

A STUDY ON COLLABORATIVE LEARNING IN ENGINEERING EDUCATION

Srikanth sattenapalli, T.V.Pavan Kumar

Alamuri Ratnamala Institute of Engineering and Technology, Sapgaon, Thane-421601

Abstract: In this paper the collaborative learning and its uses were discussed in-detail in engineering education. Two groups of students each contain 56 students were formed. Out of these; one group of the students is assigned with collaborative learning and one group is assigned with class room teaching. The students were examined after 15 days study. It was found that the group assigned with collaborative learning has independent behavior, improved helping nature and leadership qualities along with good subject knowledge. After the study the second group also assigned with collaborative learning and found similar results.

Key-words: Collaborative learning, engineering education, group study.

1. Introduction: Collaboration is a word represents joint work or group activity. These collaborations were often observed between two industries, two departments or two countries for mutual growth. This collaborative learning [1] process was adopted for engineering students to learn a particular topic from Applied Physics-I of first semester. In this study 112 students of same age group were chosen and made as two groups, each consisting of 56 students. Again the group is subdivided into 8 groups consisting of 7 students each. On the other hand, the second group was assigned with classroom teaching. After 15 days of case study, all the 112 students were examined in different ways. Compared to the second group, first group (assigned with collaborative learning) students were good in independent nature, capable to think and they were showing interest to lead small groups along with the knowledge in the subject.

After the study, feedback was collected from the all participating students and 80% of the students were agreed that this learning process is helpful to them and useful to improve their skills and knowledge. Most of the students were agreed that the process adopted was helpful to increase their skills in their professional lives to work in groups as well as to lead the groups in nearest future.

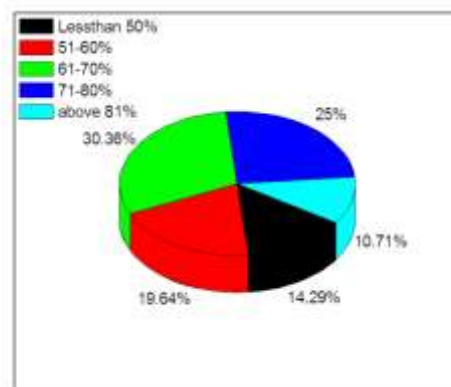
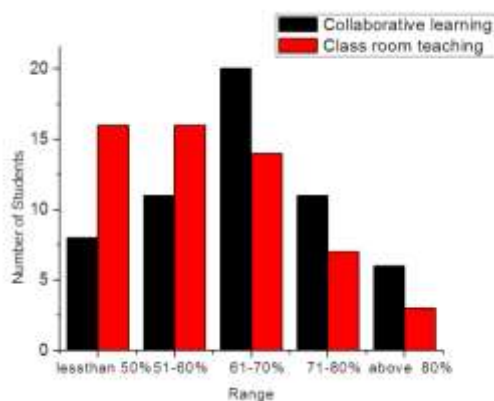
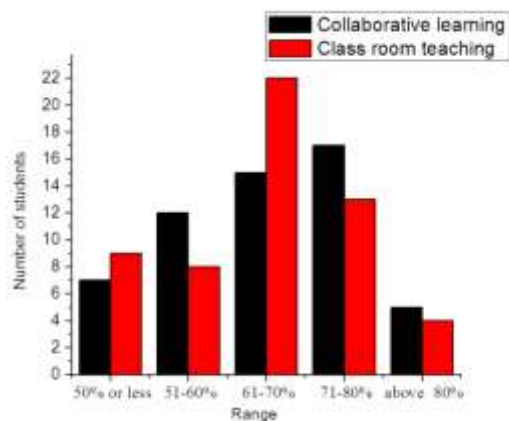
2. The Method: As said in introduction, 112 students of engineering first year were chosen for the study. 56 students were made as one group and assigned with classroom teaching to learn the topic entitled "Semiconductor Physics, PN Junction diode and its applications in electronic circuits." The same topic was assigned to other group for collaborative learning. For this a subgroups were formed containing 7 students and a total of 8 sub-groups were formed in this group. This topic was made 8 subparts and assigned to each sub-group.

Now each student was asked to learn his topic on his/her own. The faculty guided them to learn the topic thoroughly. The student can take help from others as well as he/she can help others to learn the topic. After 6 days period each student asked to report to the faculty about his learning level. Meanwhile the faculty was teaching the same topics to the other group.

After completing the self-learning process, each group asked to teach their topic to other groups. A period of 8 days was assigned for this process. Each day one group explained their allotted topic to other group students. After the 14 days of study, the students were examined in their subject knowledge, leadership qualities and thinking capabilities.

3. Examination Scheme: The 112 students were tested after 15 days of study. The testing process was sub divided into three parts. In the first part the students were asked to answer 10 questions which are from the assigned topic. In the second part 5 application oriented questions were asked based on assigned topic. In the third part a group activity was conducted. The students were asked to submit their personal and professional details. At the end of the study, feedback was collected.

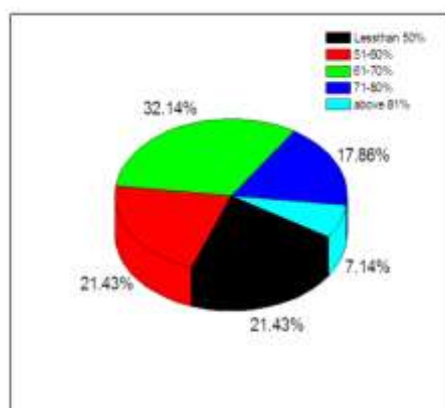
4. Discussion of the results: In the first part (Subject knowledge) of the examination scheme, out of 112 students most of the students (nearly 68%) performed well and 25% of the students were extremely good. In the second part of the test (application oriented) the students from the collaborative learning group performed well. The other group performance is above average. The results were shown below graphically.



Student's performance in 1st part of exam.

Student's performance in 2nd part of the exam.

The overall performance of each group is shown below in the written exam.



Classroom teaching group.

Collaborative learning group.

In the third part of the exam, the students were asked to submit the personal and professional details within a day time. The collaborative learning group submitted this data in half a day and the other group took two days to complete this process. The first group students explained that they collected the data subgroup wise and sorted it for submission whereas the second group students said that they had done separately and individually. On close observation of this activity, one can conclude that the students were making team work and good leadership qualities can be found in the first group. They distributed the work among all the students and completed the assigned task quickly.

Later the second group was again examined for 7 days with collaborative learning process for a new topic and good results were obtained.

5. Merits and Demerits of the program: As discussed above the program gives good results in learning process. Exchange of information, ideas and evaluation of work are the main results of this process. However a continuous guidance and observation of the faculty is needed in this process. Collaborative learning helps the students to increase their group activities, leadership qualities and volunteer nature. Arranging the resources for all the students to learn on their own is a tough task. The program needs good support and patience to get the successful results.

6. Conclusions: In this paper, collaborative learning and its uses were discussed by performing a case study. Further this collaborative learning can be extended to perform the lab experiments, to learn the new topics and to give the knowledge to students beyond the syllabus.

7. References:

- [1] Bruffee, Kenneth (1993) "*Collaborative Learning.*" Baltimore: The Johns Hopkins University Press. pp. 28–51
- [2] Johnson, R.T.& Johnson D.W.(1986). "*Action research: Cooperative learning in the science class room*" *Science and Children*, 24., 31-32
- [3] Kollar, I., Fischer, F., & Hesse, F. (2006). "*Collaboration Scripts-A Conceptual Analysis.*" *Educational Psychology Review*, 18(2), 159-185.