

Empowering Engineering Education: From Classroom to Corporate

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Abstract

With the advent of technology the field of academics has also bloomed by thoroughly using it so as to get the superlative results and also make the students aware of the latest scenario in the field of technology around them. To inculcation of the spirit of leadership and entrepreneurship students have been aligned towards the University Ambassador Programs and for start – up of companies the students are given support by the University Incubation. The online courses are the latest tool that has proved to be a boon for the universities all over the world. Massive Open Online Courses (MOOC) is one such example which is a recent development in the field of distance education that enables millions of students to learn expediently. The other tool being used for the augmentation of the skills of the students and faculty is “Content Rich Course Package” that provides rich-course content to the faculty to deliver the best to the students. This technology provides content rich study material to the students as well as the faculty. It also makes teaching effortless, balanced and beautiful. The faculty has full control over the course. Moreover the team work of the students is enhanced by the concept of “Integrated Projects”, wherein the students work in a team to put into operation concepts learnt in the curriculum. Using these approaches the results shown are impeccable and also the interests of the students have raised radically

Keywords: Technology, MOOC, Content Rich Course Packages, Employment, Entrepreneurship

1 INTRODUCTION

Learning is nowadays no more restricted to only the chalk and marker teaching. Nor is it only relying on the teachers to teach students. The modern education system demands for alternative methodologies of teaching. The transition from being an engineering student to a Multi National Company’s employee is a journey that requires a lot more than just academic curriculum. In today’s scenario where the competition has reached to peaks, the corporate sector demands for much more than mere engineering concepts and knowledge. To give an upper edge to students several tactics are

being employed like using technology to improve the results. The Massive Online Open Course (MOOC) being a world-wide accepted standard of online courses is being followed gravely in several universities. This approach promotes the use of technology to the fullest so that the students do not restrict themselves only to the curriculum; rather they explore the enormous spheres of knowledge that would help them to gain the realistic aspects of technology as well. The other aspects to this newly fabricated approach is use of “Content Rich Course Packages” to enable students to grasp content using the visual aids to help better learning of concepts. The content is bestowed to the students in the form of presentations and animations that not only increases the interests of the students rather it also alleviates the results remarkably. The knowledge of conceptual content is not the only parameter which decides the rank of the engineer.

Whilst working in a corporate environment the qualities required are teamwork, confidence, leadership, hardwork, knowledge and zeal to learn more and more. In order to inculcate these values special efforts need to be taken. The concept of project building in a group helps students to identify their special qualities as well as assess their shortcomings while working in a squad. The communication aspect is one of the most essential traits that the companies search in the engineers while hiring them. This facet can be instilled by their interaction with the real exposure to the industrial personnel. This would help them understand the current prerequisites and circumstances of the real corporate world. The above mentioned initiatives are the up-to-the-minute proposals that need to be used so as to get immensely positive results from students in academics as well as the jobs point of view. The rest of the paper is organized as follows Section 2 contains relevant work that has been used as best practices that can be followed. Section 3 consists of discussion and results and Section 4 consists of conclusion of the approaches used.

2 RELEVANT WORK

P. Karthikeyan [1] emphasized on the need and importance of Information and Communication Technology the trend in the teaching methodology of education. Information and Communication Technology (ICT) has a greater impact on the learners' side too. It has transformed the role of teachers and learners. Now the teacher has become instructional designers and learners have become self learners. ICT is a greatest supplement to teaching and learning. This paper elaborates about the significance of ICT in education. On similar lines Dr. Swati Shantaram Mujumdar [2] discussed the issues faced by the developing countries face numerous challenges including but not limited to lack of financial resources, lack of good teachers, lack of IT skills, unreasonable demand-supply ratio, issues of access & equity in education. Several issues like inability to maintain quality of education, inability to provide extensive student support services, lack of industry interface, administrative issues, unavailability of national policies on quality and lack of high quality IT infrastructure & IT skilled resources have been the barriers in India.

Mackness, J. et al. [3] portrayed the scenario of 'CCK08' that was a unique event on Connectivism and Connective Knowledge within a MOOC (Massive Open Online Course) in 2008. It was a course and a network about the emergent practices and the theory of Connectivism, proposed by George Siemens as a new learning theory for a digital age. It was convened and led by Stephen Downes and George Siemens through the University of Manitoba, Canada. Although the event was not formally advertised, more than 2000 participants from all over the world registered for the course, with 24 of these enrolled for credit. The course presented a unique opportunity to discover more about how people learn in large open networks, which offer extensive diversity, connectivity and opportunities for sharing knowledge. A. McAuley et al. [4] illustrated the detailed introduction to the MOOC, its benefits to the learners as well as the teachers. The research gaps have been discussed and detailed in their paper and the future directions for conducting the courses have also been detailed.

Several discussions have been conducted on the importance of entrepreneurship whilst engineering education. Christian Lüthje and Nikolaus Franke [5] presented a study where in a covariance structure model was tested to identify the causes of entrepreneurial intent among engineering students. Specifically, they explored whether steady personal dispositions or whether perceptions of contextual founding conditions have an impact on the intention to found one's own business. The survey of 512 students at the MIT School of Engineering broadly

confirmed the model. Personality traits have a strong impact on the attitude towards self-employment. The entrepreneurial attitude is strongly linked with the intention to start a new venture. The students' personality therefore shows an indirect effect on intentions. Furthermore, the entrepreneurial intent is directly affected by perceived barriers and support factors in the entrepreneurship-related context. Souitaris V. et al. [6] discussed a theory of planned behavior, the study tested the effect of entrepreneurship programs on the entrepreneurial attitudes and intentions of science and engineering students. This was necessary in order to confirm (or disconfirm) conventional wisdom that entrepreneurship education increases the intention to start a business. The results proved that the programs raise some attitudes and the overall entrepreneurial intention and that inspiration (a construct with an emotional element) is the programs' most influential benefit. The findings contributed to the theories of planned behavior and education and have wider implications for a theory of entrepreneurial emotions and also for the practice of teaching entrepreneurship. Steven P. Nichols, Neal E. Armstrong [7] laid emphasis on the need and significance of promoting entrepreneurship amongst engineering students. Many engineering programs have added courses and material on "engineering entrepreneurship". These programs represent a diverse understanding of what engineering students should receive in the way of instruction in the area of entrepreneurship. The research examined various definitions of engineering entrepreneurship, and also examines the pedagogical justification for including entrepreneurship in engineering education. The authors used as a context the engineering programs at The University of Texas at Austin, particularly the Department of Mechanical Engineering. The paper examined educational objectives and criteria discussed in documents produced by the National Science Foundation, the American Society of Mechanical Engineering International, the Accreditation Board for Engineering and Technology, and other sources, to develop one approach for entrepreneurship education.

3 DISCUSSION AND RESULTS

Based on the case-studies of several Universities and referring the advantages of the ITC and entrepreneurship in engineering education, Chitkara University tried to incorporate the best features of the studies in order to achieve favourable results.

To encourage employability of students from the very start of their education, the students have been offered an "Innovation Box" in the Chitkara University premises where if a student has an innovative idea regarding research or any business related idea, they can make a drop-in there.

Students have used opportunities and have set up their companies as per their interests like Trideal offers deals on shopping and services available in regions of Chandigarh, Mohali and Panchkula. Another achievement by the alumni is “Yellow Cursor” that provides extremely researched, highly visual and interactive e-Teaching and e-Learning content, which helps the teachers and students perceive better. Along with the appropriate assessments at appropriate times, students learn to apply your knowledge in real-world scenarios.

To give a wide range of exposure to students and enable students to exchange ideas and adapt the culture of the corporate world, the students are motivated to collaborate with big corporate houses by “Student Ambassador Programs”. Our students have been part of Google, Iversity, Code Chef, Systems, Applications, Products in data processing (SAP) university ambassadorship programs, where in they get to meet the distinguished people from the corporate world and learn from their experiences and get inspired to learn and develop leadership qualities. Benefiting from these programs, the students have started their own businesses where they earn while they are still pursuing their engineering education.

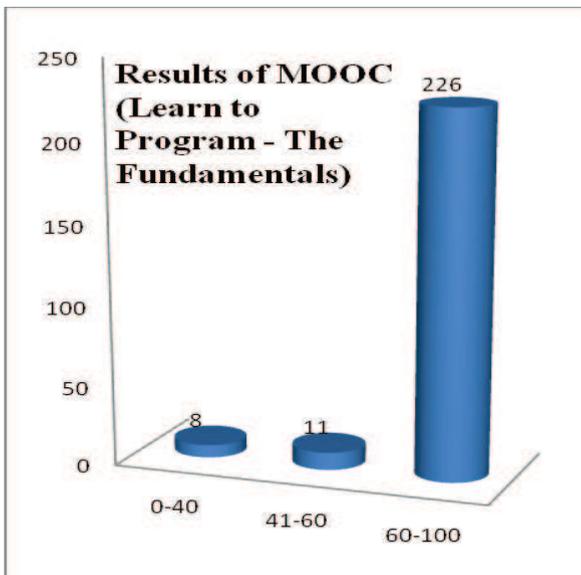


Figure 1: Results of MOOC (Learn To Program: The Fundamentals)

Online Courses help the students to collaborate with other universities to share their resources. Keeping this agenda in mind, at Chitkara University, Punjab an online course (MOOC) was offered “Learn To Program- Fundamentals” a course on basics of Python where in 245 students took the course and followed the 7 week online course by regularly completing the weekly exercises and bi-weekly assignments. The count of students who received Statement of

Accomplishment for obtaining more than 90% throughout the course was around 226 [8]. The graphs depicting the ranges of students lying in several ranges of marks and number of students lying in those ranges are given in Figure 1.

To inculcate ITC in the curriculum, “Content Rich Course Package” an audio visual method of teaching was used as a tool for teaching students programming language - C Language. The content rich resources enhanced the performance of the students as the internal depiction of the memory related operations is clear through the visual aids which is not the case while teaching theoretically.

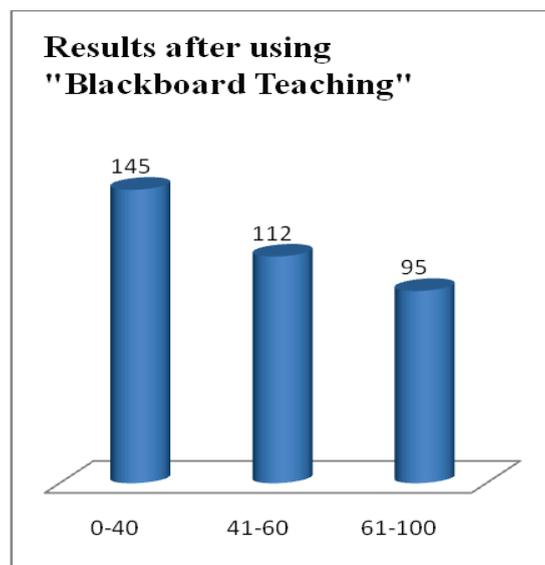


Figure 2: Results after blackboard teaching

The results of 352 students who took up a subject using the package and then learning the same subject by theoretical means is depicted below in Figure 2 and Figure 3.

The facet of teamwork and leadership are included as a part of student’s character by including a course “Integrated Projects” as a part of curriculum where the students have to develop projects not only confined to a particular subject, rather a combination of multiple subjects integrating the knowledge of several subjects into one. The development of project takes place in a team, where a group of 3-4 students indulges in the process of project development. This gives them a preliminary insight into their future where they have to coordinate with their team members in order to timely deliver the project in the desired manner. This approach takes place in the form of a weekly demonstration of the progress of the project to the mentor (who acts as the customer like in a corporate scenario).

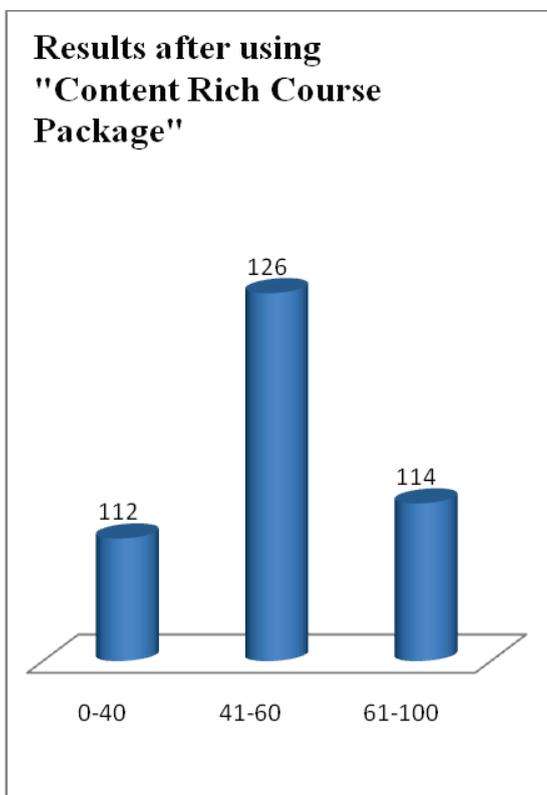


Figure 3: Results after using "Content Rich Course Package"

The ability to communicate and project one's thought is a very important prerequisite for the engineer. This facet of the character is indoctrinated in their curriculum as regular interactions with HR personnels of reputed recruiters. This helps the students take an in-sight into the contemporary panorama of the corporate world. This also helps one's confidence boosting and the improvising of interaction skills towards whom they may have to interact in the near future. This clearly marks that the results while using technology in learning and teaching has helped to improve the results to a great extent.

4 CONCLUSION

The evolution of an engineer from classroom to corporate is a transition that is a journey from being a student to professional that requires skill and knowledge in equal magnitude. To facilitate this, right guidance needs to be given. Technology is a boon that can be used to provide students the upper edge over the rest. The online courses, content rich course packet, collaborative project work and the HR personnel interaction are the key features have been used as a tool to improve the performances of the student in our study. Moreover to increase the feeling of leadership and confidence the students are given various opportunities where in with the help of the University, the students can establish their start-up companies.

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