

Improving Spoken Communication Proficiency among Engineering Students: A Pedagogical Study

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Abstract

Owing to the engineering background, the researcher possesses insight into the communication challenges faced by engineering students, which can have a profound effect on their career and professional growth. This study seeks to assess the effectiveness of a pedagogical approach focused on speaking skills to enhance communication proficiency among undergraduate engineering students at UIET, Panjab University. The research delves into the impact of integrating student-centered tasks and activities aimed at improving communication skills within the experimental group. Diagnostic and end-term achievement tests were administered and subjected to statistical analysis using an experimental methodology. The results demonstrate a noteworthy enhancement in end-term achievement-test scores for the experimental group, supporting the hypothesis that this pedagogical approach positively influences communication skills. These findings highlight the significance of innovative teaching methods in improving language proficiency among engineering students.

Keywords: Communication skills/Speaking skills, Classroom methodology, Engineering graduates, Employability, English Language Teaching (ELT), English for Specific Purposes (ESP).

1. Introduction

In today's globalized world of the 21st century, English has assumed a paramount role worldwide, with a rising demand for effective communication skills. In the contemporary landscape, possessing a strong command of communication skills in the English language is indispensable, particularly for professionals operating in the domains of science and technology, possessing strong communication skills in English has become an imperative for professionals in the engineering field. As quoted by Radzuan et al., "These skills are among the skills looked for by the industries in their prospective employees, especially in young graduates. Hence, being the provider of knowledge and channel of transition for students to become young professionals, educational institutions are responsible to assist engineering students in preparing them with these important skills" (61). Such skills not only augment their career prospects but also contributes significantly to the continued advancement of the engineering industry.

In the post-globalization era, being proficient in English is no longer optional but compulsory. Even if an employee possesses strong technical expertise, they should also be efficient in Communication skills during the interview process. Adding further, in the words of Clement and Murugavel, "The survey results

show that among all the skills ‘speaking’ is considered the most important skill and around 44% of the respondents have accepted that speaking in English is their weakness. This result proves that oral communication remains the top skill in the workplace.” (12). Hence, speaking skill is not just beneficial during the recruitment process while facing any interview, presentation or group discussion but also while doing a job in any corporate company.

2. Statement of the Problem

The current study focuses on Engineering institutions, since the researcher herself, being a science student with an engineering background, is well-versed with the problems faced by fresh engineering graduates of Punjab. They face many hardships while communicating in situations like facing job interviews or other interviews, group discussion rounds, or even presenting themselves in professional situations. Also, it has been seen that extensive research has been done related to this field in South India as compared to North India, especially in Punjab. Therefore, as discussed in the words of Clement and Murugavel, “Many engineering graduates in India are found to be unemployable due to their poor communication skills and lack of confidence. There have been a lot of research papers that have recapped the importance of improving engineering graduates’ employability skills; however, the problem of poor communication skills grows unabated in India” (116). However, there are many pieces of evidence and research conducted on engineering students which show that in today's world, engineering students need good speaking skills to get good jobs. Many students struggle to speak English well, and it affects their grades. Employers say that not speaking English well makes it hard for graduates to communicate at work. There's always a gap between what employers want and what students can do in speaking English. So, it's important to fill this gap and help students learn the speaking skills they need.

3. Research Questions

This study will try to find the answers to the following research questions:

1. Do the Pedagogy of Speaking skills help to improve Engineering students’ Communication skills?

4. Hypothesis

The aforementioned research questions led to the proposal of the following hypotheses:

- **Research / Alternative Hypothesis (H1)**

1. There is a significant difference between the level of Communication skills of the Engineering students of the control group and the experimental group in the end term achievement-test.

- **Null Hypothesis (Ho)**

1. There is no significant difference between the level of Communication skills of the Engineering students of the control group and the experimental group in the end term achievement-test.

5. Review of Literature

Riemer in *Communication Skills for the 21st Century Engineer* (2007), explores the crucial communication skills that contemporary engineers need to meet industry demands. According to Riemer, communication skills are not only considered valuable for career enhancement but are qualities sought by employers, making them an integral part of tertiary education. The researcher then delves into specific communication skills, including oral, written, listening, visual, intercultural, and interdisciplinary skills.

Rao in English for Science and Technology (2014), begins by highlighting the Learner-centered Approach, which focuses on the personal goals, desires, and needs of each individual. This approach creates a flexible teaching-learning environment that positively influences students' overall attitude, performance, and retention in Engineering colleges. It also encourages active practice of the target language among Engineering students through small-group activities in the classroom. Subsequently, the researcher delves into the development of English for Science and Technology (EST), a sub-category of the broader field of English for Specific Purposes (ESP). Specifically designed for tertiary-level learners, EST can be utilized by learners for employability purposes or higher education.

In the article, *English for Employability*, Clement and Murugavel (2015) primarily investigate the state of English classrooms in Engineering colleges, aiming to uncover the reasons behind the employability challenges faced by Engineering graduates in India. The researchers identify communication skills as the main hurdle for Engineering students in the country. They also emphasize the significance of other job-related skills such as interviews, group discussions, presentations etc.

As discussed by Vilasini and Paul (2019), the study seeks to investigate the challenges faced by Engineering students when it comes to speaking English. Additionally, the study aims to identify the underlying causes of these difficulties. The researcher implemented specific tasks based on Task-Based Language Teaching with the study sample to assess speaking challenges and their causes. The findings revealed that difficulties in speaking English were attributed to fear of making mistakes, shyness, anxiety and a lack of confidence. In response, the researcher recommended creating a supportive environment and encouraging students to engage in frequent English conversations.

6. Research Methodology

As we know, despite the communication skills being taught to Engineering students in a conventional manner, they still struggle to apply those skills effectively in real-life situations. The teacher-researcher believes that this is due to inadequate instruction provided to the students, especially in speaking skills, which is the focus of this research. Therefore, the present experimental study aims to enhance students' communication skills by incorporating pedagogy of speaking skills as a classroom methodology by applying various tasks and activities. The primary goal of this paper is to examine the impact of this approach on students' speaking skills. To achieve this, the teacher-researcher analysed and interpreted the data statistically obtained from third-year (5th semester) engineering students of Computer Science Engineering at the University Institute of Engineering and Technology (UIET), Panjab University. In this experiment, out of the 120 students, the teacher-researcher divided the third-year engineering students into two groups i.e., 60 students in the experimental group and 60 students in the control group. The teacher-researcher taught the experimental group for almost five months. The main purpose of the designed syllabus is to improve the speaking skills of the experimental group. It involves various tasks and activities to emphasise more on student-centred methods. The teacher-researcher designed the study material, which consists of five units;

1. Self-Introduction
2. Individual Long Turn
3. Talking in Pairs
4. Participating in Group Discussions

5. Facing an Interview

The experimental group was taught speaking skills by means of effective methodology whereas the control group was taught using traditional methods by their English teacher. Further, the research included a diagnostic-test and end term achievement-test, respectively for both groups. A diagnostic-test was conducted at the initial stage of the experiment, i.e., from unit one, which is Self-Introduction. At last, at the end of the semester, without the students’ prior knowledge, the teacher-researcher conducted an end term achievement-test for both groups with the purpose to compare the communication skills between both groups. Also, the teacher-researcher employed the IELTS speaking exam criteria to evaluate the speaking skills of the participants in both the tests. These criteria were used to determine if there is a significant difference in speaking skills between the control group and the experimental group.

A thorough analysis was conducted on the data collected from both the control and experimental groups, and the resulting findings were documented. The formulated hypotheses for the research are listed, and the criteria utilized to evaluate the speaking proficiency of students in both the diagnostic-test and end term achievement-test are explained. Appropriate statistical methods were employed to test the research questions and research hypothesis.

Thoroughly computer-assisted statistical analyses were conducted to find answers to the research question and determine which hypotheses were rejected or confirmed. Quantified data obtained from the tests were carefully analysed using a paired t-test. Both descriptive and inferential statistics were used to find relationships and comparisons among sets of scores. The data were analysed using Minitab 17.1.0 Statistical Software. The paired t-test was employed to determine whether the experimental treatment significantly impacted the participants' speaking proficiency. The results were presented through tables and necessary figures.

6.1 Diagnostic-test

According to the current research, as summed up in the previous section, the first phase involved conducting a preliminary examination known as a diagnostic test for both groups. The primary objective of this test was to assess the participants' initial communication skills and language usage. It consisted of an activity that allowed students to introduce themselves in various formal and informal scenarios. The test focused on the first unit of the study material, which involved self-introduction and was administered orally. The assessment of diagnostic test was carried out using the IELTS speaking assessment scale, with the guidance of my supervisor, an expert in the field of English Language Teaching (ELT). Table 6.1 consists of the mark’s distribution of experimental and control groups.

Table 6.1: Marks obtained in Diagnostic-test

Experimental Group		Control Group	
Subject Number	Marks	Subject Number	Marks
1	25	S1	26

S2	36
S3	24
S4	24
S5	27
S6	22
S7	21
S8	32
S9	25
S10	28
S11	35
S12	24
S13	20
S14	28
S15	25
S16	26
S17	35
S18	29
S19	19
S20	30
S21	27
S22	23
S23	23
S24	22
S25	34
S26	33
S27	28
S28	37
S29	37
S30	28
S31	36
S32	34
S33	33
S34	28
S35	27
S36	23
S37	21
S38	26
S39	25
S40	28
S41	25
S42	32
S43	34

S2	24
S3	26
S4	26
S5	23
S6	31
S7	25
S8	19
S9	27
S10	29
S11	27
S12	31
S13	24
S14	24
S15	26
S16	31
S17	26
S18	22
S19	21
S20	25
S21	23
S22	28
S23	29
S24	28
S25	31
S26	24
S27	29
S28	28
S29	23
S30	26
S31	28
S32	27
S33	26
S34	23
S35	22
S36	30
S37	27
S38	24
S39	18
S40	18
S41	32
S42	27
S43	29

S44	16
S45	25
S46	26
S47	26
S48	23
S49	27
S50	25
S51	26
S52	26
S53	38
S54	28
S55	29
S56	30
S57	34
S58	29

S44	23
S45	25
S46	23
S47	25
S48	27
S49	30
S50	24
S51	24
S52	25
S53	32
S54	29
S55	31
S56	25
S57	22
S58	27

6.1.1 Performance of Experimental Group and Control Group in Diagnostic-test

Table 6.2 exhibits the mean and standard deviation of the experimental group and control group across the diagnostic-test. According to the data presented in this table, it can be inferred that the experimental group and control group’s mean scores in the diagnostic-test are 27.707 and 25.948 which is strikingly low. Analysing the mean scores for each group, it is evident that they are almost equal and close to half of the total marks. Consequently, the performance of the experimental group and control group in the diagnostic-test can be categorized as ‘poor.’

Table 6.2: Experimental Group and Control Group in Diagnostic-test

	Group	N	Mean	Standard Deviation	t-value	p-value
1	Experimental	58	27.707	4.988	2.30	0.025
2	Control	58	25.948	3.337		

The paired t-test is a useful tool for determining the t-values and p-values associated with speaking assessment in the diagnostic-test. Table 6.2, also presents the calculated t-values and p-values, indicating whether there is a significant difference in mean scores between the two groups based on the students' performance. The diagnostic-test yielded a p-value of 0.025, surpassing the threshold of 0.01. This suggests that the distinction between the experimental group and the control group is not statistically significant at the 0.01 level. Consequently, based on the results of the t-test analysis, there is no significant difference between the means of the experimental group and the control group in the diagnostic test. Figure 1 visually demonstrates that the speaking competence of both groups is almost similar.

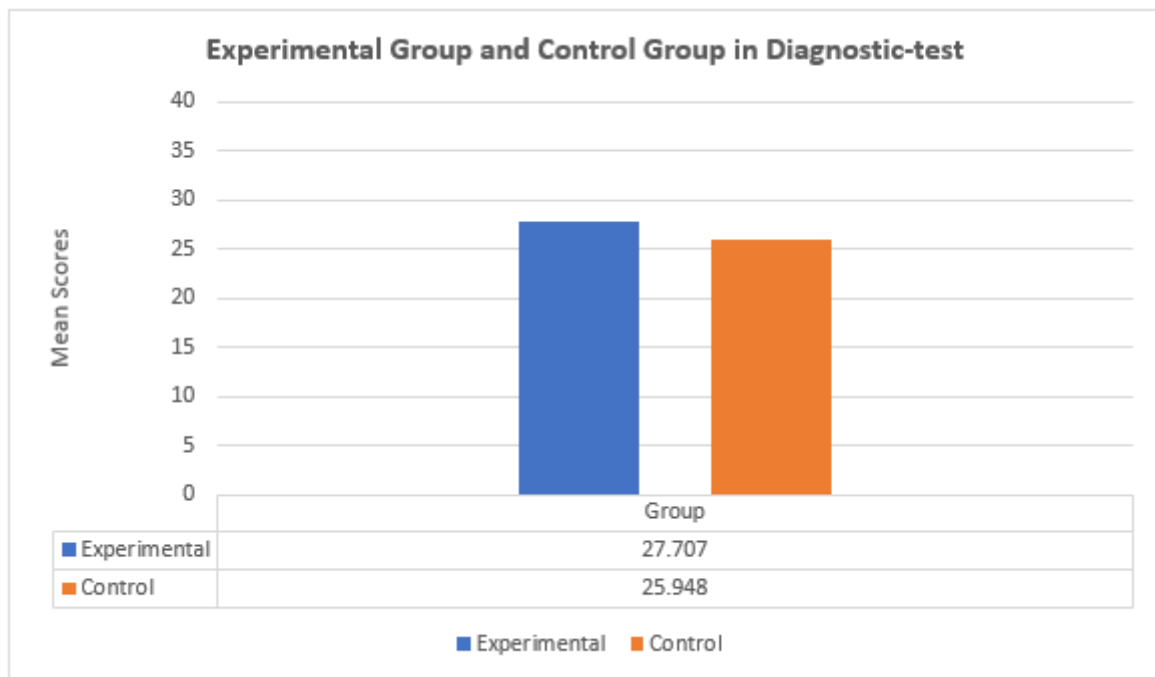


Figure 1: Representation of Experimental Group and Control Group in Diagnostic-test

6.2 Intermediate Assessment

The teacher-researcher employed pedagogy of speaking skills as the classroom methodology while forming a well-structured syllabus for the experimental group within the given timeframe. The syllabus was thoughtfully designed, with a focus on areas that are commonly used and relevant to the students, such as Self-Introduction, Group Discussion, and Facing an Interview etc. They were assigned various activities related to the topics discussed in the classroom. Also, throughout the course, the students underwent intermediate assessments. These assessments were conducted periodically, typically between the beginning and end of a unit, throughout the duration of the course. The main aim of this assessment was to monitor the students' progress and provide them with timely feedback.

6.3 End term Achievement-test

Now after conducting all the intermediate assessments and employing various activities to teach the study material for approximately five months, ultimately the teacher-researcher decided to administer an end-term achievement test (post-test) to both the groups. The primary objective of this test was to evaluate the progress made and assess the students' proficiency and language usage at the conclusion of the study. The test was centred around the final unit of the study material, which focused on facing an interview. Finally, the same evaluation process employed in the diagnostic test was followed, utilizing the IELTS speaking assessment scale and conducted under the supervision of my expert supervisor. Further, Table 6.3 displays the scores obtained by the experimental group in the speaking assessments of the end term achievement-test.

Table 6.3: Marks obtained in End term Achievement-test

Experimental Group		Control Group	
Subject Number	Marks	Subject Number	Marks
S1	38	S1	29
S2	45	S2	26
S3	37	S3	30
S4	38	S4	32
S5	36	S5	26
S6	34	S6	37
S7	32	S7	29
S8	44	S8	21
S9	35	S9	31
S10	37	S10	32
S11	42	S11	30
S12	36	S12	34
S13	32	S13	26
S14	40	S14	25
S15	38	S15	29
S16	36	S16	36
S17	43	S17	28
S18	40	S18	25
S19	30	S19	23
S20	41	S20	29
S21	40	S21	26
S22	36	S22	33
S23	34	S23	32
S24	38	S24	31
S25	43	S25	37
S26	42	S26	26
S27	40	S27	32
S28	45	S28	32
S29	44	S29	30
S30	35	S30	32
S31	43	S31	30
S32	40	S32	32
S33	41	S33	28
S34	36	S34	25
S35	38	S35	25
S36	35	S36	36

S37	34	S37	29
S38	38	S38	28
S39	37	S39	20
S40	40	S40	22
S41	36	S41	37
S42	42	S42	28
S43	43	S43	35
S44	30	S44	26
S45	37	S45	29
S46	38	S46	26
S47	40	S47	27
S48	37	S48	30
S49	40	S49	34
S50	36	S50	26
S51	38	S51	27
S52	40	S52	28
S53	45	S53	36
S54	40	S54	33
S55	42	S55	37
S56	41	S56	28
S57	43	S57	26
S58	38	S58	30

6.3.1 Performance of Experimental Group and Control Group in End term Achievement-test

Table 6.4 showcases the mean and standard deviation values for the experimental group and control group in the end term achievement-test. Upon examining the data, it can be deduced that the performance of the experimental group students has shown significant improvement in this test, as it can be clearly seen that the mean has increased to 38.603 marks. Whereas, in the control group there is no noticeable progress observed in the performance of the participants in this test. The mean score of the control group here is 29.431, which is similar to the mean score (25.948) of the control group in diagnostic-test. Therefore, the overall performance of the control group in the end term achievement-test can be characterized as ‘poor.’ Hence, there is no significant difference between the scores obtained by the control group in the diagnostic-test and end term achievement-test.

Table 6.4: Experimental Group and Control Group in End term Achievement-test

S. No.	Group	N	Mean	Standard Deviation	t-value	p-value
1	Experimental	58	38.603	3.656	12.91	< 0.001**
2	Control	58	29.431	4.138		

Note: ** denotes significant at 1% level.

The scores obtained by the experimental group and the control group in the end term achievement-test are analyzed to determine if there is a statistically significant difference between them. The paired t-test is applied to compare the mean scores of the two groups based on their performance in the end term achievement-test. As part of this analysis, the research hypothesis (H1) stating that “There is a significant difference between the level of Communication skills of the Engineering students of the control group and the experimental group in the end term achievement-test.” has to be tested. The mean scores of the experimental and control group in this test are presented in Table 6.4.

From the data presented in Table 6.4, it is evident that the calculated p-value for speaking assessment is less than 0.01 at the 1 per cent level. This indicates that the disparity between the mean scores of the control group and the experimental group holds statistical significance. Consequently, the research hypothesis (H1) claiming that “There is a significant difference between the level of Communication skills of the Engineering students of the control group and the experimental group in the end term achievement-test.” is accepted based on the statistical analysis outcomes. However, the null hypothesis (Ho), “There is no significant difference between the level of Communication skills of the Engineering students of the control group and the experimental group in the end term achievement-test.” is rejected based on the provided statistical analysis. Additionally, Figure 2 demonstrates that the experimental group has exhibited a noticeably higher level of performance in comparison to the control group.

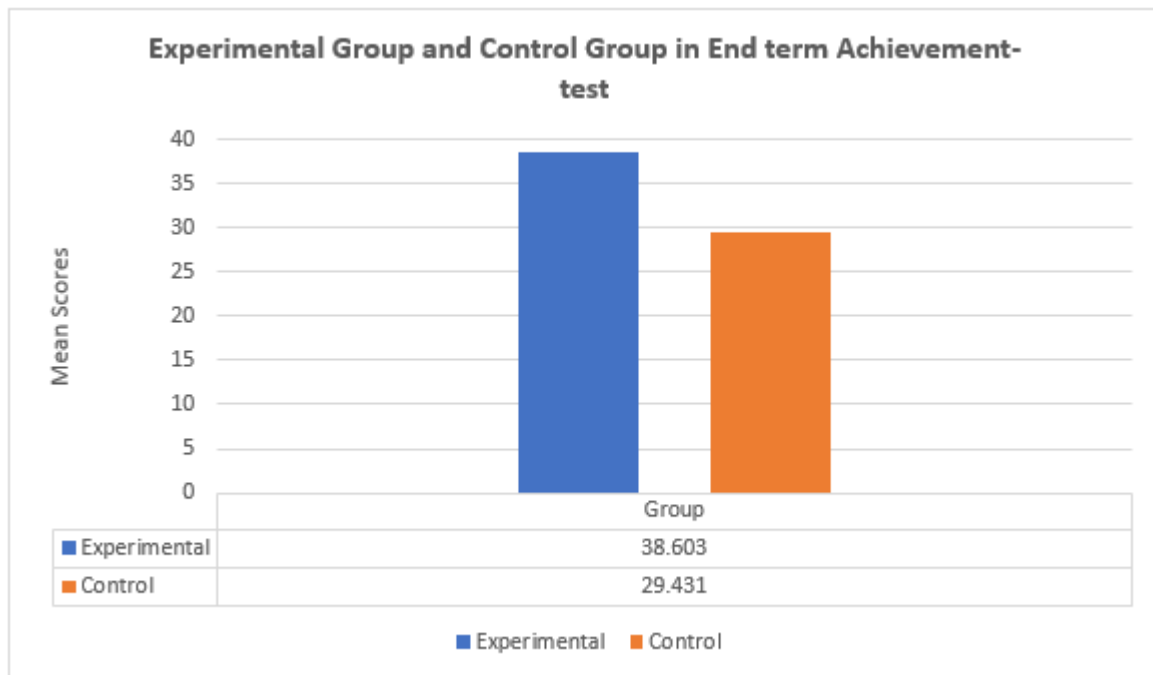


Figure 2: Representation of Experimental Group and Control Group in End term Achievement-test

7. An Overview of the Findings

As mentioned earlier, the research hypothesis (H1), “There is a significant difference between the level of Communication skills of the Engineering students of the control group and the experimental group in the

end term achievement-test.” is accepted and the null hypothesis (Ho) “There is no significant difference between the level of Communication skills of the Engineering students of the control group and the experimental group in the end term achievement-test.” is rejected. This rejection of the null hypothesis is due to the notable disparity in mean scores of the experimental group and the control group in the end term achievement-test. The difference in the mean scores can be attributed to the implementation of the pedagogy of speaking skills through specially designed modules provided to the experimental group. Therefore, the study affirms that the communication skills of students can indeed be improved by incorporating different classroom activities for engineering students, which justifies our first research question i.e., “Do the Pedagogy of Speaking skills help to improve Engineering students’ Communication skills?”

8. Conclusion

The main focus of this article revolves around the collected data and its analysis to assess the performance of both the control group and the experimental group in both the diagnostic-test and end term achievement-test. Additionally, the hypotheses formulated for the study are tested by conducting statistical analysis on the mean scores of both the control group and the experimental group in the diagnostic-test and end term achievement-test assessments. Notably, there was a significant improvement in the students' speaking skills as evidenced by higher end term achievement-test scores compared to their diagnostic-test scores. Therefore, this study has successfully demonstrated that the pedagogy of speaking skills indeed helped the students to enhance their communication skills. They can overcome their shyness in oral communication, especially when exposed to the module designed in this research. The activities and tasks conducted in the study effectively decreased the students' anxiety, highlighting the importance of motivation in encouraging students to improve their communication.

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