NEED OF SKILL BASED MODULE TO ENRICH PROFESSIONAL COMPETENCIES IN BUDDY ENGINEERS

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[k]*Abstract: Higher education in India has expanded very rapidly in the last seven decades after independence yet its accessibility and quality both remain a concern. There is no space for creative learning and higher order thinking and students are forced to learn only syllabus and are not really encouraged to go out of the boundary. Hence there must be skill development while learning engineering education itself during the course of study which can be augmented directly from time to time. Autonomous Institution has a freedom to offer an additional course apart from a Curriculum. Being an Autonomous Institute, we have framed the Skill Development Course considering an aspect from Physical Fitness to Employability Course. Skill courses are designed to groom budding engineers, become employable and a responsible citizen of the nation. By offering these courses, we can bridge the gap between the Industry and Academics. Buddy Engineers are slowly trained step by step to face the Human Resource People during the Interviews. Skilled Engineers will be produced by the Higher Education Institutions on imparting the skill based modules with the regular Curriculum.*

Keywords: *Skill Development; Higher Education; Employment; Autonomous*

1. INTRODUCTION

India's higher education system is the third largest in the world, after China and the United States. The nation has more than 1.5 million schools with more than 260 million students enrolled and around 1000 universities and 39,931colleges. The education frameworks in India are advanced in nature, but still a lot of potential is required to facilitate improvement in the education framework. In spite of different achievements in Higher Education, severe strains and stresses are faced by Engineering education in India. This creates unemployment among the budding professionals. On other hand, industry expectation is high, looking forward for skilled Personnel's. 90% of the education is theoretical with minimal scope in practical learning and research aspects. Lack of interest among students in learning is also one of the causes. This creates a broader gap between the current output of our education system and the requirements of the industry. Our education system has produced more graduates in terms of qualifications but skill or employable qualities of graduates seem to be less.

More than 15 lakhs certified engineers are graduating in India every year, according to the union human resource development ministry. Of this, 1.75 lakh pass out from Tamil Nadu's 552 engineering colleges. The graduates are expected to be ready to enter the industry. But expectations of the industrial sectors are highly in standards. Industry expectations do not fulfill with the curriculum. Some measures have to be taken to build the domain specific skill during the period of learning along with the regular learning. Students who are with technical knowledge even when their less academic grade points excels compared to rank holders. Skills are assessed in the interviews as the recruiters wants to choose the Engineers who can adapt themselves to the industry and brings innovation in the field. There must be regular insist during the period of study to learn broad range of skills along with the technical skills failing which leads to lack of skills even after completing the mandatory curriculum.

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2. INDUSTRY EXPECTATION

India's engineering sector has increase in growth over the last few years which are of strategic importance to India's economy. The rate of hiring among engineering graduates across India stood at 31 percent in 2020. Overall, the engineering sector saw a higher rate of hiring compared to other fields of study in the country. Due to more number of graduates graduating each year, the job market tends to be overflowing. Scope of engineering job is vital. Students are planning to enter into corporate sector with a dream of white collar job after their graduation. But the expectation of industry is high. In current scenario of job market, recruiters recruit the buddy engineers who possess the following category of skills such as Professional, Methodological, Social and Personal skills listed as follows:

TABLE 1.CATEGORY OF SKILLS

Category	Skill Set
Professional	Technical Knowledge, Recent Technologies, Application
Methodological	Programming skill, Planning and Project Management
Social	Ethical, Human values and Interpersonal skills
Personal	Self Discipline, Attitude and Communication skills

Engineers invent everything ranging from organic material to automation industries. Hence much technical skills are needed for engineering technocrats. Depending on the complexity in design, more knowledge is to be acquired regarding the advancements in the same fields. It's important for the working professionals to translate the knowledge to outside world. Due to the highly technical demands, communication also often proves to be one of the most challenging soft skills for engineers. Engineers must manage the teams and to work with allied departments, hence managerial skill is essential.

India produces a large number of engineers each year, but there are blaming from the industrial sector due to lack of the preferred quality of engineers. The industrial sector is looking for an engineer who may have to shoulder several responsibilities at the same time. This may not be possible for individuals who focus their complete attention on one thing. That is when the ability to multitask becomes extremely crucial. An engineer is expected to multitask in the organization. Augmenting the art of skill development during the period of study is essential to excel in the job market.

3. ROLE OF EDUCATIONAL INSTITUTIONS

The aim of education today is to train and furnish the students to meet the challenges in future. Hence the education must be highly valued to face the standards. In contrast to international standards and global demands, technology and scenario, the education system is in compelled mode to offer the skills based course.

In school education, many of students are strongly encouraged to carry out the learning through memorizing only. Our School system does not support the creative thinking among all the students. Strong Hurdles are faced by most of the students during the Engineering Education due to the lack of ability of higher order thinking skills. A student from rural area after entering the Engineering faces hurdles to bridge the gap between school education and engineering. They require more time to adapt themselves. But the student from urban area will have better communication skills than other students who are

hailing from rural and semi urban areas. Though the technical skills of urban students are not up to the remarkable level, they are used to manage themselves.

In curriculum of Engineering education, only technical exposure is provided. Practical exposure also seems to be less for engineering when compared to other developed countries. When the curriculum is analyzed, the basics are only learnt. Percentage of the recent developments updated in the current curriculum is less. Scope for upgrading of curriculum and syllabus is very minimum, since many of our colleges are affiliated with the University, where frequent revision of syllabus will not occur. Apart from technical knowledge of learning, small provisions are provided for employability enhancement course, wherein the students will have the platform for developing communication skills. Project study is offered during the last semester of their study hence the involvement in this is not found to be satisfactory for all students. Only the Engineering Curriculum learning alone will not helps the students to equip themselves in acquiring the analytical, problem solving skill or social skill. Hence additional training or learning is needed to face the recruiters.

4. GAP ANALYSIS

More Engineers are graduated from India in recent years. According to the recent survey, only 7% of Engineering graduates are readily employable and the ratio is pulling down as years pass by. This occurs due to the gap between Industrial needs and Academics. Engineering syllabus is covered with the foundations and the scope of learning about Latest technologies is less. Adequate training is not provided for acquiring the problem solving skill during the course of study. Inspite of this, students are also not aware of workplace expectations. So awareness must be created by exposing them with the work place. Focus on personality development of students inclusive of social and ethical also tends to be poor. But these are expected at the entry level engineers in industrial sector.

To excel as a successful Engineering Graduate, a graduate has to incorporate the following criteria's: a) Engineering Knowledge, b) Problem Analysis, c) Design/Development of Solutions, d) Conduct investigation of complex problems, e) modern tool usage, f) The engineer and Society, g) Environment Sustainability, h) Ethics, i) Individual and team work, j) Communication, k) Project Management and Finance, l) Lifelong learning. As per the curriculum of Engineering, it is very difficult to acquire the outcomes in mentioned criteria's. Bridging industry-academia gap plays an important role in this whole scenario where students, universities, organizations and government need to work together.

5. DIFFICULTIES IN OFFERING SKILL BASED MODULE BESIDES CURRICULUM

Normally the Credit requirements for Engineering Education in our country range from 180 to 220. Students were fully engaged with the learning of department specific courses. Student's interaction with the outside world is very minimum. Many of the students do not have much exposure in software based learning. To inculcate this, some initiatives had been taken by the University Regulations in offering of Value added course, online course, Internship and Inplant training. But that has not been made as mandate for students; hence the student's involvement is not quite satisfactory.
Curriculum for Engineering Education has been renovated by the AICTE to meet the industrial needs. Model Curriculum has been proposed in the year 2018, in which the number of credits required is reduced to 160 from 220. Induction training is made as

mandate to reinforce the fundamental concepts and the required language skills for technical education.

Even though AICTE has reduced the credit ranges, the affiliated colleges are not supposed to take the decision on their own. Since revision of curriculum and syllabus occurs once in 4 years, the scope of offering skill development course is not up to the remarkable level. But there exist scope for Autonomous colleges and Universities, wherein they can develop their own curriculum and they can append the skill based courses.

6. OPPORTUNITIES FOR AUTONOMOUS COLLEGES

Autonomy is the freedom granted to selected institutions of high standards and repute to develop the curriculum based on the current industry needs. The autonomous colleges are highly privileged to have academic freedom, to offer choice based credit system, provides better subject choice and electives, conduct of examinations on their own and so on. As an autonomous institute, a process has been initiated to offer skill based module to the students thereby to minimize the gap between the Industry and Institute to some extent. Curriculum also designed taking into consideration of AICTE model curriculum for the successful execution on the identified skill based module.

7. PRACTICE AT OUR INSTITUTE

Skill development courses are offered in Higher Education Institution to equip skills among its students both at academic and industry level, thereby to increase the progress in employment and research activities. Major areas are identified for Skill Development. These courses are offered with the objective of augmenting curricular courses and to enrich students with additional skills, knowledge and attitude.

TABLE 2: GROUP CATEGORY LIST

G1	Health & Fitness	G2	Service to Society Level -1	G3	Skill Course Level -1
G4	Technical Expertise Level-1	G5	Social Course	G6	Employability Course Level-1
G7	Skill Course Level- 2	G8	Service to Society Level- 2	G9	Employability Course Level -2
G10	Proficiency Exam	G11	Technical Expertise Level-2	G12	Employability Course Level-3

Detailed description of group is listed below:

Health & Fitness: Orient and accelerate learners to pay attention towards health, fitness and to live a healthy life.

Social Course: Cultivating the relationships and functioning of the society with government, economics, civics and sociology

Service to Society: Inculcate the essence of Service to Humanity based on solidarity, sharing and brotherhood and create a sense of oneness.
Skill course: Impart essential computing/ language / proficiency skills gaining confidence towards active participation in administering the role.

Technical Expertise: Instilling Capacity building skills that lead to implementation/ design of products, solution.

Employability skills: Fostering career path across wide sectors beyond qualifications and experience.

Proficiency Exam: Measures the student abilities and skills in their specific programme and also to know how well he/she has learned, understood and internalized the related concepts and principles of his/her courses.

In each semester, fourteen modules of 2 groups are floated to have a wider choice among the students.

Semester	I	II	III	IV	V	VI	VII	VIII
Group Offered	G1	G1	G4	G5	G7	G7	G8	G10
	G2	G3	G5	G6	G9	G11	G10	G12

Students have to enroll any one of the module (considering 2 Groups) every semester. Detailed description of Health & Fitness, Social Course and Service to Society are listed below:

Health & Fitness	**Social Course**	**Service to Society Basic Level**	**Service to Society Advanced Level**
Yoga for Human Excellence	Indian Constitution and Finance	National Service Scheme	Guidance to School Education
General Psychology	Essence of Indian Knowledge Tradition	Youth Red Cross	Organizing Continuing Education Programmes
Health care Programme	Environment Protection	Red Ribbon Club	Dissemination of Information on Government welfare schemes to villagers
Physical Grooming	Universal Human values	Energy Club	Cleanliness
Fire Safety Hazards	Ethics in Engineering	Water Club	Agriculture for Engineers
Transportation Management	Stress Management	ECO Club	Swachh Bharat Abhiyan
Value Education	Emotional Intelligence	E Club	Gender Sensitization Programme

Skill course and Technical Expertise module details are listed below:

Skill Course Basic Level	**Skill Course Advanced Level**	**Technical Expertise Basic Level**	**Technical Expertise Advanced Level**
Ms-Office	FOSS course – Domain specific	Value Added Course – Domain specific	International Conference
Computer Installation & Troubleshooting	Workshop/ Smart India Hackathon	Online course-NPTEL	Publications
Electrical Wiring ,Basic Repair of Home Appliances	Technical Seminar	Online Course-Course Era	Self learning courses
Basics of Google Domain	Website Development	Project Contest	Organizing a technical event-IEEE/ISTE
Typewriting-English/Tamil	Professional Society Membership & Activities	Virtual lab	Product Development
Digital Photography/ Music	Symposium events	App/Arduino Developer	Document preparation system : LaTex
Tally	Inhouse Training	Value Added Course – Domain specific	Educational & Technical Visit

Module Details of three levels of Employability course and Proficiency Exam are listed below:

Employability Course- Basic Level	Employability Course –Intermediate Level	Employability Course –Advanced Level	Proficiency Exam
Integrated Aptitude skill course-1	GATE Coaching-1	GATE Coaching-2	Clearing proficiency Exam(GATE/ Tech Exam)
Soft skill certificate course-1	UPSC Exam Training 1	Placement	International Certificate Course
Resume Building	Integrated Aptitude skill course-2	Business plan & Development	English Proficiency Certification (TOEFL/ IELTS/BEC)
Project Management	Soft skill certificate course-2	Radio / Video Jockeying & Emceeing	Domestic Languages (Hindi/ Sanskrit/Tamil/Malayala m/ Telugu)
Inplant Training	Marketing Management	Surveying on Energy Conservation and Water Management	Foreign Languages (French/ German/ Japanese / Korean)
English Made Easy	Visual Media And Film Making	In House Project for the Betterment of Institute/ Department	Aptitude Proficiency certification (GMAT/ CMAT/GRE/ CAT)
Maths Made Easy	Domain Specific Certificate Course	UPSC Exam Training	Energy Audit/ Management or Non destructive testing

The hierarchy in execution of Skill Based Modules is described below:

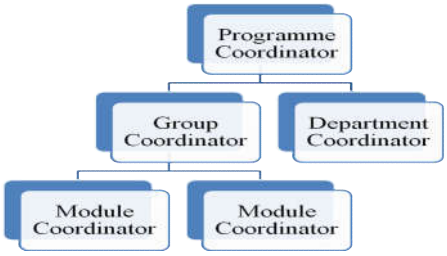

Figure 1: Hierarchy in Execution of Skill Based Module

Programme Coordinator will be the overall incharge for the courses. Introduction of new courses, monitoring the conduct of the courses, guiding in evaluation process and supporting the smooth progression will be carried out by the Programme Coordinator. Group Coordinator will harmonize the courses under the particular group. Department Coordinator will support the department students to enroll in a module. Module Coordinator will set syllabus, course plan for the module, conduct of class, supports all activities pertaining to the module and to evaluate the module through assessment or activity.

When the students undergo the skill based module at each semester, student will be made to complete each module thereby additionally few skills will be incorporated in their period of study. For the award of degree, every student has to complete at least one module in each group as a whole.

8. SUMMARY

Education is important but skill is more important. As such it is providing largest employment in the world thereby skills are playing important role. In order to develop

the skill, several reforms were taken to improve quality of education. Reforms includes in offering of Skill Based Course to bridge the gap between Industry and Academics. These courses are offered in phased manner to the students. These courses will increase the confidence level of students to meet out the Industry expectations. Due to the wide offering of skill courses in various domain, there exist more employability opportunities for the students. As an outcome, Skilled Engineers are developed with higher order thinking capability.

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