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Oral Remediation Strategies and Their Effect on Student Performance in Statics of Rigid Bodies

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ABSTRACT

This quasi-experimental research design was conducted to determine the effects remediation of oral communication difficulties on students' achievement in Statics of Rigid Bodies. A non-equivalent pretest and post-test design was used in this study. Students from third (3) year classes, Sections IV to VII, were subjects of the study. One hundred (100) students served as experimental group, ninety (90) students comprised the control group. The experimental group was given the on-the-spot remediation of oral communication difficulties for one school year, while the control group did not receive such treatment. To minimize the effect of teacher factor, the same teacher handled both study groups. Each of the four teachers made achievement tests of sixty (60) items were prepared and validated by experts. These were administered as pretest and post-test to both groups after each of the final period. The t-test for dependent samples and t-test for independent samples were used to analyze the data. This study showed that in all the final period, these students under the on-the-spot remediation of oral communication difficulties performed significantly better in the achievement test on Statics of Rigid Bodies than those who did not go through the treatment.

Keywords**:** Communication**,** on the spot, oral remediation, ,statics of rigid bodies, students' performance, traditional lecture,

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1. INTRODUCTION

More engineering science educators have observed that engineering students have poor communication skills, as reflected by their difficulty with vector addition and component resolution, struggling to apply the two conditions for equilibrium (net force and net torque are zero), and confusion with the concepts of moments and couples.

On-the-spot remediation of oral communication difficulties can positively impact students' achievement in subjects like Statics of Rigid Bodies. Communication problems, such as public speaking anxiety or trouble articulating complex thoughts, can hinder learning and lead to lower academic performance. By addressing these issues directly, instructors can help students better understand, discuss, and apply complex mechanical concepts.

Many engineering students experience a fear of public speaking, which can prevent them from participating in classroom discussions or asking for help. This fear can cause them to remain silent even when they are unsure of a concept, leading to a diminished understanding and lower grades.

Statics of rigid bodies require students to move beyond simple facts and communicate their understanding of complex systems, which often involves technical vocabulary and abstract concepts. For students who struggle to translate their thoughts into clear explanations, this can result in miscommunication and a perceived lack of understanding by instructors.

When students lack communication skills, their confidence can decrease, which in turn reduces their motivation to engage in difficult subjects like Statics of Rigid Bodies. Low engagement can create a negative feedback loop that harms academic performance over time.

2. RELATED LITERATURE

Several studies support the link between communication skills and academic success in STEM fields:

A study on engineering found that oral communication skills were correlated with improved performance on relevant projects and increased motivation.

One study focused on statics of rigid bodies communication anxiety reported that students who felt anxious about communicating in class performed worse on multiple-choice exams. [1]

Another research project found that students who used a "Presentation of Based on Multi-representation" (PBM) learning model, which explicitly links different types of representation with oral communication, showed improved conceptual understanding in physics. [2]

Other signs are problems with geometry and trigonometry in force problems, misidentifying forces (like tension, compression, or reactions), or an inability to draw and analyze free-body diagrams [3].

Extensive research on feedback systems in education consistently demonstrates its positive effects on student achievement, which provides a strong theoretical basis for the value of "on-the-spot remediation" [4]. Corrects misconceptions: Immediate feedback directly addresses and corrects student misconceptions now of learning. In a subject like statics, this prevents students from repeatedly practicing incorrect methods, which can hinder future learning [4]; Deepens learning: Immediate feedback on verbalized thought processes encourages students to explain their reasoning. This practice leads to a deeper understanding of the subject matter, such as why a particular approach to solving a statics problem is correct or incorrect, and increases engagement and motivation.

Real-time feedback, particularly when delivered constructively, can significantly increase student motivation and engagement. When students understand the purpose of an assessment, they are more likely to act on feedback to improve their performance [5].

Moreover, the researcher has observed that most written reports or investigatory projects submitted by the students show that there are language difficulties resulting from poor reading comprehension, which eventually affect their performance in Statics of Rigid Bodies.

In Statics of Rigid Bodies teaching, the teacher should encourage students to develop their critical thinking on the equilibrium of objects under the action of forces and moments by determining unknown forces, reactions, and moments, and help them to construct their own concepts to achieve a more meaningful learning [6]. This can only be made possible if the students can communicate without difficulty, whether orally or in written form, whether ideas they might have.

The researcher believes that if the students are given on the spot remediation on their oral communication difficulties, then learning might become more interesting and meaningful. Hence, their achievement will be improved.

This study investigated the effect on the spot remediation of oral communication difficulties on students' achievement in Statics of Rigid Bodies.

Specifically, this study sought to answer the following question: Is there a significant difference between the achievement in Statics of Rigid Bodies of those students taught with the on-the-spot remediation of oral communication difficulties and those taught with the traditional method during prelim, midterm, and final periods?

3. METHODS

The research paradigm is shown below:

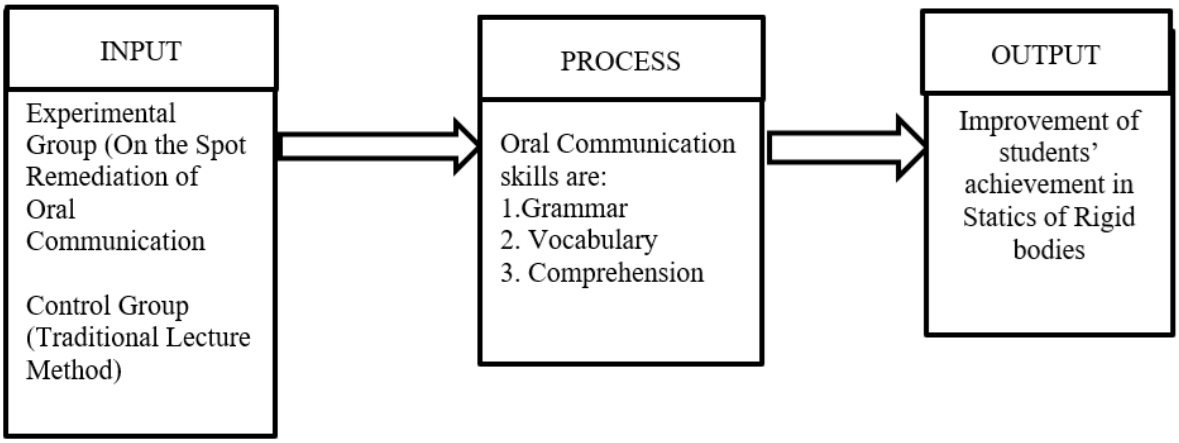

Figure 1. Conceptual Framework.

Third (3) year classes were chosen randomly and then divided into two groups-Group 1 as the experimental group and Group II as the control group. The four sections under study were taught by the same engineering science teachers. One hundred (100) students composed the experimental group, and ninety (90) students composed the control group, as shown in Table 1. There were 170 males and 20 females.

Table 1. Class Size.

Section	Experimental Group			Control Group		
	Males	Females	Total	Males	Females	Total
III-4	15	2	17	15	2	17
III-5	21	3	24	16	2	18
III-5	26	1	27	18	2	20
III-6	15	4	19	20	1	21
III-7	11	2	13	13	1	14
Total	88	12	100	82	8	90

The experimental group was given the on-the-spot remediation on oral examination difficulties in Statics of Rigid Bodies. Students who committed errors in grammar, sentence construction, and other related difficulties in language expression, comprehension (specifically in relating observations), interpretations, analysis of data and results, and deriving of conclusions were given on the spot remediation by the teacher. This was done every class meeting for one school year.

A pretest was given to both the experimental and control groups at the start of every grading period and a posttest at the end of the final period. The pretest questions were prepared and validated by the engineering science department.

Scores were tallied, and the mean score, standard deviations, and t-values were computed.

4. RESULTS AND DISCUSSION

Table 2 shows the result of the t-test for the posttest scores of the experimental and control groups from prelim to final grading periods. As presented in the table, the mean posttest scores of the experimental group for each of the three-grading period were always higher than the mean posttest of the control group. Moreover, the computed t-value for each grading period is significantly higher than that of the tabular value at 0.05 level of significance. This means that there is significant improvement of the achievement in the achievement of these students in the experimental group (those subjected to on-the-spot remediation of oral communication difficulties). They also performed significantly better than those who were subjected to the traditional method.

Table 2. Results of t-value between the Mean Posttest Score of the experimental group and the control group for Each Grading Period.

Grading Period	Posttest Scores (Experimental Group)		Posttest Scores (Control Group)		t-value (df=18.0)	Significance (2-tailed) 0.05
	Mean	SD	Mean	SD		
Prelim	24.57	2.72	23.69	2.6	2.223	1.980
Midterm	37.88	7.10	35.49	7.90	2.148	1.980
Finals	29.65	3.63	28.03	4.62	2.638	1.980

4. CONCLUSION

After implementing the on-the-spot remediation on oral communication difficulties on students in Statics of Rigid Bodies, the students that composed the experimental group performed significantly better than those in the control group, as evident in their mean posttest scores. The experimental group consistently obtained a higher mean posttest score than the control group from the prelim period to final period. On the spot remediation of oral communication difficulties is an innovative teaching method that can help the students improve their performance in Statics of Rigid Bodies.

The following remediation strategies can help students overcome communication issues and improve their achievement in subjects like Statics of Rigid Bodies: Promote collaboration and discussion: Providing opportunities for students to engage in collaborative, small-group activities can help them practice their communication skills in a low-stress environment. As students work on assignments together, teachers can monitor their discussions and offer immediate, specific feedback to correct misunderstandings and improve how they verbalize concepts [7,8].

Offer timely feedback and coaching: When an instructor notices a student struggling to explain a concept, they can offer immediate coaching to help them rephrase or structure their thoughts more effectively [9,10]. This focused feedback is often more effective than generalized advice, as it addresses the specific communication breakdown now it occurs. Build communication into learning objectives: By explicitly incorporating communication skills into the course curriculum, instructors can emphasize their importance [11]. For example, they can use structured classroom activities that require students to explain their problem-solving process to peers.

Encourage question-asking: Creating a classroom culture where questions are not only accepted but encouraged can help combat anxiety. Students who learn to articulate when and how their needs are not met are more likely to seek help effectively [12].Normalize mistakes and offer guided practice: On-the-spot remediation allows for a space where making mistakes is viewed as a normal part of learning. Instructors can model effective communication and provide a safe, supportive learning environment, which helps build students' confidence and reduce anxiety over time [13].

As a guideline, the researcher also recommends the application of metacognition, whereby teachers instruct their students discreetly on the learning process. In view of the common knowledge that students ‘errors are mostly committed through verbatim practice, teachers’ immediate remediation will prove to be indispensable factor in redirecting the course of communication.

[14] stated that the application of the said technique enables the students to think more critically, observe tact in giving oral responses, and further enhance language fluency. As a result, students would look at the subject as something they should not be indifferent to but one which is challenging, exciting, and worth learning about.

To be able to achieve the desired goal in using this teaching method, engineering science teachers should be trained in techniques on how and when to make the on-the-spot remediation on oral communication difficulties so that the students will be able to benefit from this teaching method.

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