the domains. It results in continuous watch for current technologies.

Key Learning Issues

The one credit course initiative is driven by top management and Head of Institution at Thiagarajar College of Engineering, Madurai. The learning issues on the quality attributes have been synthesized and tabulated in Table 3.

Table 1: Synthesis of Learning Issues

| <i>No.</i> | <i>Quality Factors</i> | <i>Status/Implication</i> |
|------------|---|--|
| 1 | Interactions, collaborations, and Networking with partners | Institution has effectively managed its interactions with industries such as Honeywell, TVS Motors, TCS, CTS, Texas Instruments, for sharing and promotion of knowledge and skills for working in cutting edge technologies. Faculty and Student are effectively involved in its collaborative, one credit courses. The participation by its students and its interactive industry has helped it to upgrade knowledge on a continuous basis. |
| 2 | Special Interest Group (SIG) | Powerful concept provides requisite variety of focused knowledge and resources. SIGs are effectively organized the one credit courses to improve the learning among students and more interaction with industries. |
| 3 | Life long learning through training for faculty, staff and students | Student development is in a continuous basis. The usage of human and physical resources needs to be enhanced for developing insights. |
| 4 | Management of Intellectual resources | Institution has given explicit focus for managing the diverse knowledge to students and faculty through use of industrial Collaborations and more specific on one credit courses. |
| 5 | Readiness for change | Through flexible policy framework institution has achieved and enhances its functioning and made it ready for change. |

SUMMARY

This paper shared the practices on Industry Interaction and the innovative approaches being followed in an autonomous engineering institution. A case study tool using SAP LAP is discussed through a novel enquiry under study. This paper highlighted the challenges faced in the Industry Interaction of an autonomous institution from the stake holder's point of view. The study dealt and it probed deeply and analysed the interaction between the factors that produce change. Finally, the key learning issues and influences of industry interaction in autonomous institution are summarised and tabulated.

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