APPLYING CATERPILLAR - BUTTERFLY MODEL FOR PROMOTION OF INNOVATION & ENTREPRENEURSHIP IN ENGINEERING CURRICULUM

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Abstract

Nothing is permanent but change. In times to come, the wage -employment opportunities even for the technical graduates are going to dwindle. In this context will the stereotyped classroom syllabus oriented teaching and learning really click in terms of placement of students? The advertising principle which states that, if there is need fulfill it, was true till the recent past; but today with the job saturation and cut throat competition the job scenario is fast changing its face. The other half of the above stated principle is then what really holds true and that is, if there is no need than create one, this is now the real need of the hour.

Role of education in general and role of engineering education in particular should change its paradigm from just giving the students the vast amount of knowledge and job placement, to knowledge management knowledge application and job creation Desperate and deliberate attempts need to be made to divert the students towards innovation and entrepreneurship. This could be possible if there is a renaissance in the technical school-of thought. The perspective of disseminating of technology needs a change. For this the technical institutions should provide latest schemes, which would encourage students to probe into the business opportunities, provide them necessary infrastructure and act as a mentor and facilitator in the journey of scholastic classroom teaching to the challenging world of work.

The paper aims at identifying the role of technical educational institutions by way of following techniques:--

1) *Organizing entrepreneurship workshops*
2) *Organizing personality enhancement workshops*
3) *Projects; like adopting sick industries.*
4) *Collaboration with nodal agencies like -Maharashtra center for entrepreneurship development.*
5) *By strengthening industry - institute interaction.*
6) *Diversifying the role of EDP cell in the institute.*
7) *Liasoning with banking agencies and non-banking institutions.*

Once the concept building exercise of inculcating entrepreneurship through various techniques is firmly rooted in the minds of the young technocrats, students will be motivated and initiatives will be taken, success stories will be created for diverting sizable number of students towards self-employment.

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INTRODUCTION

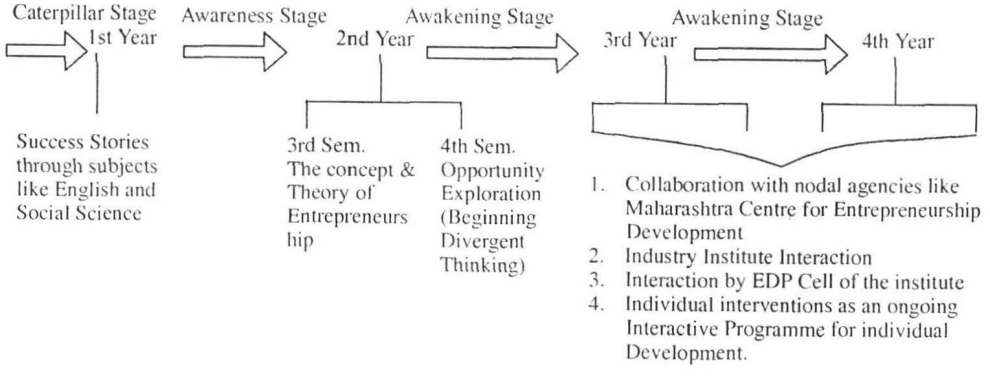
There has been a considerable expansion of technical education at various levels during last half a decade. Ironically this large expansion has created considerable unemployment of technical manpower. Under these circumstances where the chances of wage-employment for technocrats are meager, mere improvement in the wage strategy cannot solve the problem. Promoting entrepreneurial avenues amongst the students may be the most viable alternative leading to their self-employment.

There is a dire need to make the students aware of the wonderland of entrepreneurship but again not with a casual approach but with a very serious concern and in a systematic manner. Technical colleges in general and engineering colleges in particular have great potential for training and development of first generation entrepreneurs But this will require reorientation of engineering curriculum because the contemporary syllabus in any of the curriculum have very little scope for divergent thinking; the main objective of redesigning of the syllabus would be to stimulate divergent thinking. In this present paper the authors have tried to provide a model for inculcating entrepreneurial instincts in the engineering student right at the entry stage of the engineering school.

The model has a wide spectrum as it spreads over all the four years. It is named as the ***caterpillar -butterfly*** model; signifying that when the student joins the college he is in the raw, caterpillar stage and after being trained groomed and nurtured by the trainer- teacher - motivator grows into the stage of a butterfly; ready for his take off.

The model is a constellation of entrepreneurial concept, theory and it also comprises of structured activities, project (micro &macro) and individual as well as group interventions distributed in step by step fashion throughout the eight semesters. The main purpose behind developing such a model is, to integrate the subject of Entrepreneurship development in the main stream academics.

Model



CATERPILLAR STAGE

In the very first year of the four year degree course, the concept of entrepreneurship can be rooted but in a very subtle way. A capsule memoir of the successful entrepreneurs, their success stories can form the subject matter of the humanities paper. The students can get an idea of entrepreneurship by reading and learning how different people in different fields achieved success. This awareness can be created in the students in the very first year.

AWARENESS STAGE

In the second year, which is divided into two semesters, the inculcation process of Entrepreneurship becomes a more obvious one. In the third semester, the concept and theory can be taught which would comprise of topics like definitions, concept of Intrapreneur, and Entrepreneur. Enterprise management, Industrial legislation, manpower management etc along with case studies. The later half of the year (i.e. the fourth semester) can be invested in developing the conceptual basis for exploring opportunities. In this, recent researches can be discussed. For e.g. according to the article published in the Employment News dt. 5-11 Feb 2005 use of coal for power generation results in an increased quantum of fly ash production, which has reached about 100 million tones per year. It is reported that the agricultural increase of grains is around 15%, green vegetables 35% and root vegetable 50%, when fly ash is mixed with soil. It has been proved that fly ash when mixed with soil as a fertilizer; vegetables grown out of such soil have shown higher nutritive value. This was possible only because of innovation and entrepreneurship.

AWAKENING STAGE

At the onset of 3rd year the perspective of inculcating entrepreneurship shifts from theory to practical. This is the most crucial period when the students may be trained rigorously by getting involved in an actual project. The students can be divided into groups supervised by the members of the EDP cell of the college due to which students can get individual attention. By now the trainers can be in the position to asses the aptitude and -attitude of students towards entrepreneurship by administering psychometric tests combined with observation and interview. Students who have shown inclination towards innovation and entrepreneurship can be grouped and ***entrepreneurial circles*** on the lines of quality circles can be formed. At this stage the students should then be made aware of entrepreneurial resources other than monetary ones; which includes training on intrinsic motivation, market access, market information, bureaucratic goodwill etc. along with this training for developing the social capital is also very important (The Journal of Entrepreneurship vol 13. no.1 Jan-June 2004) The components of social capital include social networks, trust, and social skills. These skills can be developed in individuals by way of various interventions like Transactional Analysis, Sensitivity Training. Johari Window exercises, developing the interpersonal and communicational skills with special emphasis on *need for achievement.* Through this the students can be groomed on the following Seven Big Vital Cs

- Individual capability
- Developmental capability
- Implementation capability
- Learning capability
- Experimental capability
- Connectedness capability
- Environmental capability.

BUTTERFLY STAGE

This ongoing interactive individual development should then be integrated with the industry institute interaction programme. Association with professional bodies in the field

of entrepreneurship like MCED (Maharashtra center for entrepreneurship development), MITCON (Maharashtra technical consultancy organization), SISI (Small industry service institute) can give the students the practical feel of the actual concept, Entrepreneurship.

By the end of the of the 3rd year the students will definitely be in a position to think in a divergent and in an innovative way and then they can be placed on an actual project at the outset of the fourth year; wherein they would be required to conceive an idea, design an action plan for the same and which would also include making of the prototype and then finally bringing it into reality. The students by way of project can be taught to reach acceptable solutions so that they gain confidence in decision making process and tackling problems on their own. The project work is needed to support, broaden and supplement the learning experience of students and to integrate and reinforce the skills acquired by the students. Appraisal of this project should be dominantly on the way it could be actually put into use.

Along with the reframing of the syllabus there should be redesigning of the infrastructure too. ***Research parks*** should be created, like those on the lines of limerick; *the limerick university research park.* Such a research center would lead to an enterprising atmosphere facilitating students to acquire innovative skills. *MIT Boston* has been a trendsetter in starting an *in house technology licensing office.* This is also a novel idea and could be one of the most enterprising activities on part of the institutions in order to promote Entrepreneurship.

CONCLUSION

It was the legendary George Bernard Shaw who once wrote 'the reasonable man adopts himself to the world; the unreasonable one persists in trying to adopt the world to himself.' Such divergent thinking is the real need of the hour and as far as Indians are concerned they need to take heed of the President's address to the nation on the eve of the 56th Republic Day in which he said 'Everyone has inside of him or her a piece of good news and the good news is that you don't know how great you can be.' It is perhaps just giving yourself a chance to become giver instead of a taker. In such a positive environment where there is an ascending economic trajectory, continuously rising foreign exchange reserves, global recognition of technical competence, perhaps just a paradigm shift in the minds of the future technocrats from the traditional method of work to an enterprising one and creating this realization on the part of the students is the role of the engineering institutions.

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