

An Effective way of teaching Entrepreneurship to Engineering Students using Pain Storming as a Tool

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Abstract : Teaching entrepreneurship to engineering graduates with the purpose to develop entrepreneurial intention is a challenging process. Many technical institutions have started to offer entrepreneurship courses and While teaching experientially there is a need for proper assessment of student learning, evaluation and feedback. The purpose of introducing this course is to inculcate entrepreneurial skills and improve their future career opportunities. This paper outlines the course and teaching methodology implemented at S R Engineering College an autonomous institute in Telangana. The objective of Technology entrepreneurship course which is offered to B.Tech second and third year students as an open elective is to motivate them towards starting a venture. Teaching of regular entrepreneurship theory is done by following traditional teaching method. Pain storming is the method used at the beginning of the course which leads to opportunity recognition and students works to build their enterprising concept based on that. This paper describes the teaching pedagogy adopted in delivering this course at the institute and the pedagogy can be implemented by the institutions which are about to introduce entrepreneurship.

Key words: Entrepreneurship education, teaching, learning, assessment, entrepreneurial intention.

1. Introduction

Higher educational institutes play vital role in inculcating entrepreneurial intentions among the students, teaching pedagogy which encourages students to choose entrepreneurship as their career should be developed and practiced (Nurmi and paasio 2007). Two types of courses about entrepreneurship were identified (Levie., 1999) courses about entrepreneurship and courses for entrepreneurship. Courses about entrepreneurship were taught in traditional manner and courses for entrepreneurship were conceptualized under educational setting where students learn through an entrepreneurial process (Hannon., 2005). Entrepreneurship education is increasing but the evaluation of these courses needs to be clarified (Berchard and Toulouse 1998). Institutions play a major role in encouraging the students for regional innovation and they are the key providers of new technologies. Business ventures boost the regional economy (Laukkanen 2003, Tuunainen 2004) along with addressing the problem of unemployment. Research has been carried on entrepreneurial characteristics of individuals (Brockhaus, 1982) and recent evidence has proved that people who started business has higher education qualifications than people who had not into business (Bates, 1995: Browen & Hisrich, 1986). Entrepreneurship education has been promoted to encourage entrepreneurial behavior (Donckels, 1991) and entrepreneurial supporting programs have

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encouraged entrepreneurs to start business (McMullan et al., 2002). Career decision is influenced by many social factors including exposure to educational experiences (Dyer, 1994). Entrepreneurial education programs providing social experiences which influence a person to pursue a career congruent with his or her learning experiences (Shapiro & Sokol, 1982). The effectiveness of entrepreneurship course depends upon the design of material and modes of delivering the program (Arthur et al., 2012). Entrepreneurship teaching has been theoretical but changes have been made to encourage student's involvement in learning and building entrepreneurial concept has been designed. This paper brings the practice adopted by SR Engineering College in delivering entrepreneurship to engineering students.

2. Technology Entrepreneurship as an Open Elective

SR Engineering College mission is to create entrepreneurial ecosystem within the region. In the process of achieving, it's one of the missions, Technology entrepreneurship course has been designed, the curriculum designed to equip students with professional and life skills and foster innovation and cultivate the spirit of entrepreneurship among students. Students are provided with different electives options and information sessions regarding these open electives are conducted prior to student choosing the course. There are no specific prerequisites for choosing this entrepreneurship course and 80 students are admitted based on first opted preference. The course is designed for engineering students with an aim to provide entrepreneurial knowledge along with business skills towards their technical knowledge. Teaching entrepreneurship has number of positive effects which includes insisting of collaborative thinking and enhancement of communication skills (Sheshinski et al., 2007). The course is a track offered to 80 students of different engineering streams. It is offered for a period of a semester which includes series of lectures, activities and a group project of developing a business idea. Assessment is 50 % for the assignments given during the course period and 50 % for final business idea pitch. Upon completion of the course students are expected to

- Learn about the elements of the entrepreneurial process.

- Identifying opportunities at the intersection of technology and business.
- Conceive innovative concepts that create win-win for the stakeholders.
- Craft unique value proposition for the customers.
- Learn the customer adoption patterns.
- Pitch business concepts effectively.

3. Course delivery

Entrepreneurship is treated as a domain of business studies, the structure and content are developed which are more likely problem driven with two objectives of increasing awareness about entrepreneurship and understanding the process of creating a new business (Albornoz-Pardo, 2013). The concept of entrepreneurship teaching has been changed and made it more likely suitable to engineering domain. Course is purpose fully delivered through series of lectures to make the students gain knowledge theoretically and Practical assignments which are intertwined with entrepreneurial motivation. Each activity is given as assignment, the instructions for each activity is clearly structured, students by following the specific instructions have to complete the assignments, each activity has to be completed in a specific time duration. The assignments are aimed and designed to understand customer's needs, customer pains, customer perception towards the solution offered and customer's willingness to accept the solution provided. Overall, it is to understand the elements which offer value to the customers. The assignments are awarded breakup marks and they are considered for 50% of assessment for awarding final grade. The assignments are structured from self-discovery, problem recognition, level of pain the customer feel while performing the task and business idea generation. The course is delivered by Dr.N.Suman Kumar, Head for Entrepreneurship, with 17 years of teaching experience in technology marketing and entrepreneurship, Dr. G.Satheesh Raju, Asst professor, with 12 years of experience in Entrepreneurship and Market strategy, along with two teaching assistants. The course makes the students to identify a problem, convert it into opportunity, and build business concept around it. The assignments given in the course are:

A. Activity 1- Find your passion

It is important to know what we are interested in. when our goals are clear, attention towards achieving becomes more balanced, the challenges and feedback are accepted (Mihaly 1997). In this assignment students have to list out there five interest areas and among the five, top two interest areas are made identified by a scoring matrix which consists of five parameters. The parameters are I) you spend time while doing this II) you have the required skills in this area III) you take initiation to do this IV) you look to update yourself in this area and V) you enjoy challenges in this area. Students have to answer them by yes or no. After completion they will count the “yes” and the greater number of yes will be considered as their interest areas.

B. Activity 2- Formation of team

Entrepreneurship is a long journey, and one should have a strong team, one cannot possess all the skills required to solve the problem identified, there should be a team to fulfill the requirements. Students after identifying their interest areas needs to form into teams with the students of same interest. The students will express their area of interest and invite other students who are willing to join them. The students with like mind interests will form into a team. The team size consists of minimum of three and maximum of four, and should be from different streams of engineering. In the team there should be a minimum of one female student and a minimum of one male student. The team which fails to meet criteria is formed into a team based on the suggestions of the instructor.

C. Activity 3- Identifying opportunity

Students after forming the teams are instructed to observe the problems around the surroundings and come up with three problems faced by the people within their community. Each one will discuss the problems observed by them within the team. Later the team discuss with the instructor and after discussion based on

- problem worth solving,
- level of pain it causes to the people if it is not solved,
- opportunity perceived from the problem,

- who are in need of the solution for the problem identified,
- what needs to be done,
- at present how the problem is being negotiated and
- What is the potential size of the market for the solution?

They will select one problem to work on. Before finalizing their problem, they will present it in front of the faculty panel and after the panel approval they will take up it as an opportunity.

D. Activity 4-- Pain storming

Student teams will go out and meet the people who are facing the identified problem and will conduct pain storming interview. The interview focus on pains people are facing while performing that particular task. During this interview the student's teams lists out all the pains the respondents face while getting the job done. After getting the list of pains they select the pains which are having high impact. This impact is measured or rated based on the people's opinion they have interacted with. The pain is measured in terms of difficulty, solution availability, time and cost. The more it is difficult to perform the high it is rated. It is measured on five Likert scales where 5- Very difficult, 4- difficult, 3- neutral, 2- easy and 1 represents very easy. In similar the other factors are also measured like willingness to pay to the solution. Once they identify the set of pains by a set of people, they start to treat them as their customer's pain points.

E. Activity 5- Crafting the solution

Students' teams after identifying the customer jobs and pain points, they start working on solutions. Each solution they come up for each pain point is compared with the value it offers to the customers. The gains which have impact on customers will be considered as effective solution to work on. They identify most important problems and extreme pain points in performing a job by the customer. The students have the choice of picking a problem to solve, which many customers face or it might be a problem which only few customers face.

F. Activity 6- Evaluation of the solution

To evaluate the solutions the students have come

up with, a panel consisting of faculty, entrepreneurs and people connected with incubation center will assess. This panel gives inputs to the students based on the relevance of solution to the problem, its possibility for implementation technically, socially and acceptability. This panel listen to the students pitching for three times and gives approval for carrying it further. This pitching is also considered for their grading of final assessment of 50% marks.

A survey was conducted after completion of course. The survey focused on the learning's by students who as undergone the course. The aim of the survey is to measure the change in their perception. The results of the survey are used to better understanding of the student's mindset. A total of 71 students who were willing to continue the specialization have responded to the survey.

Table 1 :

Time Duration For The Activities And Marks Assigned

Activity Name	Time Duration	Grading
Find your Passion	2 Hours	5 Marks (Each parameter carries 1 Mark)
Team formation	2 Hours	5 Marks (Teams with four different streams- 5marks, three different streams-4 Marks, teams with two different streams -3 marks)
Identifying opportunity	1 week	10 Marks(Teams coming out with findings to all 7 parameters scores 10, 8 marks -6 parameters, 6 marks- for up to 4 parameters, 4 marks for 2 parameters and 2 marks for 1 parameter
Pain storming	2 week	10 Marks (Based on the complexity of the problem)
Crafting the solution	4 weeks	10 Marks (Awarded by the expert panel)
Evaluation of the solution	2 weeks	10 Marks (Awarded by the expert panel)

4. Results and discussions

A. Gender Analysis

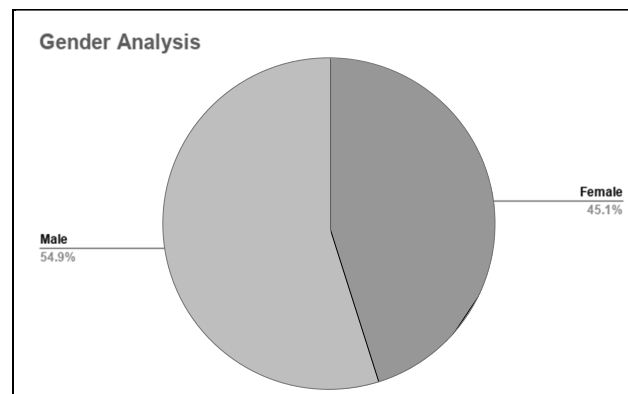


Fig. 1: Analysis of gender

A total of 80 students have registered for the course entrepreneurship. From the above analysis it can be observed that after completion of course Essentials for Entrepreneurship among 80 students 71 students had shown willingness to continue the specialization track. Among these 71 students 32 are female and 39 are Male. Out of the 9 students who were not willing to continue the track, 4 of them were female and 5 are male. There is no great gender difference among the students willing to continue entrepreneurship track after completion of course. The students willing to exit from the course has given the response that they were not willing to start their own business, they felt that it does not belong to their core degree and they are showing more willingness to join courses being offered in their core streams. The other major reason was group dynamism; they felt they are not getting proper priority in the team.

B. Students responses towards the question “Taking this course has made me feel more confident in starting a business later in my career”



Fig. 2: Student's opinion analysis-1

The responses from students are, 33.8% of them have strongly agreed, 18.3% of them have agreed, 19.7% responded for the option neither agree nor disagree. 18.3% of them have responded with disagree and 9.9% of them has responded with strongly disagree. The students who agreed to start the business later in career were confident with the opportunity they have identified. The students who disagreed were not very sure with the opportunity they have identified.

C. Students responses towards the question “I expect to perform better in the future as a result of this course”.

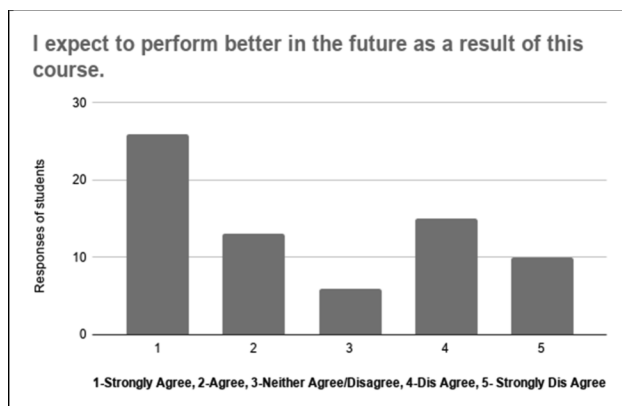


Fig. 3 : Student opinion analysis-2

The students response for the statement “I expect to perform better in future as a result of this course” was 37.1% of them has strongly agreed, 18.6% of them has agreed, 8.6% of them has neither agreed nor disagreed, 21.4% of them has disagreed and 14.3% of them has strongly disagreed. The students who agreed responded that they were confident in identifying the problem and finding a solution for it. The process of identifying the problem and crafting the solution has made them feel more expertise. Students who were not agreeing it said either they were not good at identifying problem or failed to come up with the right solution.

D. Students responses towards the question “I apply the learning from this course in my life activities”

The Students responses for the statement “I apply the learning from this course in my life activities” was 31.4% of them have strongly agreed, 15.7% of them has agreed, 22.9% of them has neither agreed nor disagreed, 14.3% of them has disagreed and 15.7% of them has strongly disagreed with it. The students who agreed it has responded that they have learned how to

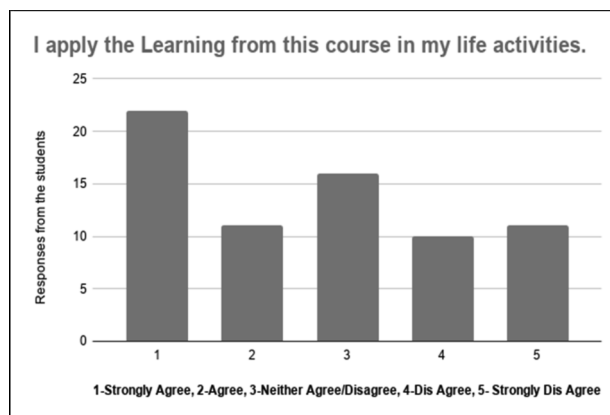


Fig. 4 : Student opinion analysis-3

identify the problem and analyze the problem that is worth solving. This approach has built confidence among them to believe that the learning from this course can also be utilized in their life activities. The students who responded with disagree and strongly disagree has stated that they have learned only business aspects. They felt that the learning has given an input of thinking from business perspective but could not apply it in their future personal activities.

E. Students responses towards the question “I have found the way to identify real world problems during this course”.

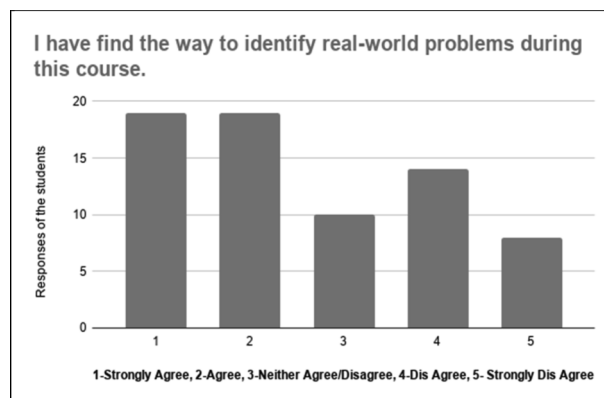


Fig. 5 : Student's opinion analysis-4

The Student's responses for the statement “I have found the way to identify real world problems during this course” was 27.1% of them have strongly agreed it, 27.1% of them have agreed, 14.3% of them have neither agreed nor disagreed it, 20% of them have disagreed it and 11.4% of them have strongly disagreed with it. The students who agreed the statement have revealed that they feel confident in finding out the problem worth solving, the problems to which the customers are looking for a solution, and

solution for which the customers are willing to pay and has potential to build business with the solution.

F. Students responses towards the question “I can transfer the skills learnt from this course to multiple contexts”.

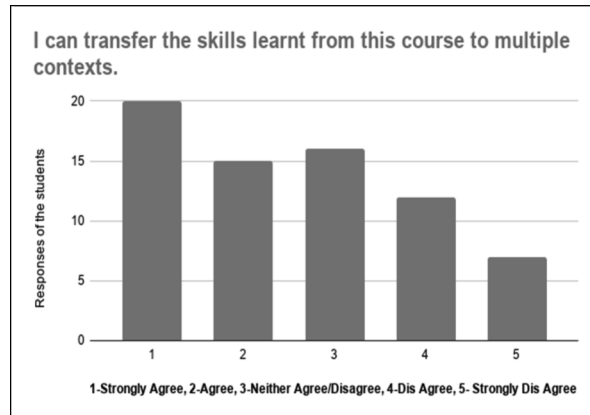


Fig. 6 : Students opinion analysis-5

The Student's responses for the statement “I can transfer the skills learnt from this course to multiple contexts” the responses are 27.8% of them have strongly agreed it, 20.8% of them have agreed, 23.6% of them have neither agreed nor disagree it, 16.7% of them have disagreed it and 11.1% of them have strongly disagreed with it. The students who agreed responded that the learning's from the course can be applied in multiple contexts in making decisions. They learned to differentiate the pros and cons of a issue. The students who disagreed responded that they were not sure about applying the learning's from the course in future.

G. Students responses towards the question “After taking this course I feel confident to work with students from different streams”.

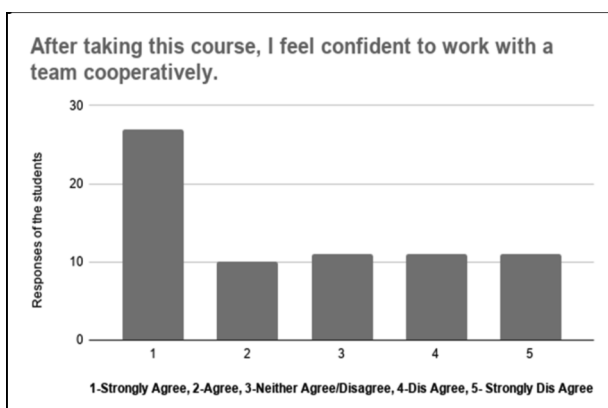


Fig. 7 : Students' opinion analysis-6

Student's responses for the statement “After taking this course I feel confident to work with students from different streams” the responses are 37.5% of them have strongly agreed it, 13.9% of them have agreed, 15.3% of them have neither agreed nor disagree it, 16.7% of them have disagreed it and 16.6% of them have strongly disagreed with it. The students who agreed have responded that they feel confident to work with other stream students without any difficulties in their future endeavor. The students who disagreed have faced difficulties while working with other stream students as a team.

H. Students responses towards the question “After this course I started to see the world from others perspectives”.

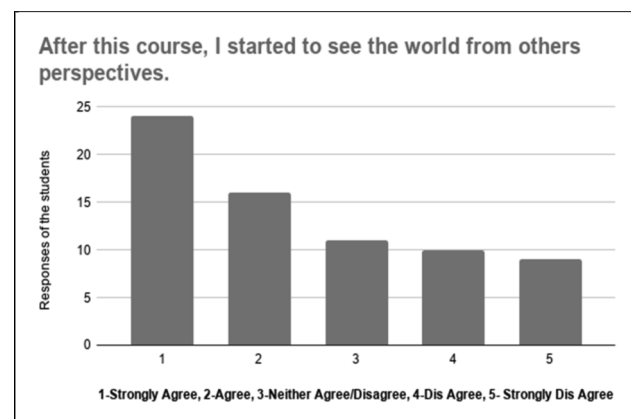


Fig. 8 : Student opinion analysis-7

The Student's responses for the statement “I have find the way to identify real world problems during this course” the responses are 33.3% of them has strongly agreed, 22.2% of them have agreed, 16.7% of them have neither agreed nor disagree it, 15.3% of them have disagreed it and 12.5% of them have strongly disagreed with it. The students who agreed as responded that, they feel empathetic while considering a problem, they started to think about it from the perspective of problem seekers. The students who disagreed have responded that they feel confident in viewing the problem in their own perspective and the solution they offer will meet the customer's requirement.

5. Conclusions

Technology entrepreneurship course offered as a track in three semesters has been a frame work of involving and identifying the opportunities. It starts with problem identification and later goes on in

crafting viable solutions. The course moves ahead towards business modeling and setting up a venture. The assignments are intended to make the students involve in observing and identifying the challenges. This curriculum is an attempt made to suit engineering institution as there are different streams of students getting involved, which add various skills in coming up with solution to a problem. The collaboration is making the students to look into a problem from different aspects and build solution from various aspects. However, there are few challenges faced while delivering the course, the major challenge was forming students' teams, as most of the students were willing to work with their classmates. To make them understand about team dynamics was an issue of concern. The other challenge was making the students to understand "problem worth solving", as students were coming out with general problems they observed. Interaction with people and taking their inputs has resulted in coming up with "problem worth solving". The feedback survey revealed that only 52% of students have met the course output requirements which are challenging to take the course further. The other challenge is to fulfill the team size as 9 students have left the course, and few got placed during their final year has lost the track of execution. However, it has proved that the modules and curriculum designed to teach entrepreneurship has impacted many students / groups as they practiced their ventures during their stay in the campus. Even if 20% of the teams / students continue to focus on their venture, after graduating from course, we would succeed in realizing our target. This study would give scope to analyze the trend for 3-5 years before we conclude on positive note.

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