Enhancing Communication Skills of Freshman EngineeringStudents by using Reciprocal Teaching as a Cooperative Learning Technique.

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Abstract:

Communication is one of the important graduate attributes, defined byABET (Accreditation Board for Engineering and Technology). Communication skills as a life-long learningskill are an essential component in engineering education. We are following student-centered teaching than teacher-centered teaching methods due to technological advancement in the present classroom. Outcome-based education is vital in present education policy and comprises various approaches such as cooperative and collaborative learning techniques, PBL (problem/project/puzzle-based Learning), TBL (Task-based learning), Peer learning which active learning strategies such as T- P-S (Think- Pair- Share), Flipped Classroom and Reciprocal Teaching are very important.

Reciprocal Teaching is initially designed for comprehension purposes. The presentwork offers some insights after the successful implementation of reciprocal teaching for improving communication skills of First Year B. Tech. students at Anurag University. We made an effort to develop all four basic language skills: Listening, Speaking, Reading, and Writing. This research was conducted for fourweeks. After successful implementation, the students of the experimental group were assessed by qualitative and quantitative methods. The results reflected an increase in CO attainment of the experimental group as compared to the control group. The structured implementation of modified reciprocal teaching as an activelearning tool helped to enhance students' presentation skills,teamwork, leadership skills, and ultimately communicationskills.

Keywords*: Life-long learning, ActiveLearning, Cooperative Learning, OBE, Communication.*

Introduction

Communication training classes enable young engineers to express their thoughts and views clearly and concisely to their colleagues and patrons. Today we are living in the competitive world, where success incareer depends not just on acquiring knowledge and domain-specific skills, but also on effective communication skills.Communication has left no field untouched: be it law, fine arts, basic sciences, medicine, or engineering. English is citedas the ...major language of international business,diplomacy, science, and the professions. Forengineering students to be employable, communication inEnglish language is a major requirement. It is the biggestdeterminer of success in the modern engineer's professionalcareer. The incorporation of language and communicationimprovement courses is an important element of continuous learning, and will ultimately contribute to the process oflife-long learning. RIT introduced English Proficiency Lab I&II courses for Freshman engineering students to foster communication skills in the English language. The objective ofimplementation of these courses at entry-level is to enhancefour basic English language skills viz. listening, speaking,reading, and writing. The course has been designed bykeeping the following course outcomes at the center.

After successful completion of the course, the student will beable:

1. Demonstrate listening skills throughcomprehension by applying the skills and strategies of active listening.
2. To comprehend reading content with competency by applying reading techniques.
3. To prepare and communicate the desired messagethrough letters and reports in appropriate formats
4. To demonstrate verbal and non-verbalcommunication ability through presentations,speeches, group discussions, and role plays.

To achieve these course outcomes various active learning methods like T-P-S, puzzle-based learning, project-based learning, jigsaw, brainstorming session, role plays, mobile-assisted language learning, and cooperative learning methods are being used. This research work narrates the successful implementation of modified reciprocal teaching for the above-said class.

Reciprocal Teaching as a Cooperative Learning Technique

Cooperative learning is an instructional strategy that develops positive interdependence and creates a learning environment in the classroom. It helps to promote higher-ordercognitive skills among students. Reciprocal teaching is oneof the cooperative learning techniques, that was developed by Palincsar and Brown in 1984. It facilitates a group effort between teacher and students as well as among students in the task of bringing meaning to the text [3]. It has roots in Vygotsky´s theory about the role of social interaction in thedevelopment of cognition [4]. This technique promotesthinking while reading, resulting in better comprehension ofthe reading material. Cooperative learning, group discussion, and dialogue were all beneficial during the reciprocal teaching procedure [5,6]. The delivery of the instruction can take a variety of approaches but usually incorporates scaffolding, small groups, and the teaching of four reading strategies: Generating questions, summarizing,clarification, and prediction [7].

Conventional reciprocal teaching focuses on reading comprehension only. Reciprocal teaching is to use discussion to improve student's reading comprehension, develop self-regulatory and monitoring skills, and achieve an overall improvement in motivation [6].

Many researchers agree that reciprocal teaching can be incorporated into other content areas [7,8]. The present work reflected the same with different perspectives. For engineering students beyond reading skills, there is the requirement of developing presentation skills and interpersonal skills. By considering this the researcher modified the conventional reciprocal teaching. The difference between conventional and modified reciprocal teaching is shown in Fig. 1.

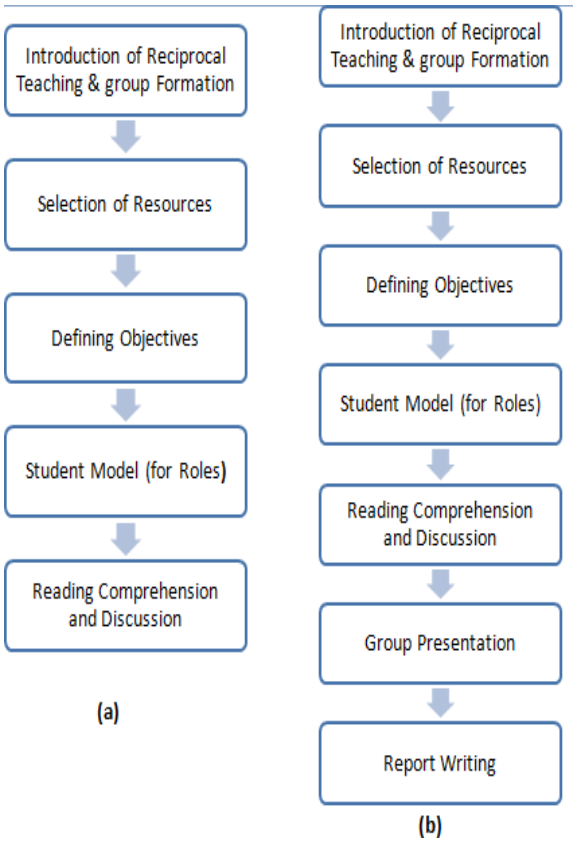

Fig. 1 Difference between a) Conventional Reciprocal Teaching Method and b) Modified Reciprocal Teaching Method

The reading material selected for this activity is from the technical domain so that students can learn any technical course by this method on their own and experience peer learning. This activity fosters relationships between students [8]. After a successful discussion of the content as per defined roles, group presentations were conducted on given reading material and students were asked to write detailed reports of their whole group activity as shown in Fig.

1. Due to these add-on presentations and report writing tasks,students have actively interacted with each other which helped them to develop interpersonal skills and teamwork.The whole activity was assessed by using rubrics that covered reading skills, summarizing skills, listening skill, presentation skills, and report writing skills.

Methodology

The experimental group selected for implementation is 32 students from the First Year B. Tech Computer Science and Engineering C2 batch while the Control group is 35 students of the C1 batch. The course was delivered to both groups by the same instructor. The instructor intentionally delivered course to control group by conventional teaching methods.

The activity was implemented in the experimental group as per the following stages:

1. Introduction and instructions about the modified reciprocal teaching activity
2. Formation of the group of students:
3. Defining the role of individual student by student's only like predictor, questioner, clarifier and summarizer.
4. Providing resource Material for reading to groups
5. Time allotment for reading- 20 Minutes
6. Execution of individual's role
7. Summary writing as per the roles defined
8. Group presentations by all groups
9. Report writing

This sequence was followed for 4 sessions, for 4 different topics and the role of individual student shifted as shown in figure 2. The instructor acted as a facilitator and evaluator.

rubrics focused on students 'role performing and active participation, demonstration of active listening skills by providing thoughtful responses, including asking questions, speaking, body language, no grammatical errors, correct pronunciation, clarity in writing as per the task and convincing evidence to support main idea. The students were assessed at 4 levels: levels 1, 2, 3 & 4 respectively in descending order.

Quantitative assessment was done by using rating method in which the researcher provided questionnaire to students having 5 statements and students were assessed the activity by choosing one option as shown in Table 1. The sixth point is for any observations. The observations recorded by students were analyzed for future implementation.

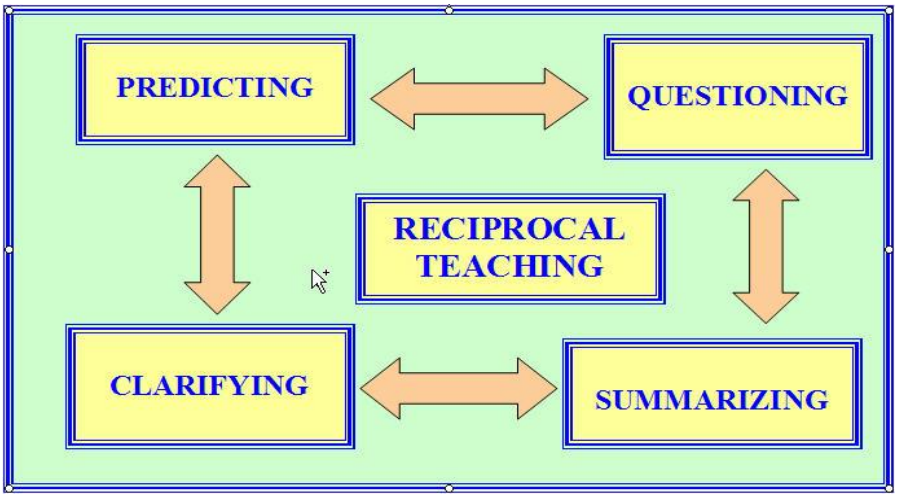

Figure.2 Shifting of the role of students in the Modified reciprocal teaching method

A total of 8 groups were actively involved to discuss topics related to Group Discussion during these sessions. The understanding of topic was evaluated during the session by the instructor with the help of previously defined rubrics. Each participant in a group got a chance to be a leader and managed group work by discussing the four main strategies. The students had a great level of brainstorming for a particular topic. The group presentations were conducted on assigned topic from selected topics. The presentations were followed by a question-answer session and discussion on observations. The groups showed enthusiasm and team spirit to clear the doubts raised by peers. The presentations were recorded for improvement in presentation skills. In the end, students wrote the report of the task as per the instructions received from instructor. The purpose of writing a report is to assess basic grammar, vocabulary, and presentation styles.

2.1 Assessment

To investigate the effects of modified reciprocal teaching on first -year engineering students, and whether this method enhanced participants' performance as per the objective of the activity both qualitative and quantitative assessments were done. The qualitative assessment was carried out by using already defined and published holistic the rubrics. The parameters of rubrics were preparedness and active participation, listening and response, reading comprehension and summarizing, communication and presentation, and writing skill. The assessment through

Table 1. Rating Method

Sr. no	Statement	Strongly agree	Agree	Neutral	Dis agree	Strongly disagree
1	Do you agree active learning techniques helped more to enhance skills than traditional teaching method					
2	This method of teaching gave you chances to interact with your peers and promote peer learning and enhancement in interpersonal communication skills.					
3	Has it provided an opportunity to enhance team building skills.					
4	Noticed an improvement in LSRW skills					
5	This tool helped to keep you engaged during the practical and improved					

	learning efficiency					

Results and Discussion

Fig. 3 shows a graphical comparison of CO attainment of the experimental group and control group. Each Course outcome is evaluated for 25 marks. The Experimental group has obtained an average of 20 marks while the control group obtained an average of 16 marks.

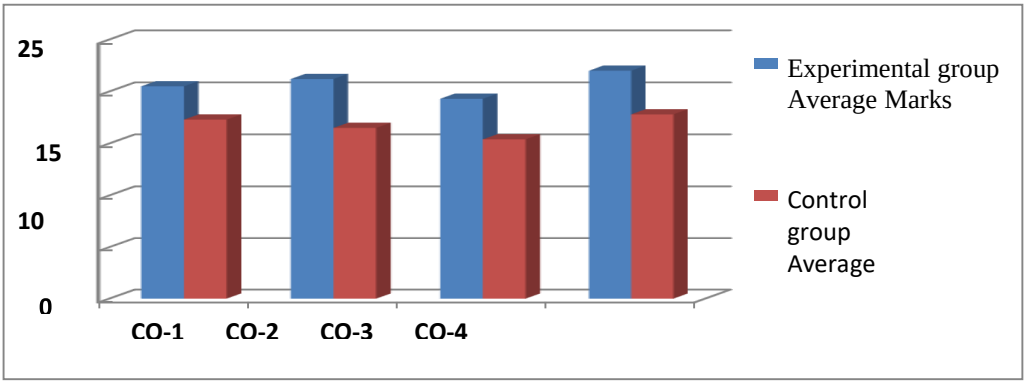

Fig.3 Comparison of Co attainment by direct assessment Method.

The average increment in marks of experimental group is 16% which is significant. The most appreciable thing is that the attainment of course outcome 4 which is related to presentation skills (the major requirement for engineering students) is the highest in all other course outcomes.

For quantitative assessment rating method was used. Students were provided questionnaire having 5 questions for rating purposes. A completely anonymous survey was conducted to obtain students' feedback. Figure 4 shows that 70% students were strongly agreed with the affirmative statements of achievements of outcomes of activity.

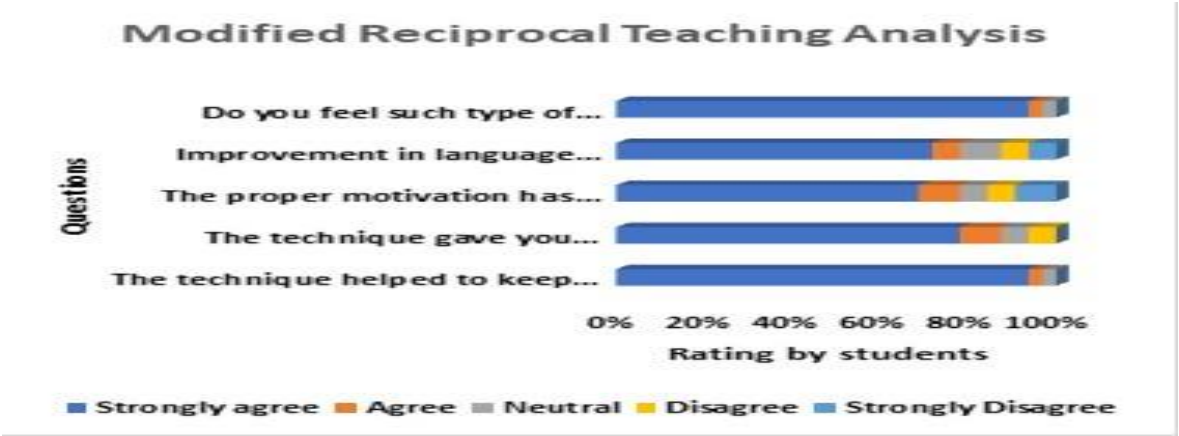

Fig. 4 Result analysis of rating method

The observations(or) findings from qualitative and quantitativeassessments are given below:

1. Students' confidence level is enhanced due to peerlearning.
2. Students 'became active listeners as they were activelyinvolved in discussions.

- ✓ The shy students tried their level best toovercome their shyness while giving presentations.
- ✓ Fear of the teacher was reduced as the role of teacher wasthe mentor and motivator.
- ✓ The comprehension skills were enhanced.
- ✓ Overall performance of students was better ascompared to the traditional teaching of reading.

Conclusion

Good communication skills in the English language are very important in the education of engineering students to prepare them for the demanding and competitive job market. Reciprocal teaching is a cooperative learning approach that focused on four basic English language skills. As per the observations, it could be seen that this strategy helped students to understand given text easily as they performed the roles of predictor, questioner, clarifier and summarizer well. It means by using this strategy the students understood the content of the text given by the teacher. The students' involvement made sure that they are responsible for learning. The data from the questionnaire showed that the implementation of a strategy for reading comprehension enhances students' listening, writing, reading and presentation skills. The performance of the experimental group has been increased by an average 16% in the form of CO attainment. The effectiveness of the evaluation using direct and indirect methods has shown an increase in the performance of the experimental group. This activity also explores teamwork, leadership. and self-management skills through peer learning. Students engage more eagerly when we teach them using different methods as mentioned in the article than traditional method. Student centered approach is more suitable to teach professional courses.

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References

[1] , J., Onchwari, G., &OnChwari, J. (2009). Technology and student learning: Towards a learner-centered teaching model. AACE Journal, 17(1), 11-22.

[2] Jiang Jin-gang, Zhang Yong-de, Du Hai-yan, QiaoYu-jing, Wang Mo-nan, Dai Ye(2016), design and application of flipped classroom teaching model, the 11 international conference on computer science and education(ICCSE 2016), august 23-24 2016, Nagoya University, Japan.

[3] Ang SweeWen, NorasykinMohdZaid,JamalludinHarun (2016), enhancing student's ICT problem-solving skills using flipped classroom model, IEEE 8thinternational conference on teaching, assessment, and learning for engineering (ICEED).

[4] Hashey, M. & Connors, D. (2003). Learn from ourjourney: Reciprocal teaching action research. TheReading Teacher, 57 (3), 224 – 232

[5] Dave Keengwe Towey(2015), lessons from a failed flipped classroom, IEEE international conference on teaching, assessment and learningfor engineering(TALE)