Enhancing Teaching Learning and OBE process through CEED in Collaboration with iGurukuls

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Abstract: Enriching the developments in an Engineering Education is one of the India's top most priorities. K G Reddy College of Engineering and Technology is attempting to develop the Engineering Education, which results in making the students world class professionals and move towards the Outcome Based Approach (OBE). The institute has already started awareness in bringing the effectiveness of teaching and the learning process through the establishment of Center for Engineering Education Development (CEED) but still fall well behind in obtaining the OBE and research in Engineering Education. To address this, the institution has started collaborating with iGurukuls. This paper visualizes OBE approach and list the benefits derived through collaboration with iGurukuls. This paper will likely impact the Engineering Education Research in future.

Keywords: CEED, iGurukuls, EER, Engineering Education, OBE

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1. Introduction

Research shows that Educational Experiences which are contextual and engaging leads to in-depth learning. It develops higher level Řhinking, good communication and leadership skills. The Industries seek graduates with all the above qualities. Education is the dominant model of evident in most of the places today (Sandhya Tuti, Rohit Kandak☐tla, Syed Khamruddin, 2016). The collaboration results in a true partnership of professionals committed to the reform of Engineering Education. It makes possible the learning and sharing of ideas, projects, and materials bridging programs, institutions, languages, and national boundaries (2002). It is a model that is receding more and more rapidly as the forces of new pedagogies in an educational context. CEED is a cell established for improving the teaching and learning process in K G Reddy college of Engineering and Technology in the year 2015.

The establishment of this center has started with a few faculties after the completion of their International Teachers Certification Program conducted by IGIP in collaboration with IUCEE. Some faculties have also gained more exposure by attending the ICTIEE conferences held in 2014, 2015 and 2016.

As an initiative CEED has started implementing the student engagement in the class rooms by introducing various activities like presentations, etc. as their assignments. The faculty who completed the

certification programs started conducting the faculty development programs in the institution. As the first initiative under the newly established CEED, a 2-day faculty development workshop has been designed by considering three different modules such as preparation, delivery and assessment of the course with the major contents as:

A. Characteristics of 21st Century Learners

Today's digital kids think of the information and communication technology (ICT) as something akin to oxygen. It's what they breathe, and it's how they live. They use ICT to meet, date, learn, acknowledge each other and form their personal identities. Students born after the 1980's are known as the millennial learners, they are also known as Generation Next, Generation Y, and digital learners.

The learning needs of the millennial learner had changed considerably since the past century. They

- Learn best when the content is relevant and presented in a rationale manner.

- Learn best when content is presented in multiple modes – visual, audio, games, and contests.

- Expect closer interaction with the faculty.

- Learn well in group/collaborative activities.

- Learn best in a relaxed environment.

- Enjoy challenging research-based activities.

By taking into account the various characteristics of the 21st century learner, the following techniques have been proposed to students to improve the student learning in the subject.

1) Make content relevant: Whenever possible connect the content to the real world. This is possible for most topics in engineering, which is so closely linked to life.

2) Partner with Technology: Use different strategies/technology options whenever possible

3) Make yourself accessible: Encourage them to connect with you (e-mail is an excellent tool); support the shy/ weak students to develop confidence.

4) Regular Assessment: Embed assessment in everyday instruction. This will ensure regular review and repetition leading to enhance student performance and confidence.

5) Plan and Implement group activities: Plan activities regularly which can be conducted in pairs, small groups and large groups.

6) Provide constructive feedback: Positive reinforcement is said to be one of the most powerful tools for motivating students

B. Course Description Document

Course description document is a short, informational statement about the planning and content of a course. Anyone who can have a glance at the course description document should be able to determine very quickly what the course is about.

The course description document is divided into 8 sections.

Basic Details: This section contains the title of the course, name of the instructor, class hours per week and the meeting room of the instructor if necessary.

Course Overview: Here brief overview of the course along with the test portion for the assignments and internal examinations are given.

Course Outcomes: This contains a list of outcomes that the students are expected to achieve at the end of the course.

Detailed Schedule: This section contains a detailed list of name of the topic being taught and its associated topic outcome.

Textbooks and references: This section contains list of text books and other references which can be referred during the course.

Activities in the class: This section contains list all activities that the faculty will be conducting during the class.

Grading and Evaluation Criteria: This contains the grading criteria and pattern for the evaluation of the course.

C. Lecture Delivery

This segment is about activities such as minute paper, think pair share, TAPPS, group activities, online quizzes etc. can be organized and conducted in the class.

Taking all the above into consideration, all the faculty were suggested to follow the below lecture structure.50 minute lecture is divided into 5 segments

- Day's lecture objective/s
- Part 1 of the day's topic
- Activity with/without assessment
- Part 2 of the day's topic
- Summing up-key take away.

The faculty development program was ended with an interactive session during which faculty got clarified all the necessary doubts with us.

D. Aspects Falling Behind

However most of the faculties started implementing new proposed delivery methods but still the institution is falling behind in achieving most of the themes in the Engineering Education. As the quality in Engineering Education mostly depends on the Outcome Based Education and the EER the institution should focus more on these two aspects. In recent years, Engineering Education Research (EER) has emerged as an internationally connected field of inquiry through the establishment of EER conferences, interest groups within engineering education societies, Ph.D. programs, and departments and centers at universities (Maura Borrego, Jonte Bernhard, 2011). As the institution is having less resource in achieving the above, it has become a challenge. On the other side the IUCEE has started a Gurukul program to address various issues in Engineering Education for all the institutions. IUCEE has identified some of the institutions working towards improving the quality of Engineering Education and the journey began.

2. iGurukuls

What are iGurukuls?

IUCEE has conducted many conferences, workshops, webinars, etc. in most of the locations around the world. It has now raised a step forward to build an eco system through collaboration among the institutions. It has started "IUCEE Gurukuls for Learning and OBE" (iGLOBE) which can be also named as iGurukuls in short.

iGLOBE program addresses the vital needs for institutions to develop self-reliance towards achieving excellence in Engineering Education. The central feature of the Gurukuls will be, continuous mentoring of the faculty in the implementation of proven best practices and innovations in Engineering Education. Faculty abilities to do so will be developed through courses and workshops offered on a regular basis, either face to face or virtually. Major emphasis will be on the teaching and learning process, curriculum development, curriculum delivery and outcomes assessment. iGLOBE is focusing on the 12 multidimensional aspects visualized as below Fig.1

Fig.1 IUCEE facilitate these Gurukuls which are modeled as a blend of the Centers for Engineering Education and Centers for Teaching and Learning around the world.

(i) Collaboration though iGurukul

Around 25 institutions have come forward to be a part in the iGurukuls across the country. IUCEE has organized an introductory webinar to share their issues and their road maps leading to improve the quality in Engineering Education. IUCEE has also organized a summit in KLE technological university in Hubli in the month of July 2016. The faculty of the host institution presented the courses developed through faculty conclave to the entire Gurukuls which completely explores the road maps to the OBE. All the

Gurukuls have shared their road maps presentations for attaining the EER, OBE, and so on. An interaction and networking session was held to share and discuss the common issues or themes and the action plans to be implemented in the future.

Fig. 2   **Fig. 3**

Fig. 2: iGurukul members presenting their road maps of engineering education.

Fig. 3: Students of KLE Tech. University demonstrating their course projects to the members of iGurukuls.

ii) Themes and Action Plans

The following are the themes and their action plans discussed in the first summit by iGurukul in Hubli:

a) Building Engineering Education Research Culture:

  1. Management buy-in

  2. Build critical mass of faculty members for EER at Institutional level

  3. EER workshops during ICTIEE in all the three venues

  4. Access to journal publications

  5. Faculty Conclave at Gurukul Cluster Level

  Role of IUCEE: To facilitate PhD Engineering Education; Courses on EER from global experts; Collaboration with experts in EER through IUCEE; Journal of Engineering Education Transformations.

b) Developing Institutional Strategic Plan:

  1. Develop Strategic plan based on common themes (Institutional Development Plan – IDP)

  2. Leadership/Institutional Development

  3. Faculty Workload – Performance Review Criteria

Role of IUCEE: Webinar series on strategic plan – in September.

c) Building collaborations with Industry experts/institutions (for faculty and students):

  1. Identifying the gaps and opportunities for collaboration

  2. Connecting with the resources for filling the gaps and exploring opportunities; invite them into advisory boards

  3. Take up initiatives for curriculum revision, projects, internships and placement

  4. Create Gurukul Clusters: Student exchange – engaging students among Gurukuls; Networking between Institutes –mentoring/sharing best practices/sharing resources in Gurukuls; MOU between Institutions; Faculty Exchange

  5. Industry – Institute Engagement/Exchange

  Role of IUCEE: Industry Talks; Global Expert Network; ICTIEE 2017 Conference; WEEF 2016; Use Media Outlets; MITE Conference at TCE in Dec 2016; Guidance with Alumni/Advisory Boards

d) Adopting Outcomes Based Education (OBE):

  1. Creating complete OBE framework/awareness

  2. Publishing lesson plans with OBE mapping for all courses

  3. Filling up of section 2 and 3 of NBA SAR

  Role of IUCEE: Offer OBE Course

e) Innovating Curriculum (Content, Delivery, Assessment):

  1. Faculty certification

  2. Identification of program focus / Introduction of new courses / revision of courses based on gap analysis and opportunities

  3. Technology Enhanced Learning –Flipped classroom, MOOC, etc.

  4. Active and experiential learning

  5. Developing appropriate assessment tools

  6. First Year Course

Role of IUCEE: Offer Courses: IIEECP (IUCEE International Engineering Educator Certification Program); M. Tech Course on Teaching and Learning; Courses on Integrated Curriculum Design, Instructional Delivery – Active Learning, PBL, Technology Enabled Learning.

f) Preparing faculty leaders for future:

1. Identify processes that are critical for institutional development

2. Identify leadership teams for these processes, empower them through training, exposure, rewarding

3. Develop mechanisms to measure effectiveness of leadership

Role of IUCEE: Engineering Educator Awards; Institutional Awards; Certificate Courses – Faculty Professional Development

g) Encouraging Entrepreneurship and Social Engagement:

1. Develop institutional goals and policies for incubation center

2. Develop Value Proposition for start-up culture

3. Identify formal and informal mechanisms for student engagement

Role of IUCEE: UMass Lowell/BVB Global Immersion Program

h) Attaining autonomous status:

1. NBA Accreditation

2. Permanent Affiliation

Role of IUCEE: Facilitate exchange of information

i) Infrastructure:

1. Infrastructure –Maker spaces, Workspaces

2. Building Resources – Library Materials, Access to Resources at Subsidized Rates

3. Pedagogical Tools

The other collaborations through iGurukuls are:
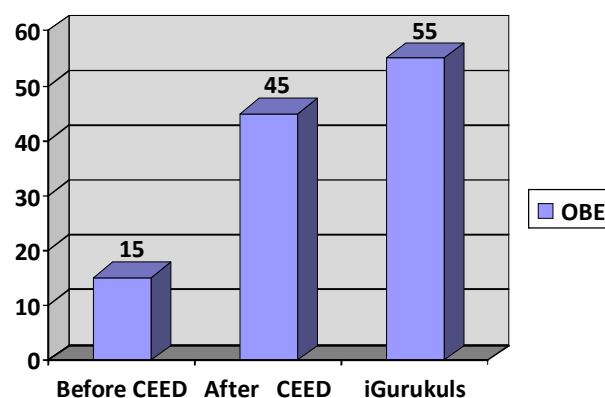
1. Canvas

2. Future summits

3. Bi-Weekly Webinars

4. iGurukul whatsapp group

3. IMPROVEMENTS

The collaboration through iGurukuls has shown some improvements in the institution for achieving particular dimensions in Engineering Education

1. An initiative has been taken up in the institution to develop the project based skills by distributing the assignment grading to the projects. Initially the assignment marks has been given through the written test.

2. The graph shows the percentage of OBE awareness achieved at different stages. It includes the revised outcomes, assessment of OBE, etc.

This is assessed by checking the Course and Program Outcomes written by the course instructors and the head of the departments in the last two academic years for every semester.

Fig.4 Statistics

3. The collaboration is also being monitored and carrying forwarded with the help of the canvas- a "web-based tool" for working together and the Bi-Weekly webinars by IUCEE.

4. Roadmaps: The road maps of all the institutions have been shared which will be helpful in identifying the time frames and the obstacles in achieving the short and long term goals.

5. Gurukul whatsApp Group: A WhatsApp group for all the institutions through iGurukuls is created in which lot of information about OBE, Industry Interactions, Teaching and learning process has

been discussed. It has also has become one of the platform for assessing the OBE in the institution for the Fig. 4
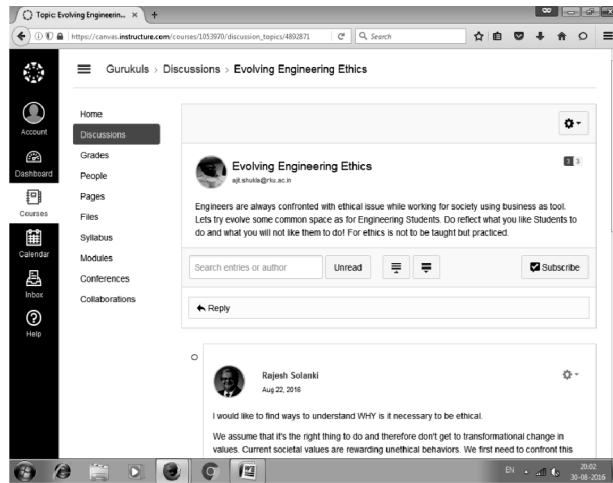
Fig. 5 Canvas Web-tool screen shot

6. Gurukul dimensions: Out of the 12 dimensions mentioned in the gurukul format the OBE, Networking and collaboration, Engineering Education Research and the Industry Engagement were mostly addressed in the first summit. However in the future CEED is looking forward to align with all the iGurukul institutions to successfully master in all the 12 dimensions.

4. CONCLUSIONS

There are many ways to improve the Engineering Education culture but the collaboration techniques especially through the iGurukul platform brings a unique picture of how the reform happens in every stage of Engineering Education. In future we are looking forward to achieve all the dimensions mentioned in the iGLOBE structure. Webinars on Strategic Planning and Faculty exchange programs are also being planned by forming clusters in iGurukuls. This will definitely be a mile stone in this collaboration format to develop an eco system among the institutions and to enhance the teaching, learning as well as the OBE effectively.

Acknowledgement

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