

Implementation of different Pedagogies in Numerical Based Subjects

Baby Theresa Gudavalli¹, Rahul Gaikwad², D Hari Madhava Swamy³.

¹Dept. Of Mechanical Engineering, Hyderabad Institute Of Technology and Management, Hyderabad, Telangana

^{2,3}Dept. Of Mechanical Engineering, Hyderabad Institute Of Technology and Management, Hyderabad, Telangana

¹babytherisag.mech@hitam.org

²rahulg.mech@hitam.org

³devisetty.harimadhavmech7776@gmail.com

Abstract: By keeping track with student ability towards technical education, implementation of different pedagogies came into picture. By using deductive method of teaching, students are not attracted towards classes where always faculty goes on shouting and student learning is not happening. So in this paper, different pedagogies like model presentation, co-operative learning and group learning are discussed to attract students to teach numerical oriented subjects. In this paper deductive method of teaching is not diluted, but the new pedagogies introduced are value added to students. By implementing these pedagogies, faculty is able to ensure that the learning of students happens.

Keywords: Deductive method, model presentation, cooperative learning and Group learning.

1. Introduction:

Russ Edgerton introduced the word pedagogies of engagement in 2001 Education white Paper [1]. In past 50 years, if we observe the most common model used in engineering education is like pandit quipped, the information passes from the notes of the faculty to notes of the students without passing through the minds of either one. Deductive learning can be explained in a single word as teacher centred learning where teacher continuously teaches all the concepts etc. In deductive method of teaching, information transfer is unilateral. So to improve this learning process, inductive methods are introduced.

This paper deals with inductive methods such as model presentation, cooperative learning and group learning are introduced in modules of design subjects. Inductive learning also known as student centred learning where a student is made to involve in learning. "To teach is to engage students in learning." This is quoted from Education for Judgement by Christensen et al[2]. So the main aim of the faculty is to make the students learn.

As stated by director of centre for engineering education research (CEER), that faculty should make the students to realise their own responsibility; this paper emphasise on self-learning. But the pedagogies used for delivering models of design, substantial care has taken not to dilute traditional teaching though introducing value added methodologies.

Methods Implemented: a) Model Presentation:

To create more interest in students towards numerical subjects, there is a need to introduce new methods of teaching where they are made to involve, share and learn. One of the pedagogies used here is model presentation. Model presentation is the new pedagogy where a model of a component such as gears, bearings, knuckle joints, keys etc., is prepared by using wooden material and demonstrated in the class. This was a deliberate attempt to get the concrete idea about components as mentioned above. Students also involved and are more active in class. Instead of giving terminologies related to component in written, showing a model has more influence on better understanding for student. On survey from students it has been observed that it was more lucrative. A Chinese proverb Tell me, I'll forget. Show me, I'll remember. Involve me, I'll understand" is achieved by implementing this pedagogy in classroom or Labs.

Baby Theresa Gudavalli

Assistant Professor, Department of Mechanical Engineering, Hyderabad Institute of Technology and Management, Hyderabad, INDIA
babytherisag.mech@hitam.org



Fig 1: Model Presentation in class/Lab

b) Cooperating Learning:

This paper describes how a cooperative learning is effectively working to improve both students' affective and academic experience in this course. In this pedagogy students felt that they learned and has given the positive response towards cooperative learning. Cooperative learning is one of the pedagogies in which information passes not only from teacher to student and from student to teacher and student to student. Cooperative learning is the instructional use of small groups so that students work together to maximize their own and each other learning [3,4]. The structure of cooperative learning is framed in a much planned way where positive interdependence and individual and group accountability are addressed. Around 305 studies were done in Cooperative learning center and were used to compare the efficiency of cooperative learning

in colleges as reported in [5,6]. By doing this activity, sharing of knowledge is happening.



Fig 2 : Cooperative learning

c) Group Learning:

The main aim of group learning is to develop critical thinking among the students and make their learning easier. In group learning students are made into groups and a task will be given to each group. For example, all the students in the class (Max. strength : 60) are divided into seven groups (As the problem has seven steps – In seven steps problem can be completed). Each group will be given a group number (Ex: Group 1 to do step 1, Group 2 should do step 2, group 3 should do step 3 and so on.) A problem is given to each group. Group 1 should write the given data and pass it to Group 2. Now Group 2 should check the data given by group 1 and correct the group 1 if they are wrong and should proceed to next step. In the same way all seven groups together should solve the problem. After completing the problem by all the groups, one student from respective

group should come and explain the steps done by their group on board. By doing this all students will think and participate actively in solving the problem simultaneously learning also happens. By conducting group learning communication skills, confidence level, problem solving skills, sharing ideas and correcting themselves have been enhanced in students.



Fig 3: Group learning conducted in class room

Results:

These pedagogies are implemented in the classroom to improve the result in the numerical subjects. The survey was conducted among the students to check whether these pedagogies helped them or not. The students are happy with the pedagogies as they have learned and are able to remember the formulae for different problems. This was proved by their mid term exams. Mid marks of the students are improved when compared with the first mid results. In

first mid term exam, out of 119 students only 55 scored 85% of marks. After first mid term exam, these pedagogies are introduced in class room. This has shown more impact on the second mid term exams. In second mid term exam, out of 119 students, 89 students scored 85 % of marks. The feed back given by the students is that the pedagogies implemented in their class has helped them to remember the formulae and procedure to solve the problems. Even university result has also improved by 15% when compared with the previous year results.

Conclusions:

The pedagogies discussed here help the students to enhance learning and improve confidence levels in them. By doing such activities students are more attracted towards learning. In all the three pedagogies discussed here, the common quality is sharing of knowledge and cooperation between group members. So in life to succeed in any aspects, cooperation is more important. In family or organisation or any where, cooperation and sharing is more important to succeed. All these activities enhance sharing and cooperation amongst all the students. Conducting all these activities has shown a drastic difference in student's performance in mid marks which has given the faculty a good sign and encouragement to implement more pedagogies in teaching.

References:

- [1] Edgerton, R., Education White Paper, 2001, <http://www.pewundergradforum.org/wp1.html>.
- [2] Christensen, C.R. Garvin, D.A., & Sweet, A., Education for Judgement: The Artistry of Discussion Leadership, Cambridge, Mass.: Harvard Business School, 1991.
- [3] Smith, K.A., Johnson, D.W., and Johnson, R.T., "Structuring Learning Goals to meet the Goals of Engineering Education," Engineering Education, vol. 72, No.3, 1981, pp. 221-226.
- [4] Johnson, D.W., and Johnson, R.T., and Smith, K.A., cooperative Learning: Increasing College Faculty Instructional Productivity, ASHEERIC Report on higher education, Washington, D.C.: The George Washington University, 1991.
- [5] Johnson, D.W., and Johnson, D.T., and Smith, K.A., Active Learning: Cooperation in the College classroom, 2nd ed., Edina, Minn: Interaction Book Company 1998.
- [6] Johnson, D.W., and Johnson, R.T., and Smith, K.A., Cooperative Learning Returns to College: What Evidence Is There That It Works? Change, Vol. 30, No. 4, 1998, pp. 26-35.