

Factors Effecting Engineering Education

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Abstract: Research on different educational models is a continuous process. The basic aim is to improve engineering education and the impact of engineering students on society. But there is always a gap between knowledge of engineering student and the requirement of industries. In this paper we have discussed the obstacle and challenges in engineering education based on three parameters like learning ability, learning content and teachers management status.

Keywords — Active learning, cooperative learning competency, learning skills, Gap, learning content

I. INTRODUCTION

India is developing in all directions at very fast phase specially towards technical field. It is very important to develop youth with same speed. So this responsibility comes directly on educational institutes and in this paper we will focus on technical institutes. If we study present scenario a lot of problems are there with Indian educational system, few of them we have discussed in this paper. The whole paper is divided in three parts based on three major factors effecting engineering education.

II. LEARNING ABILITIES OF STUDENTS

Diversity in students learning ability based on their background, IQ, interest etc poses a significant challenge to improve learning ability of students on a same ground. Traditionally engineering education is addressed through straight lectures, problem sets, laboratory work, mini projects and projects [9][10][11][12], with this traditionally given knowledge the students having significantly high learning abilities are not satisfied due to a feeling of unfulfilled potential, and the students with significantly low learning abilities feel lost. The challenge an educator face in this scenario is to choose methodology which can cover and bring improvement in all students simultaneously.

To overcome this issues many models have been proposed and implemented. Educator should divide his class in groups based on a performance by statistical distribution in beginning of session, students can be divided in three groups [15][16] average students, the students who possess high learning skills (HLS), who are at the right-extreme of the distribution and the students who possess low learning skills due to limited abilities or other difficulties (LLS), who are at the left-extreme of the distribution, are not helped much. The academic passions of the HLS are not fulfilled [23], whereas the LLS feel lost in the course, and significantly struggle to pass [21]. The distributions of learning or performing abilities in a class are usually

normal, skewed-normal, or bi-modal [18]. When the distribution of learning abilities in a class is bi-modal or skewed-normal, the LLS or HLS could form a significant percentage of a class, which is apparent from the relevant distributions. G.K Surishkumar in his paper "Strategies to improve learning of all students in a class" discussed the ideal graph and the actual graph.

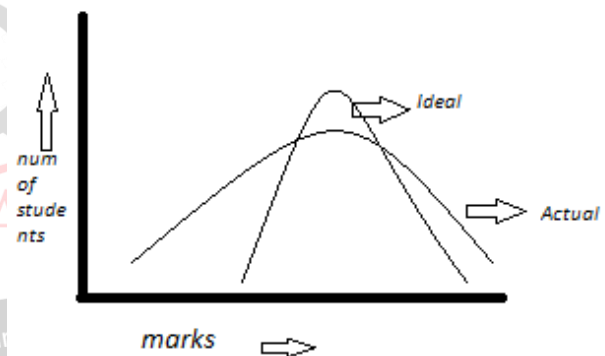


Figure 1

He discussed how to reduce this spread. To better fulfil the HLS potential, a challenging exercise called the Choose-Focus-Analyse (CFA) exercise [23] can be assigned which develops the skills of choice, focus and analysis. The impact of the CFA exercise is in the long term.

On the other hand for LLS cooperative learning works at best, when they are placed in a group with students of different ability. Here he gets opportunity to learn from peers and feel confident, instructor can build up a connection to LLS during such group activities.

LLS usually hesitate to meet and interact with instructor. The communication with LLS needed to happen in a highly sensitive fashion, at least until their trust is gained. To build trust, active learning periods work where students worked

out a small problem, part derivations of essential material, etc., basically recall or remember of Blooms works to fill gap, Once their trust is gained, it became much easier for the instructor to help LLS with their learning. Also, when the instructor made efforts to reach out to the LLS with genuine kindness, the LLS respond well, and with time, felt comfortable to discuss their learning difficulties.

III. LEARNING CONTENT

Gap between what is taught and what is required in industries is one of the challenge in engineering teaching. The main factors which bring this is rapid changing technology in industry but the courses in colleges can't be changed with that pace, also upgrading teaching fertility with that pace is practically not possible .In almost all undergraduate engineering education systems, a course is offered over a fixed time of an academic term, called a semester or a quarter [25]. In such fixed-time system, along with statistical distribution in learning abilities, it is difficult to target for every student in class to reach the same, level of understanding, i.e. mastery learning[27],to successfully complete the course. Therefore, grades define different levels of 'satisfactory' achievements [28], and a failure grade is given for 'less-than-satisfactory' achievement. If the system allows for mastery learning, then the instructor could set the bar high to complete course, but such a system does not exist in engineering education in most parts of the world, although research have been made to induct mastery learning or its variant, competency-based learning[19]. Thus, a fixed course time seems to be a constraint for mastery learning.

This issue can be handled to certain extent by encouraging self-study and other online courses. Many models like competency-based learning [19]are designed to overcome this issue. Introducing more electives could be one of the possible way to fill the gap. Many universities ,make sure that final year students are exposed to industries rather than to class rooms. this initiative is basically taken from industry sides, they prefer to select students in third year of graduation and allow them to do inhouse training as per company requirement which give students good exposure and at the same time company mould them in required shape.

IV. TEACHING, FACILITATOR, MANAGEMENT

The other challenge in engineering education is untrained teachers, Teaching is always a underpaid job so people with good technical knowledge prefer to go to industries for more earning .Most of the colleges are private institute who do not follow government norms so there is always a friction between staff and management, which effect stability of staff in institute working hour for any teacher in institute is around 8-9 hours in a day.

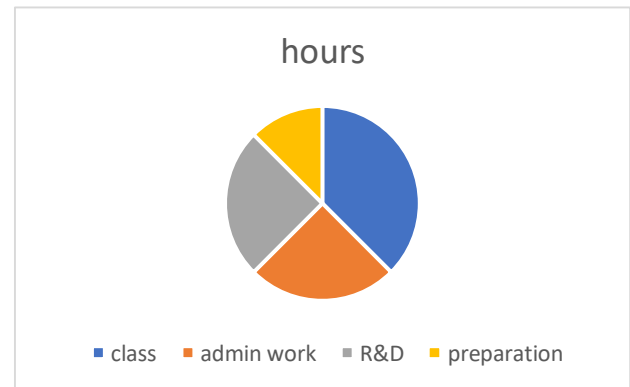


figure 2

On an average the time spend on R&D and subject preparation is very less as compare to class hours and administrative work.

It is a big challenge to overcome this problem as management don't get required fund from government as a result either they appoint underqualified faculties or less number of faculties.

Government should provide funds as per requirement, Government bodies should make strict rules for private bodies who run educational institute regarding salary working hours and all .Organization can appoint teaching staff in three categories like Lecturer, assistant and R&D where lecturer can deliver lectures ,assistant can assist them in works like valuation and those who joined under

R &D should only focus and guide students for research which will give work satisfaction to all category and will improve quality of research in India.

In future we can apply these strategies in real world and see the effect statistically.

V. CONCLUSION

India is growing in all direction and in same way educational system is improving or getting modified as per requirement. The growth in technical world by Indians is remarkable ,India is a source of resources worldwide ,though our technical education system has few drawbacks but it could be rectified if handled in a planned manner as discussed in the paper above. Infact big changes has been observed in past few years.

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