

**Progress report of the Project
Developing a Teacher Supportive Material
for Faculty Improvement among Engineering and
Technological Colleges**

A report of Two Day Consultative Workshop with the Experts of
Engineering and Technological Institutions
(16th and 17th October 2019)



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Introduction

Teaching-learning process is considered as the heart of any educational programme. Many researches have been conducted upon this area in order to bring quality improvement in learning as well as to explore when and how students will learn well. It is found that, Students learn enthusiastically when they perceive and do the activities by themselves; their learning is also accelerated more when they implement. The students are also benefited when they apply their knowledge and skills, in which they can test and debug their experiment, which is nothing but self- exploration. This helps the students to remember the content because of their practical involvement and getting first-hand information. Normally in the typical classroom environment the teachers are transmitters and students are receivers, whatever the teacher says it is transferred to the students in the form of knowledge, in that, only fraction of students will gain the knowledge and will try to think and implement, rest others will be left out completely or partially.

Usually any classroom will have a heterogeneous students group following a common syllabus, common teaching-learning situations and common examination system which completely ignores the individual difference. The low employability of engineering graduates and the respective capacities nurtured in the engineering programme, especially in today's competitive world are not compatible. There is a great lacuna between the students coming out as engineering graduates and the need of the society with highly sophisticated MNC's, other corporate companies, technology savvy and industrial environment.

In the present scenario it is observed that, only the output namely "outcome based learning" is focused in engineering programme, whereas little importance is given at 'input' and 'process' phases. But it is very significant to take care at input as well as process phase in any educational programme, so that the output will be guaranteed. Here input includes teacher competencies, students' competencies, and their learning abilities, available resources, infrastructure, and curriculum. The process phase will include the curriculum transaction, teaching-learning process, formal and informal evaluation, diagnostic tests and remedial measures (Formative Evaluation). Similarly output includes the Summative Evaluation, Feedback for both Teacher and Taught. Pedagogy is the study of learning by children (i.e. child learning, for adults' learning it is andragogy) which involves activities that induce changes in the learners. It is a methodology which helps the students to develop an existing technique or innovating new techniques. Pedagogic approaches help the teachers to deliver the content to the students in an effective manner. The teachers can deliver actually what they think and what they want to say. Ultimately the goal of pedagogy is to improve the leaning methodology of students. Pedagogy involves Teaching and Learning activities which make some noticeable changes in students. These kinds of methodologies make the students to innovate new ideas. Thus there are a comprehensive variety of teaching strategies, which plays a vital role to develop the teaching methodologies at the highest level. Hence the project is designed with the following objectives:

Objectives:

- To identify the Learning outcomes for selected course papers in different subjects of Engineering Programme (first and second semester)
- To generate alternative Teaching-Learning and Evaluation activities based on Pedagogic Approaches for the identified learning outcomes
- To identify teaching competencies required to develop the learning outcomes for the selected course papers

Need and Justification:

The report by UNESCO in 1996 at International Commission on Education for 21st century has enforced "Learning the treasure within" which has highlighted the concepts, 'learning to know', 'learning to do', 'learning to live together' and 'learning to be'. This implies that students must develop not only cognitive skills, but also a higher order of abilities like, critical thinking, problem solving skills, social awareness, empathy, perseverance and grit, team work and leadership among them. The present scenario in universities and colleges meant for engineering education is not in accordance with these perspectives. There seems to be a gap between the teachers and students. This could be because of teacher dominated and authoritative approaches in teaching.

- National policy on Education 2019 (draft) under chapter 9 points out that most of the higher education institutions in India have rigid boundaries of disciplines and have not responded to the modern advances in the disciplinary knowledge or in educational practice. Student support is almost non-existent.
- The focus of engineering pedagogy must be on the development of teaching concepts for the preparation of future engineers for their leadership roles in changing structures of production and service. But the reality is that most of the Indian Universities design their pedagogy around an examination system which tests the student memory than the ability of students to apply, analyse, evaluate and create knowledge.
- There is a demand for good faculty but only few colleges can afford their salaries, and the other face of the same problem is courses and colleges are available but without good faculty. Hence it is felt that engineering subject matter and engineering pedagogical content knowledge are two main bases that would be the most important to focus on developing engineering teachers.
- The real problem in engineering colleges started 2 decades ago, because too many number of colleges got opened at the same time the syllabus also has improved phenomenally in trying to match the industry expectations. The best of the students get placed from the best of the colleges in the best of the companies and this percentage is not more than 5.

- As it is rightly told by Dr. Sitarmsohni HOD of Engineering and Research IJM University (2018) that if we really want to improve the engineering education in India and make our engineers really contributing to the growth and prosperity of the nation the whole domain needs complete re-thinking.
- In India engineering research and development programmes exist mainly in IITs. Even there also, the main focus appears to be fundamental research and applied research activities rather on low-key.
- There is a disparity between renowned technological institutions such as IITS, state technological universities and other engineering colleges in the country.
- The low employability of engineering graduates and the relevance of the capacities nurtured in them for the purpose of employment in today's knowledge-intensive, quality and productivity conscious, technology savvy, industry environment are serious concerns.

Qualitative Assessment for improvement of technical education using Total Quality Management reveals that outburst of huge unemployment problem is due to:

- Desegregation of quality education at the input and output due to lack of curriculum planning
- Inadequate resources
- Ineligible fresh pass out joining as teachers
- Greater emphasis is on theory rather than the practical performance
- Evaluation system encourages only memorization of the subject knowledge

The research journal IRJFE AND T 2017 has pointed out the factors affecting the quality of technical education is as follows:

- quality of students admitted
- students with rural background
- lack of communication skills
- students are inhabitant to ask questions
- faculty facilitation
- marks oriented system
- quality and skills are not up to the current real life situations
- existing trend in teaching is out dated (collaborative learning, co-operative learning, inter and multi-disciplinary learning approaches and much more have to be incorporated)
- freedom of inquiry required for educating young minds is totally missing

Methodology: A three Phase Activity spreading over a period of five months. The pattern of the activities is represented in the table given below :

SL. No.	Activities proposed to be organized	Proposed dates
1.	Phase 1: Identify the learning outcomes in terms of content analysis in different subjects of first and second semester of engineering course (UG)	September 2019 to October 2019
2.	Phase 2: Generating alternative teaching-learning activities and evaluation based on pedagogic approach for the identified learning outcomes.	November 2019 to December 2019
3.	Phase 3: Coverage of the subjects whichever left in phase 2 and preparing a teacher-supportive material incorporating the earlier phase 1 and phase 2 outcomes. Validation of the so prepared material by regular practitioners and experts.	January 2020 to February 2020

Details of Phase I Activities

To mark the initiation of the project, Phase I was executed by means of two day workshop on 16th and 17th October 2019. The programme scheduled for the respective dates, mainly meant for the consultation, orientation and guidelines for the construction of teacher Supportive material is given below:

INTER UNIVERSITY CENTRE FOR TEACHER EDUCATION
(National Council of Educational Research & Training)
Regional Institute of Education, Manasagangotri, Mysore - 570006.

A TWO DAY CONSULTATIVE WORKSHOP WITH THE EXPERTS
On

Developing a Teacher Supportive Material for Quality Improvement among Faculty of Engineering and Technological Institutions

DATES: 16th to 17th October 2019

PROGRAMME SCHEDULE

VENUE: IUCTE Hall, IUCTE - RIE, Mysuru

DAY & DATE	SESSION -1	Tea Break	SESSION -2	Lunch Break	SESSION -3	Tea Break	SESSION-4
DAY I - 16 th October 2019 Wednesday	09.30 - 10.00 AM REGISTRATION ***** 10.00 - 10.45 INAUGURATION ***** 10.45 to 11.15 AM Concept Note By Dr. Suneetha C.N Project Coordinator Assistant Professor IUCTE - RIE, Mysuru.	11.15 - 11.30	11.30 - 12.30 Prof.Menon Former Director and Chief UNESCO Education Programme Kochi Topic: General orientation with emphasis on thrust areas 12.30 - 01.30 Prof.Shivakumar Director CDC NITTTR Bangalore Topic:Curriculum Design and Concept Map	1.30 - 2.30	2.30 - 03.30 Prof.Manjula Shantharam. Department of Biochemistry Jnana Kauveri Mangalore University Topic:Experiential Learning 3.30 - 04.30 Demonstration by Mr.Hariprasad Mr.Anilkumar Mr.Mohammed Nadeem	4.30 - 4.45	4.45 - 05:30 Group discussion and team formation
DAY II - 17 th October 2019 Thurs	09.30 - 10.30 Prof. Shirish M.Kerur Joint College of Engineering, Belagavi 10.30 to 11.30 Prof.Giridharan NITTTR Chennai Topic: Pedagogical approaches to engineering program	11.15 - 11.30	11.30 - 12.30 Prof.Raviraj. Principal GSSS First Grade College Mysore Topic: Teaching learning and evaluation. 12.30 - 01.30 Team work on chosen topics	1.30 - 2.30	2.30 - 03.30 Balasundaram.S.R HOD of Computer Applications NIT Trichy Topic: Preparation of "Teacher supportive material" 3.30 - 04.30 Team work on chosen topics	4.30 - 4.45	4.45 - 05:30 Presentation and discussion on Teacher Supportive Material and Feedback *

DAY - ONE – 16th October 2019



The project titled “Developing a teacher supportive material for the quality improvement among the faculty of Engineering and Technical Institutions”- approved by the Prof. Y.Sreekanth, Principal RIE-Mysore was launched on 16th October 2019.

After getting the registration procedure completed by the resource persons the inauguration of the workshop was conducted. Mrs. Sunitha. N, JPF IUCTE compered the programme and Mrs. Divya Shree and Ms. Kusimitha rendered the invocation. This was followed by the introduction of the resource persons and the welcome speech by Dr. Suneetha.C.N assistant professor, and the coordinator of the project IUCTE RIE-MYSORE. Professor.M.S.Talwar, the Director of IUCTE RIE-Mysore chaired the session and Prof.Mohandas.B.Menon, Former Director and Chief UNESCO Education Programme, Kochi was the chief guest for the session. Prof.M.S.Talwar gave the introductory talk regarding the activities of IUCTE as a whole and the present workshop in particular. He wished the grand success for the innovative type of activity which the project is aiming at Prof.Menon also spoke the need of the hour and relevance of the project pursued by the project co-coordinator under IUCTE RIE-Mysore.



Dr. Suneetha gave the concept note and explained about the objectives of the project. She also gave the justifications and rationale for the present study. The key terms, namely, pedagogical approaches, teaching approaches, methods, strategies were narrated and a reference regarding Bloom's Taxonomy and the Revised Anderson's Bloom's Taxonomy was illustrated.



Prof. Menon gave the detailed information about the different attributes of a graduate course, programme learning outcome and course learning outcome and relevant websites and links so that it could be helpful for the further activities of the workshop. He stressed about the significance of the objectives and the nature of outcome based learning at engineering programme.



Prof. ShivaKumar In charge Director of NITTTR, Bengaluru gave different model of curriculum design with respective features and information regarding concept mapping. He brought about the merits of having OBE model and CAIO model of curriculum and the AICTE norms as bench mark any curricular package in the discussion. He also threw light on the present exam based educational activities and critically analysed the level of compatibility between the engineering programmes and the market requirement and societal demands. He also gave the review regarding the attributes prescribed in the syllabi, which is neither pure cognitive nor affective in its nature. He stressed upon the importance to be given with respect to soft skills, like, communication skill, lifelong learning, team spirit and collaborative activities.



Prof. Manjula Shantharam HOD and BOS of Biochemistry department, Mangalore University rendered the lecture regarding experiential learning. She stressed upon the use of experiential learning by its advantages and impact on learning. Information regarding the cycle of Experiential learning, different approaches and strategies that promote EL, Methods, and Models of EL, namely, Greenway and Kolb's Learning Models was presented with ppt. The advantages of EL as well as some guidelines for the teacher to adopt EI were also narrated.



At the end of the day a demonstration lesson was arranged in which three educational practitioners, namely, Mr. Hariprasad M.Sc. B. Ed., Mr. Anil. K.S. M.Sc. B.Ed. and Mr. Mohemmad Nadeem M.Sc. B.Ed. showcased the team teaching. The demonstration was given to students of I year Science Degree course, on the topic 'wave theory and quantum theory' in physics of I semester of engineering programme. This was followed by the collection of feedback about the demonstration lesson and also group discussion regarding the further activities of the workshop.

DAY-TWO -17th October 2019



The first session of the second day of the workshop was started by Prof. Shirish M. Kerur, associate professor from Jain College of Engineering with a very effective lecture on teaching-learning process in general, the role of empathetic teacher, the importance of acquiring communication skills and life skills. He pointed out regarding the direction in which the present education system should move and why it is so important. He also stressed upon the role of teachers regarding their responsibility in bringing out our future generation. He gave detailed account of qualities of and the competencies of a good teacher



Prof. Balasundaram.S.R Professor and HOD of Computer Applications NIT Trichy gave bench marking guidelines regarding the educational packages development in general and e-learning packages in terms of suitable pedagogical methods for various classes, intellectual calibres and research in e-learning in particular. He brought out the points like, the need of the teacher to understand the students and their levels, knowledge of technology, the ability of a teacher in creating a learning culture and also that a teacher must know that the students are for the society/Industry. He insisted on collaborative learning and good interaction sessions in teaching-learning process. He gave the authentic digital links for pedagogy project meant for both teachers and learners.



Prof.Giridharan.K.S. Assistant Professor CDC-NITTTTR, Chennai, as an expert in the curriculum designing, writing of instructional objectives, spoke about the importance of contextual learning and gave very impressive illustrations and live examples. He touched upon the significant points, like, how a student perceives the learning points, processes it, and could apply in new situations. He stressed upon the need of assessing the students based on their learning style. Students may belong to sensory learning style or intuitive learning style. In such cases the input preference also vary. He explained the distinguishing aspects of “Digital Natives” and “Digital Immigrants” which could creep in as generation gap in a classroom situation. Regarding the processing part of information he explained as it could be in terms of active mode, reflective mode, and a student may organise such information by inductive/deductive based logical analyses. For all this the content which a teacher teaches should have connectivity, and one has to connect the content to real time application.



Prof. Raviraja, principal of GSSS College, spoke about the inbuilt system of evaluation and the comparison between the Indian systems of education with that of the education system in abroad i.e. USA or UK. And also about the importance of criterion based evaluation.



Prof. Somnath Somnath Yadawad, Associate Professor, KLE College of Engineering, Belgaum, expressed his ideas and suggestions for the further activities of the workshop by taking the support of power point presentation. He illustrated several teaching strategies, including lecture cum demonstration, group discussion, and how a process plan must be constructed phase by phase for the Engineering Product, may

be for home appliances or for any company. He stressed upon the importance to be given towards the sequential operations and this was illustrated by some supportive tools.

The project is yet to complete its Phase II and Phase III in the due course of time. The feedback obtained about the Phase I will be incorporated for the planning of the next phases. In phase III the Teacher Supportive Material will be completed as the final draft.

Scheme of Evaluation: The prepared material will be disseminated to the concerned departments of technological institutions and colleges of southern states and the written feedback, on-line feedback and opinions from the faculty members will be collected. The programme will be modified based on the need and the significance of rectification.

Dissemination of the Findings: The digital version of the document will be uploaded on the IUCTE website and also sent to the technological universities and the colleges of southern states, NCERT and NCTE, IITs, and polytechnic Institutions.

Plans for follow-up/feedback on the utilization of the programme:

- Since the Programme is meant for engineering educators as a teacher-supportive material with a special reference to the first and second semester subjects of Engineering Programme it could be further developed for different subjects of the remaining semester course papers.
- Could be introduced as an open elective subject, namely, "Engineering Education" for those aspirants who would like to become engineering educators (teachers in engineering colleges). This could probably take care of quality input for engineering educators.
- The material could be utilized by faculty of polytechnic teachers where the subject-specific innovations in the form of teacher-supportive material could be developed.
- The material could be utilized by the faculty of Diploma in Technological Education, which needs subject-specificity, and in this direction further developmental work could be taken.