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Research Article

Improving Remedial Students Group Discussion Skill in Physics Classroom

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Abstract

This classroom-based action research investigates the effectiveness of structured group discussions in enhancing the academic performance and engagement of remedial physics students at Raya University. Using a mixed-methods approach that combined quantitative data (surveys, test scores) and qualitative insights (observations, student reflections), the study examined the outcomes of targeted interventions such as assigned group roles, facilitator guidance, and curriculum-aligned discussion objectives. The class consisted of 42 students, with a gender distribution of 71.4% male and 28.6% female. Following the intervention, 66.7% of students demonstrated measurable academic improvement, with average test scores rising from 68% to 75%. Additionally, 71.4% of students expressed satisfaction with the group discussion format, and 67.6% reported participating "often" or "sometimes" in discussions. Qualitative findings highlighted improvements in students' communication, collaboration, and critical thinking skills. Despite minor challenges such as unequal participation and off-topic conversations effective facilitation and role rotation strategies helped maintain focus and inclusivity. The study concludes that structured group discussions, supported by both qualitative and quantitative evidence, are a powerful tool to boost comprehension and performance among remedial students, with equitable benefits across gender lines.

Keywords

Group Discussion, Remedial Students, Physics Classroom, Collaborative Learning

1. Introduction

Physics, as a fundamental scientific discipline, presents significant challenges for many students, particularly those requiring academic support. At Raya University, the academic performance and engagement of remedial students in physics has been a persistent concern. Remedial education refers to instructional programs designed to support students who have not yet achieved the expected curricular competencies, aiming to strengthen their foundational skills and prepare them for future academic success. Traditional lecture-based teaching methods often fall short in addressing the diverse needs and learning styles of remedial students. To overcome these limitations, a shift toward student-centered approaches—such as group discussion—has become essential. Group discussion transforms the conventional teaching paradigm by fostering a more interactive, participatory learning environment. It encourages students to actively engage in the learning process by supporting and motivating one another both inside and out-

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side the classroom. Group discussion enhances several key educational outcomes, including teamwork, critical thinking, reflection, communication skills, and meaningful learning experiences [1]. When students are given shared teaching responsibilities, they are more likely to revisit and internalize course content. This collaborative setting encourages mutual accountability and helps students collectively achieve their learning objectives [2]. Furthermore, it promotes the development of higher-order thinking skills, supports knowledge retention and transfer, and contributes to improved academic performance. In addition to cognitive benefits, group discussions also foster social competencies such as organization, communication, presentation, problem-solving, and leadership skills [3]. This action research aimed to explore the impact of structured group discussion sessions on the engagement and academic performance of remedial physics students at Raya University. The sessions were deliberately structured to include diverse group composition, clearly defined objectives, assigned roles, and interactive learning strategies. By evaluating the effects of these discussions on students' engagement and understanding, this study seeks to identify effective practices and offer actionable recommendations for educators working with similar student populations.

1.1. Statement of the Problem

At Raya University, remedial students enrolled in physics courses consistently encounter difficulties in understanding and retaining core physics concepts. These challenges are reflected in their lower academic performance, reduced retention rates, and declining interest in the subject. Traditional lecture-based teaching methods, which often emphasize passive learning, have proven insufficient in addressing the diverse educational needs of these students. This action research seeks to address the need for more effective instructional strategies—specifically, structured group discussions—to improve the learning experiences and academic outcomes of remedial physics students. The study focuses on the following key challenges:

1) *Lack of Engagement:* Traditional lectures often fail to actively engage diverse student populations, resulting in limited participation and motivation.
2) *Varied Learning Styles:* Remedial students come from a wide range of educational backgrounds and exhibit diverse learning preferences, which are not adequately accommodated by conventional teaching methods.
3) *Conceptual Understanding:* Many students struggle to grasp abstract physics concepts and face difficulties applying them in problem-solving contexts.

To address these challenges, this research aims to develop, implement, and assess structured group discussion strategies designed to foster greater student engagement, deepen conceptual understanding, and improve academic performance. By systematically examining the effects of these strategies, the study aims to generate evidence-based recommendations that can enhance physics instruction for remedial students and support their academic success and confidence in scientific learning.

1.2. Research Questions

The study is guided by the following research questions:

1) How do group discussions affect the comprehension of fundamental physics concepts among remedial students?
2) What impact do group discussions have on the academic performance of remedial physics students?
3) Are there gender-based differences in the experiences and outcomes of remedial students participating in group discussions in the physics classroom?

1.3. Objectives of the Study

General Objective:

To improve the group discussion skills of remedial students in the physics classroom, thereby enhancing their learning experience and academic performance.

Specific Objectives:

1) To help remedial students achieve the expected standard of academic performance in physics.
2) To assess the impact of group discussions on the comprehension of fundamental physics concepts among remedial students.
3) To measure the effect of group discussions on the overall academic performance of remedial students in physics.
4) To examine how group discussions influence student engagement and participation in physics classes.
5) To identify gender-based differences in the experiences and outcomes of remedial students participating in group discussions.

1.4. Significance of the Study

This study on improving group discussion skills among remedial physics students at Raya University provides several valuable insights:

1) *Enhanced Learning Outcomes:* Group discussions significantly improved students' understanding of physics concepts, resulting in improved academic performance.
2) *Active Student Engagement:* The shift from traditional, lecture-based instruction to interactive group discussions promoted active learning and increased student participation.
3) *Accommodation of Diverse Learning Styles:* The group discussion approach effectively addressed the diverse educational backgrounds and learning preferences of remedial students, thereby enhancing overall educational outcomes.
4) *Gender-Based Insights:* The study identified gender-based differences in students' experiences and learning

outcomes, offering important considerations for ensuring equitable learning opportunities through group discussion methods.

1.5. Limitations of the Study

Despite its contributions, the study faced several limitations:

1) *Sample Size and Generalizability:* The research was limited to a single section (Section A) of remedial physics students at RU, which restricts the generalizability of the findings to other sections, contexts, or institutions.
2) *Time Constraints:* The study was conducted over a limited time frame, which may have constrained the depth of data collection and analysis. As a result, long-term effects and behavioral changes may not have been fully captured.

2. Literature Review

2.1. Group Discussion

Group discussion serves as an effective approach for acquiring knowledge about collaborative learning, enhancing awareness of how individual learning choices impact others. Observing the diverse strategies adopted by peers can expand one's understanding of different learning approaches [4]. Students are more inclined to engage in discussion when they share similar goals and when the success of each individual is positively linked to the group's performance. This sense of positive interdependence fosters interaction, where students provide feedback to one another, challenge conclusions, and consider alternative viewpoints. In diverse groups, students often feel more comfortable expressing themselves without time pressure, which can enhance communication and academic achievement [5]. A growing body of research indicates that students benefit both academically and socially when they collaborate to achieve shared goals, making group discussion a widely endorsed pedagogical method.

2.2. Features of Group Discussion

Group discussion typically involves participants assuming the role of peer tutors while receiving general and subject-specific instruction, with a strong emphasis on both curriculum content and interaction processes [6]. Some models emphasize structured materials, while others focus on behavior patterns that facilitate effective interaction across various subjects. Key features of successful group discussions include positive role modeling, goal-setting encouragement, constructive feedback, open-ended questioning, and collaborative problem-solving [7].

2.3. Significance of Multiculturalism in Group Discussion

When students from diverse backgrounds engage in group discussions, they are afforded opportunities to share personal experiences and cultural perspectives. This exchange promotes mutual understanding and highlights the unique contributions of each member [8]. By recognizing and valuing these differences, group discussions can transform the classroom environment to better support academic achievement. Furthermore, students often gain confidence through these interactions-learning to lead discussions, support peers, and manage group activities, often more comfortably than in teacher-led scenarios [9].

2.4. Students' Perceptions of Group Discussion

While many students view group discussions positively, a minority hold negative perceptions. This is often due to limited understanding of group work's value, ineffective group usage, or poor time management [10]. Lack of engagement can result from several factors. Some students may find peer interaction unproductive if the material is too basic or too advanced, or if peers are unprepared. Others may experience confusion about the correct interpretations or feel anxious about missing critical information, leading to a preference for instructor-led sessions [11].

2.5. Challenges of Group Discussion

Despite its benefits, group discussion also presents challenges, including coordination difficulties, varying motivation levels, intellectual limitations, and poor time management [12]. Coordination becomes particularly complex in groups with diverse languages, cultures, and skill levels. While these differences can pose challenges, they also present valuable opportunities for enriched discussion and learning [13]. However, group dynamics may sometimes lead to conformity, overconfidence in collective strategies, and a focus on shared knowledge at the expense of unique contributions. These intellectual limitations can hinder creativity and reduce the overall effectiveness of group discussions.

2.6. Future Outcomes of Group Discussion

Group discussion methodologies support a variety of educational outcomes, including:

1) Collaborative Learning
Group work enables students to exchange ideas, build communication skills, and learn from each other's experiences, knowledge, and skills.

2) Critical Analysis and Reflection
Post-discussion analysis promotes rational thinking and enables students to articulate well-grounded viewpoints.

Reflection involves assessing new ideas, making informed judgments, and integrating them with prior knowledge [14].

3) Communication and Expression

Effective group discussion encourages students to articulate ideas clearly and confidently, reducing fear and confusion [15]. This supports deeper conceptual understanding and knowledge development.

4) Self-Directed Learning

Group discussions help students develop time management and organizational skills. By fostering an environment conducive to learning, students can better identify and pursue their learning goals within given time constraints.

3. Research Methodology

3.1. Design of the Study

This study focused on improving remedial students' group discussion skills in the physics classroom at Raya University. The aim was to support students who require additional help to meet the expected academic achievement standards in physics. The study was designed to ensure that all students, regardless of their initial preparedness, have the opportunity to succeed in their physics assessments. A total of 42 students from Section A were selected for the study. These students were divided into seven groups, each consisting of six students. The seating arrangement positioned students side-by-side and face-to-face to promote interaction. Each group was assigned a teacher to act as a facilitator. Students were instructed to study the assigned physics topic in detail prior to the group discussion sessions. Facilitators were provided guidance on how to manage discussions and foster an effective learning environment. The facilitator's role was to control the flow of discussion, redirect conversations when off-topic, and maintain alignment with the learning objectives.

The structured group discussion framework was implemented through the following key steps:

1) Setting Objectives

Clear learning objectives were established for each discussion session. These objectives aligned with the course curriculum and targeted specific learning gaps identified among the remedial students.

2) Defining Roles and Responsibilities

Group roles were assigned to encourage active participation and equal contribution from all members. Facilitators guided discussions, recorded key points, and managed time to ensure the session progressed efficiently.

3) Establishing Ground Rules

Ground rules were introduced to foster a productive and respectful discussion environment. These rules emphasized active listening, respectful communication, staying on topic, and welcoming diverse perspectives.

4) Topic Relevance and Curriculum Alignment

Discussion topics were selected based on their relevance to the physics curriculum and the known challenges faced by remedial students. Topics were chosen to promote critical thinking, problem-solving, and deeper understanding of key physics concepts.

5) Preparation of Learning Materials

Supporting materials such as worksheets were prepared to align with the session objectives. These materials helped guide student discussions and ensured that learning remained focused and structured.

6) Initial Assessment

An initial assessment was conducted to evaluate students' prior experiences with group discussion and to identify their specific academic needs in physics.

7) Facilitation Techniques

Facilitators actively monitored group interactions, guided conversations toward learning goals, and encouraged balanced participation from all group members.

8) Feedback and Reflection

Regular feedback loops were incorporated to assess student engagement, conceptual understanding, and satisfaction with the group discussion format. Feedback collected from students was used to refine facilitation strategies and improve learning experiences.

9) Continuous Improvement and Adaptation

The process was continuously evaluated based on student outcomes and feedback. Necessary adjustments were made to enhance the effectiveness of the group discussions and address any emerging challenges.

3.2. Data Gathering Tools

3.2.1. Total Sample Size Determination

Based on the census approach as outlined in [16], the study included the entire Section-A cohort of 42 remedial physics students. This comprehensive sample ensured full representation and robust data collection through interviews, observations, and academic performance records.

The use of both quantitative and qualitative methods allowed for a systematic analysis of the effectiveness of group discussion strategies in learning physics. A multifaceted data collection approach was employed, incorporating the following tools:

3.2.2. Quantitative Data Analysis

1) Gender Distribution

The distribution of students by gender is presented in the table below:

Table 1. *Comparison of Male and Female Student Distribution in the Classroom.*

Gender	Number of Students	Percentage
Male	30	71.4%
Female	12	28.6%
Total	42	100%

This distribution indicates that the class is predominantly male, with males making up 71.4% of the total student population and females accounting for 28.6%.

2) Participation in Group Discussions

Students' levels of participation in group discussions were categorized as never, rarely, sometimes, often, or always.

Table 2. *Frequency and Percentage of Participation in Group Discussions.*

Participation Level	Number of Students	Percentage
Never	2	4.8%
Rarely	5	11.9%
Sometimes	15	35.7%
Often	14	33.3%
Always	6	14.3%
Total	42	100%

The results show that most students participated "sometimes" (35.7%) or "often" (33.3%), suggesting a generally active engagement in group discussions.

3) Satisfaction Levels with Group Discussions

Students were asked to rate their satisfaction with group discussions on a scale from 1 (Very Dissatisfied) to 5 (Very Satisfied).

Table 3. *Satisfaction Levels of Students with Group Discussions.*

Satisfaction Level	Number of Students	Percentage
Very Dissatisfied	1	2.4%
Dissatisfied	3	7.1%
Neutral	8	19.0%
Satisfied	20	47.6%
Very Satisfied	10	23.8%
Total	42	100%

The majority of students expressed satisfaction with the group discussion strategy. About 71.4% of students rated their satisfaction as either "Satisfied" or "Very Satisfied."

4) Academic Performance Improvement

To evaluate the impact of group discussions on academic performance, students were categorized based on whether their performance improved, remained the same, or declined.

Table 4. *Changes in Academic Performance after Group Discussions.*

Academic Performance Change	Number of Students	Percentage
Improved	28	66.7%
No Change	10	23.8%
Declined	4	9.5%
Total	42	100%

The results show that two-thirds of the students (66.7%) improved their academic performance, indicating a significant positive impact of the group discussion strategy.

3.2.3. Qualitative Data Analysis: Comparative Analysis

The qualitative analysis was focused on the insights gathered from interviews and observational notes. These data were evaluated in terms of time (before vs. after implementation) and gender to better understand the impact of group discussions on academic performance and student engagement.

1) Performance Metrics

Final exam scores and participation records were analyzed before and after the implementation of group discussions.

Table 5. *Average Grade Comparison Before and After Implementation.*

Period	Average Grade (%)
Before Implementation	68
After Implementation	75

The average exam score increased from 68% to 75%, demonstrating a significant improvement of 7 percentage points. This suggests that structured group discussions had a meaningful and positive impact on academic outcomes.

2) Gender-Based Academic Performance Improvement

Academic performance was further analyzed by gender to determine whether improvements were equally distributed.

Table 6. *Academic Performance Improvement by Gender (Pre-test vs. Post-test).*

Academic Performance	Males (%)	Females (%)
Pre-Test Average	65	62
Post-Test Average	75	72
Improvement	10	10

Both male and female students exhibited an identical improvement of 10 percentage points. This finding suggests that the enhanced group discussion method was equally effective across genders, supporting equitable learning outcomes.

4. Conclusion

The study on improving remedial students' group discussion skills in the physics classroom produced significant insights through both quantitative and qualitative data analysis. The findings reflect the positive impact of structured group discussions on academic achievement, student engagement, and collaborative learning. The gender distribution of the class showed a predominantly male composition (71.4%), with females representing 28.6% of the total student population. Participation in group discussions varied, but a large majority of students (67.6%) reported participating *sometimes* or *often*, indicating a strong level of engagement in the learning process. Furthermore, 71.4% of students expressed satisfaction with the group discussion method, rating it as either 4 (*Satisfied*) or 5 (*Very Satisfied*) on a five-point scale. This suggests that students found group discussions to be an effective and beneficial strategy for improving their understanding of physics concepts. Academically, 66.7% of students demonstrated measurable improvement in their performance following the introduction of structured group discussions. This reinforces the conclusion that group-based learning strategies can enhance both comprehension and academic results among remedial students. Beyond academic performance, the implementation of structured group discussions contributed to the development of essential skills, such as communication, collaboration, and critical thinking. Regular monitoring and clear facilitation strategies ensured discussions remained productive and inclusive, meeting the diverse learning needs of all students. Key strategies that supported the success of the group discussions included assigning specific roles within each group, establishing clear objectives, and using facilitators to guide and maintain focus throughout the sessions. Despite the overall success of the study, several challenges were encountered. However, practical solutions were implemented to mitigate these issues:

1) *Unequal Participation:* This was addressed by assigning specific roles, rotating leadership responsibilities, and encouraging quieter students to contribute actively, thereby fostering more equitable involvement.
2) *Off-Topic Discussions:* Facilitators played a crucial role in maintaining the relevance of discussions by redirecting conversations back to the core learning objectives.
3) *Technical Issues:* Any technological challenges encountered during the sessions were promptly resolved to ensure minimal disruption and smooth facilitation of group discussions.

Abbreviations

FGD Focus Group Discussion
GPA Grade Point Average
QDA Qualitative Data Analysis
SPSS Statistical Package for the Social Sciences

Author Contributions

Berhanu Girmay Abay is the sole author. The author read and approved the final manuscript.

Conflicts of Interest

The author declares no conflicts of interest.

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