Impact of Action Plan workshop in enhancing Indian Engineering Education

Rohit Kandakatla
KG Reddy College of Engineering and Technology, Hyderabad, Andhra Pradesh, India,
rohit.kandakatla@gmail.com

Dhinesh Balaji Radhakrishnan
University of Petroleum and Energy Studies, Dehradun, Uttarakhand, India, dinesh@worldspeed.org

ABSTRACT

The role of students taking part in the discussions on enhancing engineering education all across the globe has been very minimal. Very few engineering organizations work towards making students as one of the stakeholders in these discussions and creating actions. SPEED (Student Platform for Engineering Education Development) is one of the global organizations, which has taken this as core objective. SPEED with the partnership from IUCEE (Indo US Collaboration for Engineering Education) in India has created plans for mobilizing the students and involving them in creating the change necessary for action plans. This poster presents the model of two-day workshops that has been conducted all around India in past 2 months (July-August'2013) and the results are action plans created through these workshops. The action plans were focused on addressing issues like practical learning methodologies through application-oriented learning, project based learning and community based learning. There were action plans on creating industrial collaboration with the engineering institutions, e-based learning, and inter-disciplinary within an institute and between institutes and some more on energy efficient methods and engineering mobile applications. These action plans are currently under implementation in different institutes all around the country. The progress of the action plan will be tracked and guided whenever required through a special model of Student Chapter's formed across all the colleges which attended the workshop.

Keywords: Action Plan, Engineering Education

RESUMEN

El papel de los estudiantes que toman parte en los debates sobre la mejora de la educación en ingeniería en todo el mundo ha sido muy escaso. Muy pocas organizaciones de ingenieros trabajan para hacer que los estudiantes como una de las partes interesadas en estas discusiones y la creación de acciones. SPEED (Plataforma de Estudiantes para el Desarrollo de Educación en Ingeniería) es una de las organizaciones globales, que ha tomado esto como objetivo central . SPEED con la asociación de IUCEE (Indo Colaboración EE.UU. para la Educación en Ingeniería) de la India ha creado planes para la movilización de los estudiantes y su participación en la creación del necesario cambio de planes de acción. Este cartel se presenta el modelo de talleres de dos días y que se ha llevado a cabo en todo la India en los últimos 2 meses (julio- August'2013) y los resultados en los planes de acción creados a través de estos talleres. Los planes de acción se centran en abordar temas como las metodologías de aprendizaje a través de prácticas orientado a la aplicación de aprendizaje , aprendizaje basado en proyectos y el aprendizaje basado en la comunidad . Había planes de acción sobre la creación de una colaboración industrial con las instituciones de la ingeniería , el aprendizaje e- basada , e interdisciplinario dentro de un instituto , y entre los institutos y algunos más en métodos eficientes de energía y la ingeniería de las aplicaciones móviles . Estos planes de acción se encuentran actualmente en ejecución en diferentes institutos de todo el país. El avance del plan de acción se realizará un seguimiento y guiado siempre que sea necesario a través de un modelo especial de Estudiante Capítulo de formado a través de todos los colegios que asistieron al taller **.**

Palabras claves: Plan de acción, Enseñanza de la ingeniería.

1. INTRODUCTION

Engineering education in India has transformed enormously from the British era to the present day. Starting with the establishment of 5 IIT's after independence, there has been a steep increase in the number of engineering colleges in the present day. But the major stakeholders students have always been ignored and have never been involved in engineering education. The role of students taking part in the discussions on engineering education all across the globe has been very minimal.Very few engineering organizations work towards making students as one of the stakeholders in these discussions and creating actions. The Student Platform for Engineering Education Development (SPEED) is a global, non-profit student organization that functions as an interdisciplinary network of engineering students who aspire to stimulate change and impact the development of engineering education (EE) and its effect on society, industry, the environment and local communities. In collaboration with academia, industry and government SPEED is committed to improving EE by channeling the student voice and perspective. Through local and global initiatives SPEED empowers students and encourages the development of professional, ethical and social responsibility In India, SPEED in partnership with Indo US Collaboration for Engineering Education have created plans to mobilize students and involve them in creating neccassary change through action plans development.

The theme for the workshop was creativity and innovation in engineering education. Through study and analysis it was observed that there is a great need for creativity and engineering education in the Indian education system, which directly impacts on the number of research publications, patents and PhD's every year. There had been a exponential rise in the number of engineers graduating every year. While the number has been increasing, the quality of students graduating every year is being deeply criticized as the quantity is not matched with the quality. Experts say that India produces millions of graduates every year but a very few in the count are actually employable in industries.

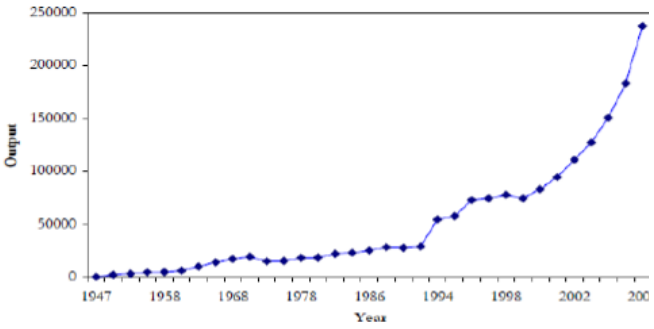

Fig 1.1 Number of Engineering graduates produced every year (Rangan Banerjee, December 16, 2008)

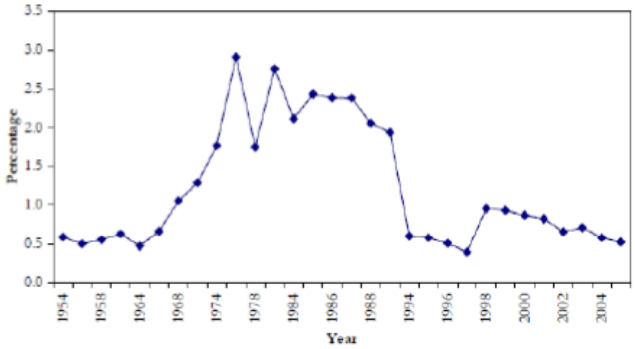

Fig 1.2 Percentage of PhD's Output to Graduate engineers output (Rangan Banerjee, December 16, 2008)

This theme was choosen was choosen for the workshops so that students as stakeholders can identify this growing issue, address it and develop concrete action plans to bring about a change in the coming years.

2 ACTION PLAN WORKSHOPS

Starting in july 2013, five workshops were conducted in different parts of the India. The locations were selected so that they were accesseble to students from all parts of the country. The location of the workshops were Hyderabad, Pune, Rajkot, Hubli and Delhi in the order in which workshops were condcuted. These workshops focussed on evaluation of issues and problems related too the theme, action plan creation and

networking, Each workshop was attended by students from around 10 engineering colleges which were located in the close proximity of the workshop venue.

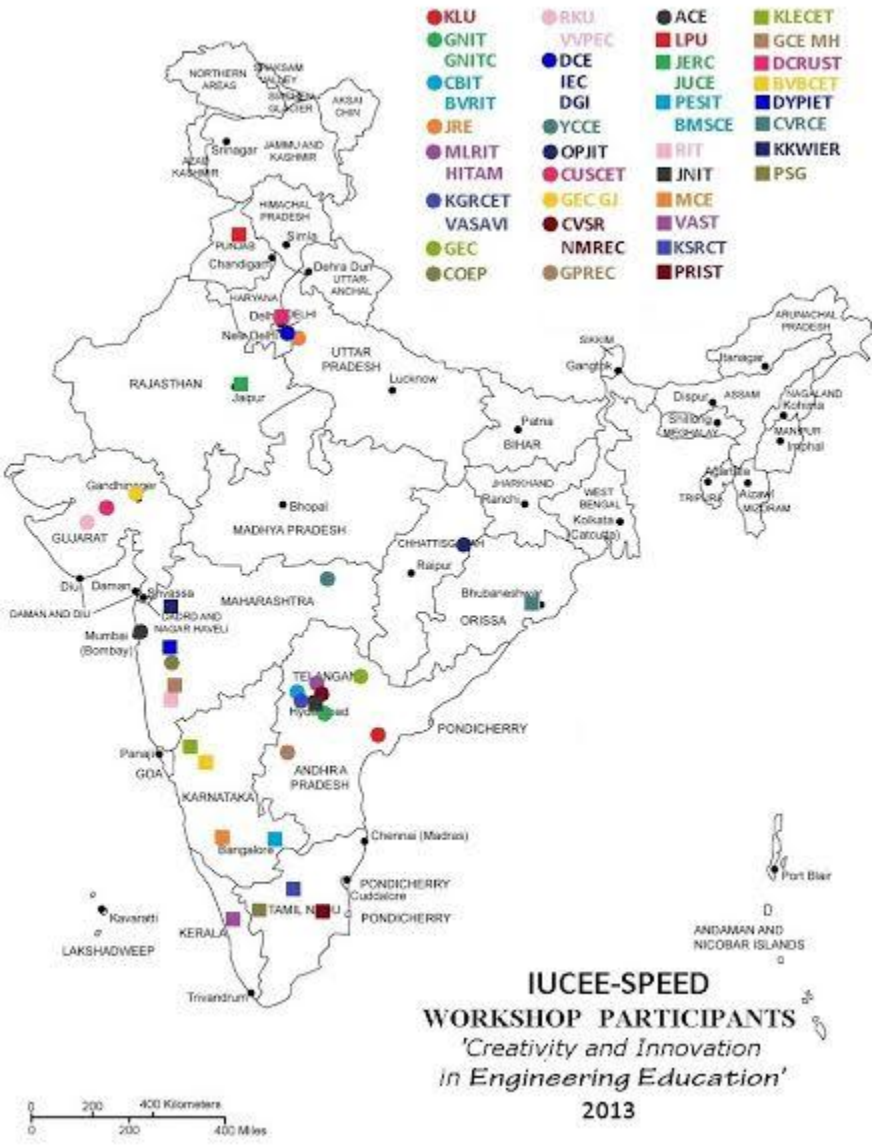

Fig 2.1 Location of colleges which participated in the workshop.

Every college was represented by a group of 5-6 students who were passionate about engineering education. Every workshop was started with a ice-breaking session in which students were divided into different groups to make sure every group has students from different colleges which made sure they network with other colleges. This was followed by a bried presentation about SPEED and introduction to the theme of the workshop. Participants where then given time to brainstorm in groups to identify the various problems, issues and challenges they face during their engineering education. Through analysis from the 5 workshops, it was observed that students expressed the lack of project, community, interdisciplinary, entrepreneurship and research oriented learning the their colleges. Another issue identified was the lack of animation, visualization and simulation based teaching due to which there is lack of effective knowledge transfer in the classrooms. The first day ended with some activities so that students could bond with each other which helped them be a a national network of students. During the second day, the participants have developed concrete action plans

which they would impliment in their local regions after the completion of the workshop. The facilitators from SPEED helped the partcipants develop the action plans to make sure they were specific, measurable, acheivable, realistic, time bound. Each action plan had a mission statement and action steps which would help the participants effectiviely impliment their action plans.

Each workshop had 10 groups who developed 10 action plan and total of 50 action plans were developed at the completetion of the 5 workshops. Each group consisted of 8 students who represented different colleges due to which each action plan would be implemented in 8 different colleges. This made sure the impact of the workshops was maximum with the available resources. Fig 2.2 shows the impact of the action plans based on the number of action plans implimented in each region.

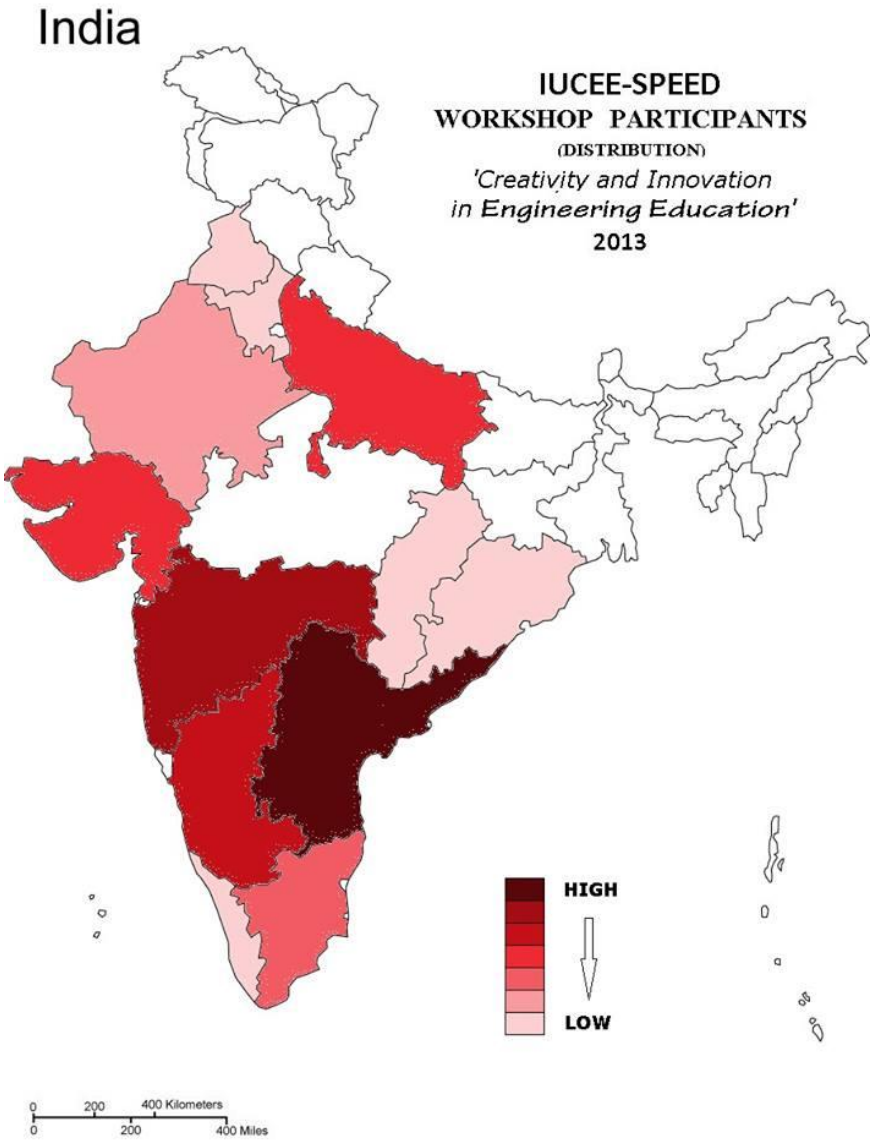

Fig 2.2 Impact created in each state of India after the workshop

3 ACTION PLANS.

After analysis of the 50 action plans developed, few of them were selected for this paper. These action plans were widely divided into three categories. 1. Animations, Modelling and Simulation based learning. 2. Community and interdisciplanary based learning. 3. Project and Entrepreneurship based learning.

3.1 Animation, Modelling and Simaulation based learning.

The mission statements for the action plans under this category are; 1.Implementing effective format in technical education by adopting visual, audio and graphical media that will help the students acknowledge the subject and have a better insight about the subject; 2. To make a cross platform mobile application which will narrow the gap between different working blocks of an education organization by solving major issues as attendance monitoring and updates from management etc; 3. To make engineering education more interactive by teaching subjects or concept using animations and visuals.

3.2 Community and interdisciplinary based learning.

The mission statements for the action plans under this category are; 1. Jugaad Urbanism; 2. Create of a more sustainable and safer world by making wiser energy choices; 3. SATTU- Social Achievement through technological up gradation; 4. To collect the waste resources and make it locally reusable; 5. Recognizing the need to bridge the gap between students of different domains to provide a platform for inter-disciplinaryresearch and development; 6. Provide a student-industry-innovator platform where students can meet with industry experts (to know needs/ requirements of the industry and various challenges faced by them) and local/rural innovators who in spite of having lack of resources created something new which can benefit the society as a whole and nurture the innovative minds.

3.3 Entrepreneurship and Project based learning.

The mission statements for the action plans under this category are; 1. Taking into account the vast number of engineers who wish to enter the field of techno-entrepreneurship and lack ofawareness of the same in India, the T-cell program aims to create techno-entrepreneurs through collaboration with industry experts; 2. To bring together a group of students having similar interests of entrepreneurship and to redirect their energy in a focused way; 3. To make engineering better by making it more practical, emphasizing on project expo, seminar and workshops; 4. Addressing the issue of lack of practical knowledge in engineering students through integration of classrooms and labs; 5. To create an Industry oriented platform for the colleges that will enhance the technical as well as practical skills of students for producing industry ready engineers.

4 CONCLUSION.

The debate on enhancement of engineering education challenging the contemporary model will become more productive with the inclusion of students in the discussion. Our action plan workshops have shown results that the students are waiting to drive the change. The action plans framed from the workshops and forums once developed will become powerful models for attracting students to engineering and in educating them. The diversification in the field of engineering and the need for special focus on different methodologies of providing education will be measured after the implementation of action plan is completed. With the expansion of SPEED in India and it's mission to drive students in developing their own action plans to enhance engineering education, the collective outcome will build the confidence and help in achieving a sustainable development in the field of engineering education in India.

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