LOYOLA COLLEGE OF EDUCATION

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PROSPECTIVE'S PERSPECTIVES 2025

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Loyola Research Forum (LRF)

PROSPECTIVE'S PERSPECTIVES – 2025

LOYOLA RESEARCH FORUM (LRF)

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Dear Readers,

I am honored to write the foreword for 'Prospective's Perspectives - 2025,' a landmark publication from Loyola Research Forum (LRF). This accomplishment underscores our institution's commitment to fostering innovation and excellence, and I am delighted to see our research forum embark on this journey, sharing insightful perspectives with a wider audience.

Education transcends knowledge transfer, and our Loyola College of Education student-teachers have demonstrated this through their action research projects. By exploring novel approaches and evaluating their effectiveness, they have achieved notable outcomes. The articles in this book highlight the promise of their research for enhancing educational practices. I applaud our students for their initiative and our faculty for their guidance, which have together cultivated a culture of inquiry and improvement.

I express my sincere gratitude to our esteemed faculty members, especially the editorial team of this book - Dr. Y. Elin Shibi, Coordinator, LRF, Dr. S. Pondyselvi, Assistant Professor, Pedagogy of History, and Dr. T. Komalavalli, Assistant Professor, Perspectives in Education - for their exceptional contributions.

I envision this publication as a springboard for future research and innovation, motivating others to pursue similar endeavors. May Loyola College of Education persist in nurturing compassionate, innovative educators who serve humanity with dedication and passion.

May Loyola College of Education continue to shape its pupils into compassionate and innovative educators, serving humanity with dedication and passion.

Rev. Dr. D. Thomas Alexander, SJ.
Secretary,
Loyola College of Education.

Dear Authors and Esteemed Readers,

It is my pleasure to introduce 'Prospective's Perspectives 2025', a remarkable collection of action research projects undertaken by our prospective teachers during their internship at schools. This anthology showcases the innovative ideas, critical thinking, and reflective practices of our prospective teachers, guided by their dedicated teacher educators.

The action research projects presented in this book demonstrate the prospective teachers' ability to identify problems, design solutions, and implement changes in real-world classroom settings. These efforts not only enhance their teaching skills but also contribute to the improvement of educational practices.

I commend the prospective teachers for their hard work, creativity, and commitment to the teaching profession. I also appreciate the tireless efforts of our teacher educators, who have mentored and guided our prospective teachers throughout this journey. Warmest congratulations to Loyola college research forum on the publication and wishes for its continued success in nurturing research excellence and empowering future teachers and educators.

The book, 'Prospective's Perspectives 2025' is a testament to our institution's commitment to fostering a culture of research, innovation, and excellence in teacher education. I am confident that this book will inspire and motivate our students, faculty, and the broader educational community.

I wish the prospective teachers all the best in their future endeavours and look forward to seeing the positive impact they will make in the world of education.

Dr.L.Kulandai Theresal
Principal

From the Coordinator's Desk…

"Research is formalized curiosity. It is poking and prying with a purpose."

– Zora Neale Hurston

It gives me immense pleasure to present this compilation of action research projects undertaken by our prospective teachers during the academic year 2024–25 under the banner of the Loyola Research Forum (LRF). This volume represents the dedication, reflection, and innovation of our student-teachers as they navigated through real-world classroom challenges, sought practical solutions, and strived to enhance the teaching-learning process.

At Loyola College of Education, we strongly believe that every teacher is a researcher at heart. Action research, in particular, allows teachers to bridge theory and practice by identifying classroom-based issues, implementing interventions, and evaluating the outcomes. Through this process, our prospective teachers have not only refined their pedagogical skills but also developed critical thinking, self-reflection, and a spirit of inquiry.

The academic year 2024–25 has been a testimony to our student-teachers' enthusiasm in embracing research as a continuous learning process. With the support of their mentors and school supervisors during their internship, they explored diverse topics ranging from learning difficulties, motivation strategies, and classroom engagement to inclusive practices, technology integration, and emotional intelligence in education. These projects reflect their commitment to transforming educational experiences for their students.

The compilation titled "Prospective's Perspectives 2025" stands as a testament to their hard work, analytical ability, and evolving professionalism. We hope that this work inspires future batches to pursue action research with equal passion and purpose.

I take this opportunity to extend my heartfelt gratitude to Rev. Dr D. Thomas Alexander, SJ – Secretary, Dr L. Kulandai Theresal – Principal, all faculty members, school mentors, and especially our student-teachers for their invaluable contributions and support in sustaining a culture of research and reflective practice.

Warm regards,
Dr.Y. Elin Shibi,
LRF Coordinator,
Assistant Professor, LCE

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DIFFICULTIES FACED BY STUDENTS IN PERFORMING BASIC DECIMAL OPERATIONS

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ABSTRACT

Mathematics is the study of numbers, patterns, structures and relationships. It serves as the foundation for understanding and solving problems in science, engineering, economics and everyday life. In this action research, main problem identified was the difficulties students faced in class VII in performing basic decimal operations. A sample of four students were closely observed and interviewed. Pre-test and post-test were conducted to investigate the effectiveness of teaching basic decimal operations. Strategies used in this study were grid model, visual model, Japanese method of multiplication were adopted. Findings revealed that the students were able to perform the sums on decimal numbers correctly and the strategies were found to be effective in understanding the decimal operations.

INTRODUCTION

"***Mathematics is not about numbers, equations, computations or algorithms: it is about UNDERSTANDING."***

William Paul Thurston

Mathematics is the study of numbers, patterns, structures and relationships. It serves as the foundation for understanding and solving problems in science, engineering, economics and everyday life. By using logical reasoning, abstract thinking, and quantitative techniques, Mathematics helps us describe and analyze the world around us.

From ancient civilization to modern advancements, Mathematics has played a key role in human progress. It is a universal language that fosters creativity, precision and critical thinking, enabling us to explore new frontiers in technology and innovation.

In Mathematics, decimals are a numerical system used to represent both whole numbers and parts of a whole. They are based on the base-10 system and use a decimal point to separate the whole number part from the fractional part. Decimals are an alternative to fractions for expressing non-whole numbers, offering a clearer and often simpler way to work with values that are less than one.

Decimals are essential in Mathematics because they allow for precise calculations and measurements. They are used in various mathematical operations including addition, subtraction, multiplication and division. Decimals also play a key role in real-world applications such as currency, measurements etc.

Decimals are widely used in everyday life, such as measuring lengths, weights, money and time. They provide a precise way to represent fractions and are crucial in fields like Mathematics, Science and Finance. By understanding decimals, we can perform calculations involving addition, subtraction, multiplication and division with greater accuracy and efficiency.

Understanding decimals helps build a strong foundation for further topics in Mathematics, such as percentages, ratios and algebra.

OBJECTIVES

The main objectives of this action research study are as follows:

- To identify and address the challenges faced by students in understanding mathematical concepts
- To help the students to perform basic decimal operations clearly and correctly
- To identify specific areas where students struggle and design targeted interventions to overcome those challenges
- To develop and test innovative teaching methods
- To develop strategies to correct misconceptions about decimals
- To identify methods to make learning decimals engaging and reduce math anxiety

PROBLEM IDENTIFICATION

The main problem, which is identified was the difficulties students faced in class VII in performing basic decimal operations. A sample of four students were closely observed and interviewed. Some of the probable causes for this problem are outlined below

- Similarities in decimal numbers with zeroes before and after the decimal points
- Lack of strong foundation in the basic concepts
- Students get confused in keeping the decimal point in proper place
- Lack of interest in studying Mathematics as a subject
- Students think that multiplying and dividing decimals is a complicated process
- Fear of getting wrong answers if one step in a solution is incorrect
- Students lack practice of basic arithmetic operations

HYPOTHESIS

There is a significant difference between the pre-test and post-test scores of the VII std students in learning basic decimal operations by implementing different learning techniques.

PRE-TEST

- Students were selected and brought together
- A general discussion was held on the difficulties faced in performing basic decimal operations
- Pre-test was conducted for the students
- The investigator corrected the pre-test answer scripts and recorded the scores
- The investigator analyzed the results that were obtained

ACTION PLAN

Day : 01

- Decimals were introduced to the students
- The students were provided with a clear understanding of what a decimal is and how the decimal point separates the whole number from the fractional part
- A discussion about decimals and their place value was conducted with the students
- An activity, which was arranging the decimals according to their place value was designed to enhance their understanding was also carried out

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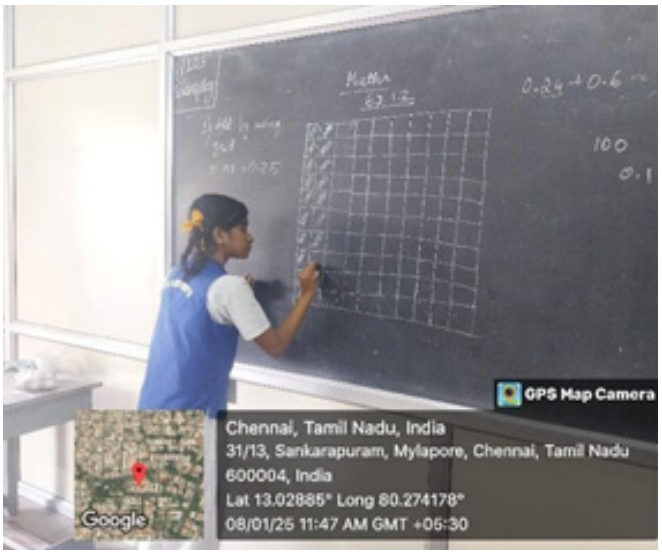
Day : 02

- The basic operations on decimals were taught to the students including addition, subtraction, multiplication and division.
- Real-life situations where these operations will be useful were discussed with the students
- They were also given an opportunity to provide examples of their own

Day : 03 - ADDITION

- The Grid model was introduced to the students for adding decimals
- Decimal grid or area models can be used to understand the process of addition and subtraction using decimal numbers
- Also, the method of adding zeros in the places where there are missing numbers is also taught to the students
- The students were asked to solve the sums on the blackboard



Day : 04 - SUBTRACTION

- The subtraction of decimals was taught to the students using a visual model and also using standard method
- The place value grid model also introduced to the students to get a clear idea about the subtraction of decimals
- Some problems involving subtraction were given to the students, and they were asked to come up with solutions using the methods mentioned above

Day : 05 - MULTIPLICATION

- The Japanese method of multiplication also known as line graph method which provides a visual and descriptive way to multiply numbers were explained to the students
- A new activity which is an art-integrated project which is used to understand and visualize multiplication of decimal numbers is also carried out
- The students were also asked to solve some examples which contains decimal multiplication in the black board

Day : 06 - DIVISION

- Dividing the decimals just like whole numbers and keeping the decimal point at last was explained to the students
- Dividing the dividend by divisor just like whole numbers and then subtract the number of digits after decimal in divisor and dividend
- Then count that number of digits from right to left and put the decimal
- The usual decimal grid method is also used to find the quotient
- The students were provided with a doubt clearing session

Day : 07

- The students were split into groups of 2 and 3 members and were provided time for study
- During this session, it was observed that the peers in the group helped each other clear doubts and solve problems
- The randomly selected were provided with worksheets which contains all the basic decimal operations to solve
- The students worked with interest to solve those problems in the worksheets

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POST TEST

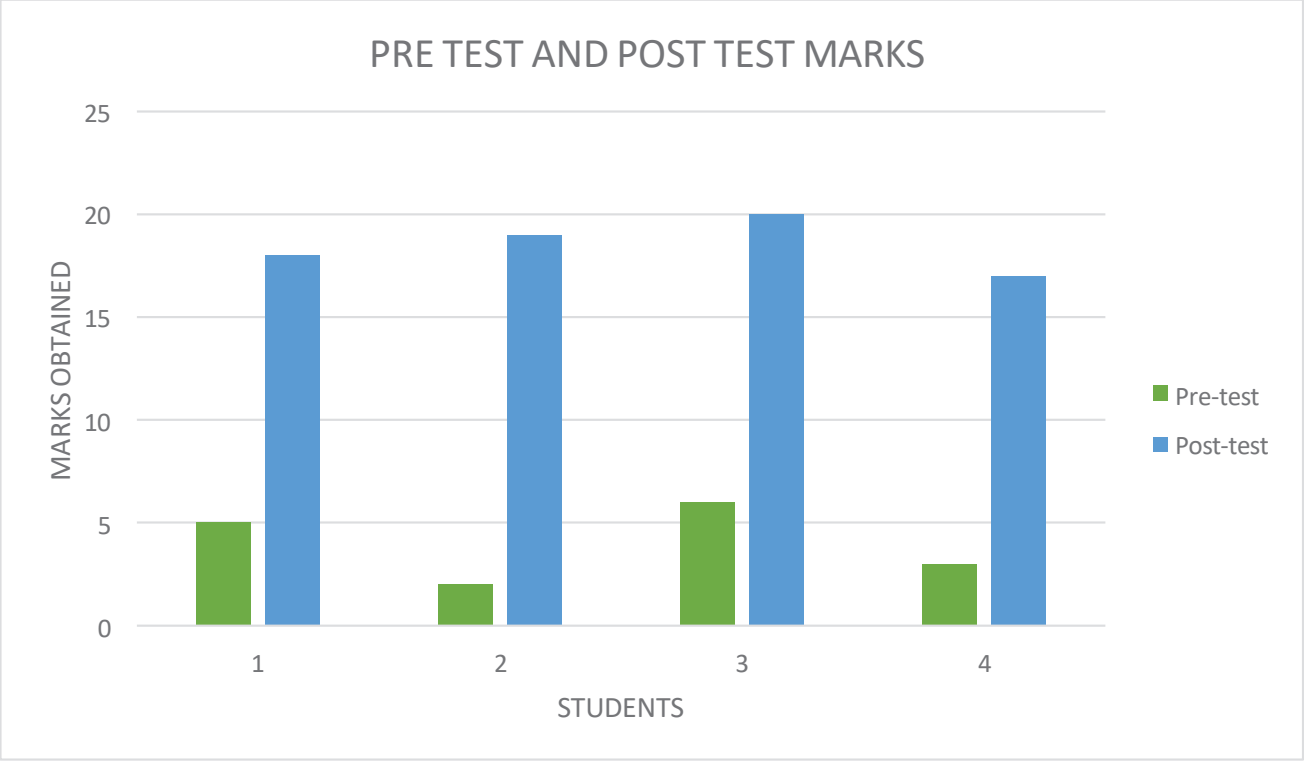
- Post test was conducted for the students by the investigator
- A general discussion was held with the students to gather their opinions about these math sessions and their improvement in the concept
- The posttest answer scripts were corrected and the scores were analyzed

DATA COLLECTION

PRETEST AND POST TEST SCORES
The pre-test and post-test scores are listed below

S.NO	NAMES	PRE-TEST MARKS (20)	POST-TEST MARKS (20)	DIFFERENCE
1	Dharshini	5	18	13
2	Nithya	2	19	17
3	Nandhitha	6	20	14
4	Swathi	3	17	14

GRAPH



INTERPRETATION OF FINDINGS

- All students those who were involved in this remedial, have scored higher marks in the post-test when compared with the pre-test. This suggests that the intervention, teaching method and prac tice applied between the two tests were effective
- **Student 1** started with moderate marks in the pre-test and achieved high marks in the post-test indicating significant improvement
- **Student 2** had low marks in the pre-test and demonstrated substantial progress in the post-test
- **Student 3** has a clear increase from pre-test to post-test marks
- S**tudent 4** showed the largest improvement, starting with very low marks in the pre-test and achieving high scores in the post-test
- The consistent improvement across all the four students indicates that the group benefitted uni formly from the conditions and strategies implemented between the two assessments
- This graph also reflects progress in learning, understanding or skills, and highlights the effective ness of the intervention.

SUGGESTIONS FOR FUTURE STUDY

- The findings of the study suggest focusing on teaching basic operations with decimals to students and the need to expose them to a variety of math problems in the future
- This study can be carried out by using different problem-solving strategies that are appropriate for solving such problems
- The study can be extended by including other difficulties faced by students in Mathematics
- The methodologies like games, shortcuts, TLMs, activities and many new methods can be adopted
- This approach can be applied to students of any level

CONCLUSION

Decimal operations are used in everyday life, from managing money (addition, subtraction) to measuring ingredients in recipes, calculating distances, or determining time. Mastery of these operations helps individuals make accurate calculations in daily tasks. Understanding decimals is the building block for more complex mathematical concepts, including algebra and statistics. Without a strong grasp of decimal operations, students may struggle to comprehend the above mentioned higher-level topics. As students practice manipulating decimals, they develop skills that can be applied to various fields, including engineering, science, economics, and technology.

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EXPLORING THE IMPACT OF CONCEPTUAL UNDERSTANDING ON SOLVING PHYSICS NUMERICAL PROBLEMS

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ABSTRACT

The focus of this action research was to explore the impact of conceptual understanding on solving Physics numerical problems. The sample of the study consists of 10 Physics students chosen from eleventh standard. This plan focuses on systematically improving students 'ability to solve physics numerical problems over a span of 13 days. Strategies like problem-based learning, group work, visual aids and simulations, scaffold problem solving and conceptual mapping were adopted to make the students understand the concepts easily to solve Physics problems. Pre-test and post-test were conducted to assess the effectiveness of strategies. Findings proved that the techniques used for teaching Physics problems was effective and improved the students' scores in the post-test.

INTRODUCTION

Physics is a subject that apply both their mathematical skills and their conceptual understanding of physical principles. While numerical problem-solving is a core component of physics Education, students often face difficulty in bridging the gap between abstract concepts and the application of these ideas to solve real-world problems. In many cases, students may be able to perform calculations and follow formulas but still struggle to grasp the underlying principles that make these solutions meaningful. This disconnects between conceptual understanding and problem-solving abilities can hinder students' overall performance and comprehension in physics.

Action research, in the context of education, involves teachers actively investigating and reflecting on their own practices to improve teaching and learning outcomes. In this study, the focus is on **"Exploring the impact of conceptual understanding on solving physics numerical problems."** The research aims to examine how a deeper understanding of core physics concepts influences students' problem-solving strategies and performance in solving complex numerical problems.

OBJECTIVES

This action research focuses on the following objectives:

- **Identify the level of conceptual understanding:** Assess students' grasp of key physics principles beyond formula application.
- **Investigate the relationship between conceptual knowledge and problem- solving:** Explore how conceptual understanding impacts students' ability to solve numerical problems and apply knowledge to unfamiliar scenarios.
- **Implement targeted interventions:** Apply teaching strategies such as interactive discussions, vi sual aids, and real-world tasks to improve conceptual understanding.
- **Evaluate the impact on problem-solving:** Measure how enhanced conceptual understanding af fects students' accuracy and efficiency in solving physics problems.

By examining this relationship, the study aims to provide practical insights for educators on ho wstrengtheningconceptualclarityinphysicscanimproveproblem-solvingskillsandbetter prepare students for advanced studies.

NEED OF THE STUDY

This study is essential due to the observed gap between students' ability to solve physics numerical problems and their understanding of the underlying concepts. During my 16-week internship with 11th-standard students, I noticed that many students could follow problem- solving steps but struggled to grasp the fundamental principles that make these steps meaningful. This lack of conceptual understanding often hindered their ability to apply knowledge to unfamiliar problems.

By focusing on improving conceptual understanding, this research aims to bridge the gap between theory and application, enhancing students' problem-solving skills and critical thinking abilities. Strengthening conceptual understanding can lead to better learning outcomes and more effective teaching practices in physics. Ultimately, the study addresses the need to help students gain a deeper, lasting comprehension of physics concepts, which will support their academic success and future learning in the subject.

PROBABLE CAUSES FOR THE PROBLEM

- **Surface-Level Learning:** Focusing on memorizing formulas without understanding underlying concepts.
- **Weak Connection Between Theory and Practice:** Difficulty applying abstract concepts to real-world problems.
- **Limited Conceptual Instruction:** Emphasis on procedures rather than the principles behind them.
- Over emphasis on Numerical Procedures: Focusing more on calculations than understanding the concepts.
- **Lack of Active Engagement:** Insufficient opportunities for students to explore and discuss concepts actively.
- **Misconceptions:** Incorrect or incomplete understanding of key physics principles.
- **Limited Exposure to Real-World Scenarios:** Lack of practice in applying concepts to practical situations.

OBJECTIVES OF THE ACTION RESEARCH

- To identify the relationship between conceptual understanding and problem- solving skills.
- To improve students' conceptual understanding in physics.
- To develop effective teaching strategies that foster conceptual understanding.
- To evaluate the effectiveness of conceptual teaching methods in improving problem-solving skills.
- To assess the impact of conceptual teaching on student motivation and engagement.
- To identify specific conceptual barriers in solving physics numerical problems.
- To measure the improvement in students' problem-solving skills over time.
- To provide feedback to educators for future teaching strategies.
- To foster a deeper connection between theory and application.

HYPOTHESIS OF THE ACTION RESEARCH

The hypothesis of this action research is that students with a stronger conceptual understanding of physics will perform better in solving numerical problems. It is expected that enhancing students' conceptual grasp of physics will lead to an improvement in their problem- solving skills overtime. By incorporating teaching strategies focused on deepening conceptual understanding, students' engagement and motivation in solving physics problems are likely to increase. Furthermore, it is hypothesized that students who undergo

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conceptual teaching interventions will show a significant reduction in common misconceptions and errors while solving physics numerical problems. Overall, the research aims to test whether there is a positive correlation between conceptual understanding and the accuracy with which 11th- standard students solve physics problems.

STRATEGIES ADOPTED

1. Conceptual Teaching Approach
2. Active Learning(Problem-based learning, group work)
3. Visual Aids and Simulations
4. Scaffold Problem Solving
5. Peer Teaching
6. Formative Assessments and Feedback
7. Reflection and Self-Assessment
8. Conceptual Mapping

PRETEST

The pretest was conducted with 11th-standard students to assess their initial understanding of physics concepts and their ability to solve numerical problems. It included both conceptual questions and numerical problems, aiming to identify gaps in knowledge and common misconceptions. The results of the pretest provided a baseline for measuring the effectiveness of the intervention designed to improve students' conceptual understanding and problem-solving skills.

PLAN OF ACTION

Day 1 : ***Pretest (Numerical Problems)***

- Administer a pretest consisting of numerical problems to assess students' current ability to solve physics problems and identify common errors or misconceptions.

Day 2 & 3 : ***Introduction to Problem-Solving Techniques***

- Teach strategies for approaching numerical problems, including breaking down the problem, identifying known and unknowns, and selecting appropriate formulas.
- Practice solving simple numerical problems as a class.

Day 4 & 5 : ***Scaffolded Problem Solving***

- Provide students with moderately difficult problems that require a step-by-step approach.
- Offer guided support to students while solving problems in groups, ensuring they focus on understanding the concepts behind the formulas.

Day 6 & 7 : ***Independent Practice***

- Assign students a set of individual numerical problems for practice.
- Students will solve the problems independently, applying the techniques learned so far.

Day 8 : ***Peer Teaching and Group Problem Solving***

- Have students work in pairs or small groups to solve more complex numerical problems.Encourage peer teaching to reinforce understanding and expose students to different problem-solving methods.

Day 9 : ***Formative Assessment***

- Administer a brief quiz or worksheet with numerical problems to monitor progress.
- Provide feedback on common mistakes and offer additional practice for problem areas.

Day 10 & 11 : ***Advanced Problem-Solving and Conceptual Application***

- Introduce advanced problems that require the integration of multiple concepts.
- Guide students to apply their conceptual understanding when solving these more complex problems.

Day 12 : ***Post test (Numerical Problems)***

- Administer a post-test consisting of numerical problems to assess students' improvement in problem-solving skills.

Day 13 : ***Data Analysis and Reflection***

- Analysepretestandposttestresultstoevaluatetheeffectivenessoftheintervention in improving students' ability to solve numerical problems.

This plan focuses on systematically improving students 'ability to solve physics numerical problems over a span of 13 days.

POSTTEST

The post-test was administered after the intervention to assess students' improvement in solving physics numerical problems. It included a series of problems to evaluate their ability to apply conceptual knowledge and problem-solving strategies. The results of the post-test were compared with the pretest to measure progress and identify areas of improvement.

STATISTICAL ANALYSIS AND GRAPHICAL REPRESENTATION

Name of the Students	Pre-test score	Post-test score	Differences
Akshaya.S	15	38	23
Bhuvaneshwari.B	18	42	24
Gayathiri.S	14	45	31
Madhushree.G	19	45	26
NabiraParveen.V	20	46	26
Natchathra.G	12	38	26
Oviya.P	22	47	25
Pavithra.G	18	42	24
Prema.S	15	40	25
Sithika.V	18	46	28

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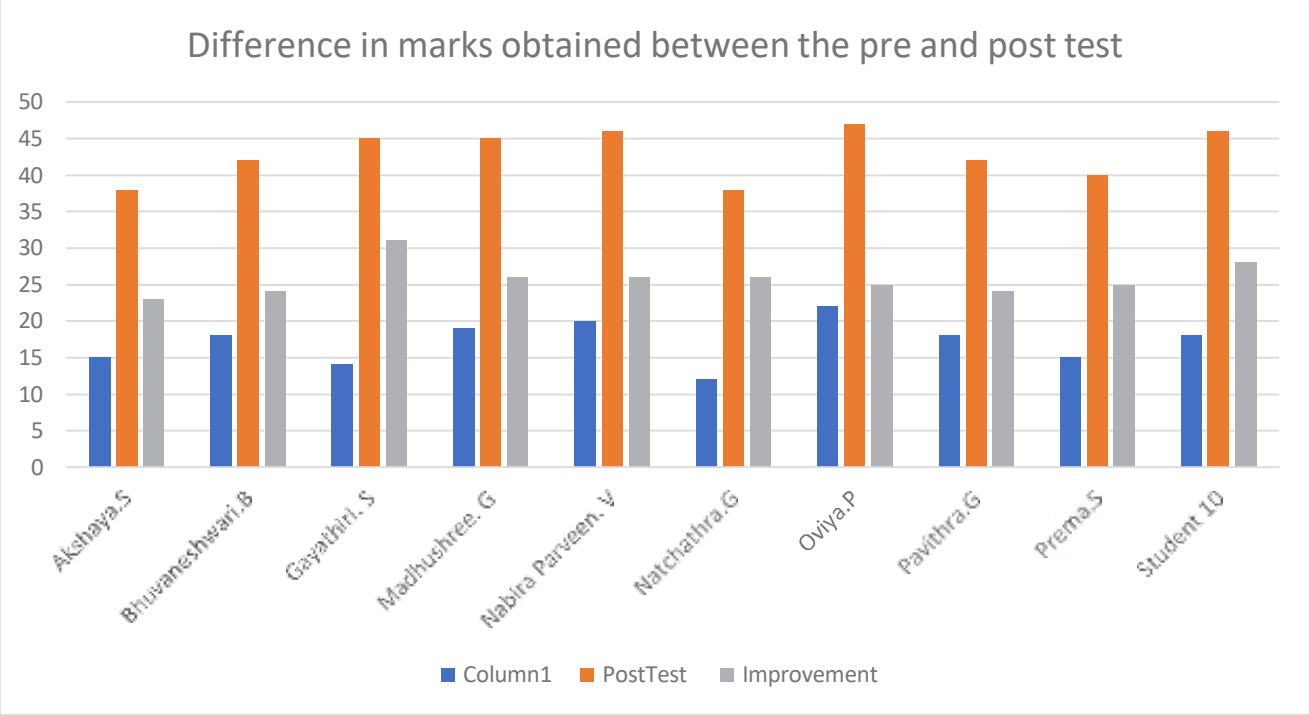

INTERPRETATION

The data shows a clear improvement in students' performance after focusing on conceptual understanding in physics. All10 students improved their scores, with gains ranging from 23 to 31 marks. The average improvement was around 25.8, indicating the strategy was effective for students at all levels. This suggests that enhancing conceptual clarity significantly helps students solve numerical problems better.

FINDINGS OF THE STUDY

- All students showed significant improvement in post-test scores after intervention.
- The average improvement was 25.8marks, indicating strong effectiveness.
- Students with lower pre test scores showed the highest gains ,showing the method benefits weaker students too.
- Conceptual understanding positively impacted students' ability to solve numerical problems in physics.
- The strategy proved effective across all levels of students' performance.

INFERENCE

Strengthening conceptual understanding in physics significantly improves students' ability to solve numerical problems. The consistent improvement in test scores confirms that conceptual clarity enhances problem-solving skills, regardless of the student's initial performance level.

SUGGESTION FOR FURTHER IMPLICATIONS

- Integrate conceptual teaching methods regularly in physics lessons.
- Use real-life examples and visual aids to strengthen understanding.
- Conduct similar studies in other subjects like Chemistry and Mathematics.
- Provide targeted support for low-performing students using conceptual approaches.
- Encourage peer discussions and group activities to enhance clarity in concept.

CONCLUSION

The study clearly shows that enhancing conceptual understanding significantly improves students' ability to solve numerical problems in physics. The consistent improvement in scores proves that concept-based teaching is an effective strategy to boost academic performance and should be incorporated into regular classroom practices.

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ROLE OF GRAMMAR IN EFFECTIVE COMMUNICATION

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ABSTRACT

Grammar is an essential part of effective communication. It helps people express their ideas clearly and understand others better. Without proper grammar, messages can become confusing or misunderstood. However, many students find grammar difficult to learn, especially when it is taught through memorization and traditional worksheets. A sample of 10 students of class GRADE in St. Matthias Anglo Indian Higher Secondary School were the sample of the research study. Pre-test and post-test were conducted for the students before and after the implementation of the strategies. Techniques adopted were teaching and learning materials, digital teaching aid and chalkboard and game-based learning platform Kahoot! Results revealed that the strategies adopted were effective and subsequently improved the scores of the students.

INTRODUCTION

"Grammar is the system of a language. It is the structure that helps us share our thoughts clearly."
— David Crystal.

"Action research is a systematic inquiry that bridges pedagogy and practice, empowering educators to diagnose challenges, implement evidence-based strategies, and transform learning outcomes through iterative reflection." Action research is a method that allows teachers to study a problem in their classroom and take action to improve it. It combines research with real teaching practices and focuses on bringing positive change. There are two main types of action research: Participatory, which involves working together with others, and Practical, which focuses on solving day-to-day classroom challenges.

Grammar is an essential part of effective communication. It helps people express their ideas clearly and understand others better. Without proper grammar, messages can become confusing or misunderstood. However, many students find grammar difficult to learn, especially when it is taught through memorization and traditional worksheets. This action research focuses on improving students' grammar skills using more engaging and meaningful strategies. The study explored the use of visual aids, educational games, and pre- and post-quizzes to support grammar learning in a more interactive way.

Visual aids helped make grammar rules easier to understand. Games provided students with opportunities to practice grammar in a fun and relaxed setting. Pre- and post-quizzes were used to measure students' progress and assess the impact of the strategies used. Through classroom observations, student feedback, and quiz results, this research aims to show that using active and creative methods can help students improve their grammar and communicate more clearly and confidently.

Grammar is a fundamental system of rules that govern the structure and composition of language, ensuring that words are organized in a way that conveys clear and accurate meaning. Proficiency in grammar is essential for effective communication, as it enables individuals to express their ideas precisely and coherently in both written and spoken forms. A solid understanding of grammar not only enhances clarity but also supports the development of reading comprehension and writing accuracy. In language education, grammar serves as the foundation for students to develop their linguistic abilities, fostering confidence and competence in their ability to communicate ideas clearly while avoiding ambiguity and misinterpretation.

NEED OF STUDY

English grammar is often regarded as a complex and challenging aspect of language learning due to its intricate rules and exceptions. For many learners, mastering grammar can be overwhelming, particularly when it comes to applying grammatical principles consistently in both written and spoken communication. This challenge is exacerbated by a lack of contextual understanding and the limited use of interactive, engaging teaching methods. The difficulties students face in mastering grammar can hinder their ability to communicate effectively, leading to confusion, misinterpretation, and lack of confidence.

This research seeks to investigate the specific barriers students encounter in acquiring grammatical proficiency, focusing on the cognitive processes involved in understanding and applying grammatical rules. Additionally, it examines the impact of improved grammar skills on overall language development, with particular emphasis on reading comprehension, writing accuracy, and verbal expression.

CAUSES OF THE PROBLEM

A sample of 10 students of class GRADE in St. Matthias Anglo Indian Higher Secondary School was closely observed and personally interviewed. Some of the probable causes for the problem are given below.

- Complexity of grammar rules and exceptions leading to confusion in application.
- Lack of engagement and motivation during grammar lessons, often due to the perceived difficulty of the subject.
- Insufficient practice opportunities, particularly for applying grammar in real-life contexts such as speaking and writing.
- Weak foundational knowledge of grammatical concepts, making it difficult for students to build on more advanced topics.
- Over-reliance on rote memorization, which does not promote a deeper understanding of grammar or its practical use in communication.
- The interference of native language structures affecting students' ability to correctly apply English grammar rules.
- Limited exposure to authentic language use, hindering the development of natural grammatical intuition needed for fluent communication.

OBJECTIVES OF THIS ACTION RESEARCH

The main objectives of this action research are:

- To identify the specific challenges students' face in understanding and applying grammar rules in both written and spoken English.
- To examine how a lack of grammatical understanding contributes to errors in sentence structure, clarity, and overall communication.
- To develop and implement effective teaching strategies that actively engage students in mastering grammar concepts, focusing on real-life application in communication.
- To enhance students' grammatical proficiency through interactive learning methods such as visual aids, games, and peer collaboration, leading to improved writing and speaking skills.
- To evaluate the impact of grammar instruction on students' ability to communicate clearly and confidently in various contexts, with a focus on improving both accuracy and fluency.

HYPOTHESIS OF THIS ACTION RESEARCH

Significant positive knowledge inculcation in learning and differentiating homophones is evident among the high school students.

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TOOLS

The following resources were used to carry out the action research:

1. Questionnaire
2. Teaching and learning materials
3. Digital teaching aid and Chalkboard
4. Game-based learning platform Kahoot!

PLAN OF ACTION

Day 1: ***Introduction to Grammar and Communication***

Method: Storytelling & Simple Examples

- Explain the importance of grammar in effective communication through a simple story.
- Show how proper grammar enhances clarity and prevents misunderstandings (e.g., the difference between "Let's eat, Grandma!" vs. "Let's eat Grandma!").
- Pre-Test: Administer a short grammar quiz to assess students' baseline understanding of grammar concepts. Use Kahoot! for a fun, interactive pre-test.
- Have students share common grammar mistakes they've encountered or made.

Day 2: ***Understanding Sentence Structure***

Method: Visual Learning through Drawings & Models

- Use diagrams to illustrate sentence structure (subject-verb-object).
- Show examples of correct and incorrect sentence structures on the board.
- Create flashcards with sentence structures and have students arrange them correctly.

Day 3: ***Parts of Speech***

Method: Activity-Based Learning

- Explain the different parts of speech (nouns, verbs, adjectives, etc.) using simple examples.
- Use color-coded word cards for students to sort into the correct part of speech.
- Have students act out different parts of speech (e.g., playing a verb or noun).

Day 4: ***Understanding Punctuation***

Method: Inquiry-Based Learning

- Guide students to explore the role of punctuation in sentence clarity.
- Provide examples with and without punctuation, asking students to identify differences in meaning.
- Have students create lists of common punctuation mistakes they encounter.

Day 5: ***Grammatical Errors in Everyday Life***

Method: Real-Life Applications

- Show students real-life examples (from newspapers, ads, etc.) with common grammatical errors.
- Have students correct the errors in pairs or groups.
- Discuss how grammatical mistakes affect communication in different contexts.

Day 6: ***Learning with Technology & Videos***

Method: Digital Learning

- Introduce educational grammar games and apps (e.g., Grammarly, Kahoot!) to practice grammar interactively.
- Show educational videos explaining common grammar issues (sentence fragments, subject-verb agreement).
- Have students use grammar correction tools to check their written work.

Day 7: ***Grammar through Games and Quizzes***

Method: Gamification

- Organize a Kahoot! quiz on the grammar topics covered so far (e.g., sentence structure, parts of speech, punctuation).
- Set up a team-based quiz competition using Kahoot! to engage students with grammar topics.
- Make the students find grammatical errors in given texts.

Day 8: ***Learning from Each Other***

Method: Peer Teaching & Group Work

- Divide students into small groups to research and present on different grammar topics (e.g., tenses, modifiers).
- Have students write short dialogues or skits using specific grammar rules, then perform them for the class.
- Implement peer review sessions where students evaluate and correct each other's writing.

Day 9: ***Applying Grammar in Writing***

Method: Higher-Order Thinking

- Challenge students to write short stories or essays that apply the grammar rules they've learned.
- Have students exchange their work and identify grammatical errors.
- Provide example paragraphs with common grammar mistakes for students to correct in pairs.

Day 10: ***Revision & Confidence Boosting***

Method: Mixed Approach

- Review key grammar concepts through flashcards and group discussions.
- Organize a final Kahoot! quiz to assess students' understanding and reinforce correct grammar usage.
- Post-Test: Administer a post-test via Kahoot! to evaluate students' progress and measure improvements in their grammar skills.
- Encourage students to share their thoughts on how grammar has improved their communication skills and boost their confidence.

STATISTICAL ANALYSIS

Statistical evidence is essential in supporting the researcher's interpretation of the results obtained after conducting the research on the selected topic using the designed or adapted tools. In this action research, the performance of students in grammar, specifically in the use of correct grammatical structures and sentence formation, is analyzed by comparing pre-test and post-test scores.

The comparison focuses on the improvement in students' understanding and application of grammar rules learned during the intervention. By analyzing the score differences between the pre-test and post-test,

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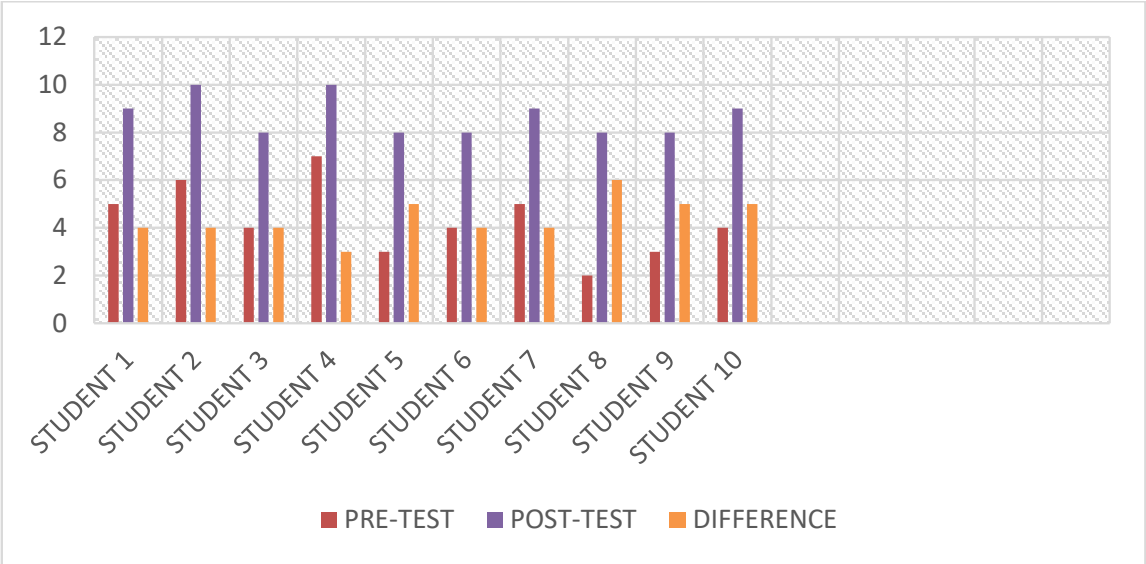
the researcher aims to evaluate the effectiveness of the instructional methods used to improve the students' grammar skills.

The following table (Table 1) presents the comparison of pre-test and post-test scores, showcasing the improvement in students' grammar knowledge, including their ability to identify and apply correct grammar rules in both written and spoken contexts.

Table 1
Pre-Test and Post-Test Scores

S.NO	NAME OF THE STUDENT	PRE-TEST	POST-TEST	DIFFERENCE
1	STUDENT 1	5	9	4
2	STUDENT 2	6	10	4
3	STUDENT 3	4	8	4
4	STUDENT 4	7	10	3
5	STUDENT 5	3	8	5
6	STUDENT 6	4	8	4
7	STUDENT 7	5	9	4
8	STUDENT 8	2	8	6
9	STUDENT 9	3	8	5
10	STUDENT 10	4	9	5

Figure 1
Comparison of Pre-Test and Post-Test



DISCUSSION AND INTERPRETATION

From Table 1 and Figure 1, it is evident that there was a significant positive improvement in the test scores of the students. This indicates that the strategies and methods implemented in this action research were effective in enhancing students' grammar skills, particularly in their ability to apply grammatical rules correctly in writing and communication.

The notable progress observed suggests that the instructional methods—such as interactive activities, peer teaching, and the use of digital tools—were successful in improving students' understanding and application of grammar concepts. The students demonstrated a better grasp of sentence structure, punctuation, parts of speech, and other key grammar elements, as evidenced by the comparison of pre-test and post-test scores.

This improvement confirms that the objectives of this action research were successfully achieved. By focusing on the essential grammar rules and using targeted teaching strategies, the study has shown that students can make measurable progress in enhancing their grammar proficiency. The results highlight the importance of engaging, interactive, and diverse methods in teaching grammar, leading to stronger writing skills and more effective communication overall.

DELIMITATIONS OF THE STUDY

- Due to the time constraint the minimal aspects of were focused.
- Sporadic attendance of the students.
- The careless attitude and interest of students.

SUGGESTIONS FOR FUTURE IMPLEMENTATION

- The study can be expanded by allocating more time for grammar-focused lessons within the academic schedule, allowing for more in-depth coverage of key concepts.
- Flexible learning approaches, such as after-school sessions or weekend workshops, can be introduced to provide additional practice and support for students outside of regular class hours.
- The framework can be enhanced by incorporating more technology-based tools, such as grammar apps, online quizzes, and interactive platforms, to further engage students and reinforce their grammar skills.
- Collaborative learning methods, such as peer tutoring and group activities, can be implemented to encourage student interaction and enhance learning through shared knowledge and experience.

CONCLUSION

English plays a crucial role in effective communication, academic achievement, and global interaction. As a language with complex grammar rules and diverse structures, it presents various challenges for learners. This action research aimed to improve students' grammar skills by focusing on the correct application of grammatical rules in both written and spoken language. The findings demonstrated a significant improvement in students' understanding and application of grammar, particularly in sentence structure, punctuation, and parts of speech. By incorporating interactive activities, digital tools, and real-life examples, teachers can make grammar learning more engaging and accessible, ultimately enhancing students' communication skills, language proficiency, and overall academic performance.

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PROMOTING ACTIVE LEARNING METHOD BY ADAPTING ACTIVITY-BASED INSTRUCTION

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ABSTRACT

Active learning is a teaching method where students are actively involved in the learning process instead of just listening passively to a lecture. This approach encourages students to participate, think critically and apply for their knowledge. Activity based instruction is one way to promote active learnings it involves using hands on activities, group work and problem-solving tasks that help students engage with the material in a more meaningful way. By adapting activity-based instruction, teachers can create an environment where students not only learn facts but also develop skills like communication, teamwork, and critical thinking. This method makes learning more interactive, fun and effective. This paper explores the effectiveness of promoting active learning by adapting activity-based instruction in various educational settings. ABI encourages students to take ownership of their learning and develop deeper understanding. The findings suggest that adopting ABI can significantly improve learning outcomes, making education more dynamic and student- centred.

INTRODUCTION

"Commerce is a game of skill which everyone cannot play and few can play well"

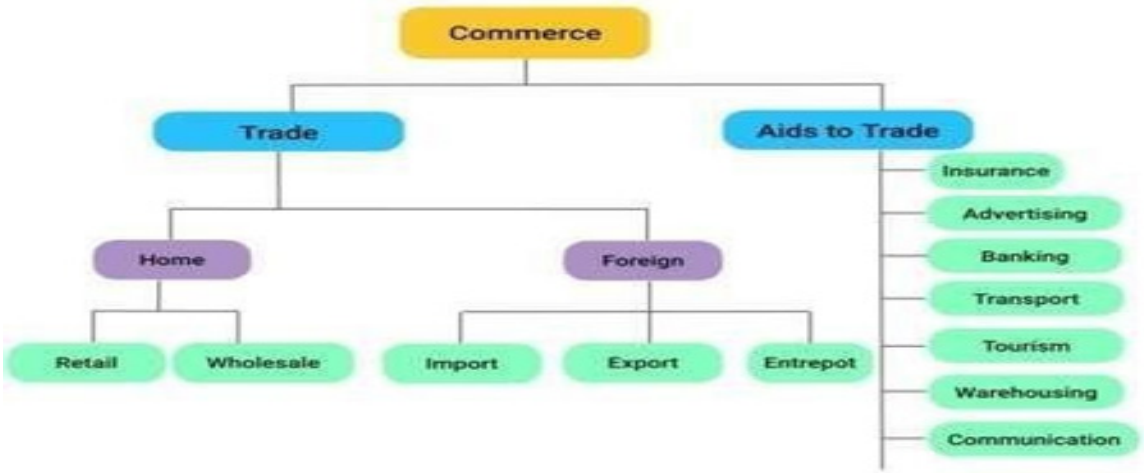
– Ralph Waldo Emerson

Commerce is the exchange of goods and services among two or more parties which often requires their transportation from one place to another (locally, nationally, or transnationally) especially on a large scale. Commerce cannot be concluded as a business but it is a part of business.

In modern day world, the need for commerce and its importance has grown wide. With the advent of technological advancement in various fields, it has even facilitated to improve trading and marketing activities for a business to survive and thrive in the market.

As students of commerce, it's important to know the branches of commerce

BRANCHES OF COMMERCE



The Students of Commerce can easily relate the concepts with real-life examples and can gain more understanding and deep knowledge on those concepts but still for academic purpose and to get maximum marks in examination they start memorizing the concepts without knowing its original meaning and therein they lack the purpose of education. This research will help to identify the understanding and memory level of students in case of rote memorization as against active learning methods through which better understanding can be attained. Active learning methodology such as role play, brainstorming, written tests and mind games has been given to the students to help them attain conceptual clarity in the subject which they are learning.

DEFINITION:

James Stephenson has defined commerce as "an organized system for the exchange of commodities and distribution of finished productions"

According to **Evelyn Thomas,** "Commercial occupation deals with the buying and selling of goods, the exchange of commodities and distribution of the finished goods."

BASIC TERMINOLOGIES IN COMMERCE

Some of the basic terminologies in Commerce which have been taken up for research purpose highlighted below:

1. **Trade -** Trade refers to the sale, transfer or exchange of goods. It is an activity by which buyers and sellers exchange useful goods and services for mutual advantage. Trade is the process of by which goods are taken from the source of production to the consumers. The persons engaged in trade are called „traders" or „middlemen". A trader acts as an intermediary between producers and consumers. Trade may be broadly classified into two parts: Home Trade, and Foreign Trade.
2. **Home Trade** - Home trade consists of buying and selling goods within the boundaries of a country. Payments for such sale are made in national currency directly or through banks and the internal transportation system is utilized for the movement of goods. It may be further sub-divided into wholesale and retail trade.
3. **Wholesale Trade -** It consists in buying in lots from producers and then selling them to the **l**arge number of retailers. It serves as a link between the producers and the retailers.
4. **Retail Trade -** It involves purchase if goods from the wholesaler or the producer directly and sale those goods to the large number of consumers in **small lots.** Hence, it is the final stage of distribution.

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5. **Foreign Trade -** Foreign trade involves purchase and sale of goods between different countries. For example, trade carried on between Kathmandu and Tokyo is foreign trade. Two countries are involved in foreign trade. It may be further sun-divided into import, export and entreport trade. Import Trade implies purchase of goods from a foreign country. Export Trade on the other hand, implies sale of goods to other countries. Entreport Trade is only re-exporting. A country imports something not for own use but to export it to other countries is known as entreport trade.
6. **Peddlers -** Peddlers are individuals who sell their goods by carrying on their head or shoulders moving from place to place on foot.
7. **Franchisee -** The individual who acquires the right to operate the business or use the trademark of the seller is known as the franchisee.
8. **Factoring -** Factoring is derived from a Latin term "facere" which means 'to make or do'. Factoring is an arrangement wherein the trade debts of a company are sold to a financial institution at a discount. The factor is an agent who buys the accounts receivables (Debtors and Bills Receivables) of a firm and provides finance to a firm to meet its working capital requirements. The main advantage of factoring is that the small or big business firm receives short term finance (working capital) to meet day-to-day payments.
9. **Logistics -** Logistics can be viewed as a logical extension of transportation and related areas to achieve an efficient and effective goods distribution system.
10. **Agreement 2(e) -** Every promise and set of promises forming consideration for each other is an agreement. In short,

Agreement = Offer/ Proposal + Acceptance

11. **Contract 2(h) -** An agreement enforceable by Law is a Contract.

Contract = Agreement + Enforceability by law

12. **Implied Contract -** The implied contract is one, which is not expressly written but understood by the conduct of parties. Where the proposal or acceptance of any promise is made otherwise than in words, the promise is said to be implied.
13. **Commercial Bank -** Banks which accepts deposits from the public and grant loans to traders, individuals, agriculture, industries and transport in order to earn profit is called as Commercial Bank.
14. **Development Bank -** The bank which grants huge finance for expansion and modernization of big industries is called as Development Bank.
15. **Fixed Deposit Account -** When certain sum of money is deposited for a fixed period for a fixed rate of interest is called as fixed deposit account.
16. **Educational Loan-** When loan is provided to students for studying undergraduate or postgraduate or professional courses is called as Educational Loan.
17. **Indemnity -** Indemnity means security or compensation against loss or damages. In insurance, the insured would be compensated with the amount equivalent to the actual loss and not the amount exceeding the loss. This principle ensures that the insured does not make any profit out of the insurance. This principle of indemnity is applicable to property insurance alone.
18. **Insurance -** Insurance is a contract between the insurer and the insured under which the insurer undertakes to compensate the insured for the loss arising from the risk insured against, in consideration the insured agrees to pay premium regularly
19. **Insured -** The person whose risk insured is called the insured or assured.
20. **Insurer -** The person who agrees to compensate the loss arising from the risk is called the insurer or assurer (or underwriter) .

NEED OF THE STUDY

- To know the level of interest of students in learning commerce
- To know the student's ability in understanding the abstract terms.
- To check the conceptual clarity of students in understanding commerce terminologies by adapting Activity Based Instruction (ABI).
- To help reduce rote memorization and promote active learning
- To enable the students to interact with the learning material and to enhance the teaching learning experience.
- To create a conducive teaching-learning experience through interaction of students with concepts and conducting activities among the students.
- To encourage active leaning methods among students.
- To enable the students to link concepts to real-life examples to promote effective teaching-learning environment.
- To analyse the probable cause for rote memorization and rectify through adopting active learning methodology.

PROBABLE CAUSE FOR THE PROBLEM

1. Students lack interest in learning theoretical subjects in general.
2. The abstract terminology given to certain concepts in commerce hinders the students in understanding the full meaning.
3. Too much concepts in a single textbook put them into pressure of remembering each and every concept at a time.
4. Use of Jorgen in the texts for explaining certain concepts make the students to go into rote memorizing.
5. Not interested in understanding the concepts instead going for rote memorization.
6. Verbal teaching often results in lower retention and understanding among the students.

OBJECTIVES OF THE ACTION RESEARCH

- To enable the students to switch the learning style from rote memorization to active learning in case of learning commerce
- To engage the students to take part in the process of realizing the commerce concepts by adapting activity-based instructions method.
- To measure the level of conceptual clarity attained after introducing active learning methods into normal classroom setting in the subject of commerce for class XI B-1 students.

HYPOTHESIS OF THE ACTION RESEARCH

H0: There is no significant relationship between level of understanding of students and the use of active learning methods in normal classroom setting.

H1: There is a significant relationship between level of understanding of students and the of use active learning methods in normal classroom setting.

TOOLS

- Questionnaire comprising all the important concepts from commerce for standard XI has been prepared by the investigator.
- Teaching- Learning Material.

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STRATEGIES ADOPTED

i. Debate
ii. Brainstorming
iii. Group Discussion
iv. Gaming method
v. Innovative methodology
vi. Observation method
vii. Role Play

PLAN OF ACTION

Day 1 : Pre-Test

- Pre-test was conducted to the students
- The teacher corrected the papers and analyzed the weakness
- Further strategies to be adopted were designed

Day 2 : Debate

- The students were asked to do a debate based on the topic "rote learning v/s meaningful learning".
- The students were divided into 2 groups.
- One group start with their point for the topic and other group against the topic.
- Finally they end with a thought-provoking statement.

Day 3 : Brain Storming

- The students were divided into 4 groups as A, B, C and D.
- One student from each group were called and made to stand in front of the black board and were given the questions for the quiz.
- Each wrote their answers in the given space and the answers was evaluated.
- The answers were given correct explanation at the end.

Day 4 : Group Discussion

- The students were divided into 2 groups
- The students were given a topic on "marketing strategies" and were asked to discuss on it within a given time.
- Students enjoyed discussing the points to their peers and completing the discussion within the given time.

Day 5 : Gaming Method

- The gaming method simulates a barter system where participants trade goods (represented by UNO cards) without using money.
- The objective was that players must trade to obtain the best set of cards.
- The game ends when players reach their trading goals or after a set time limit.
- The winner is the one who best achieves the objective (e.g., completes a full set first).

Day 6 : Innovative Methodology

- The students were made to use laptops as an innovative methodology.
- They were made to attend quiz through online mode using laptop.
- Through this the students were learning to access various resources making them a powerful tool for innovative learning.

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Day 7 : Observation Method

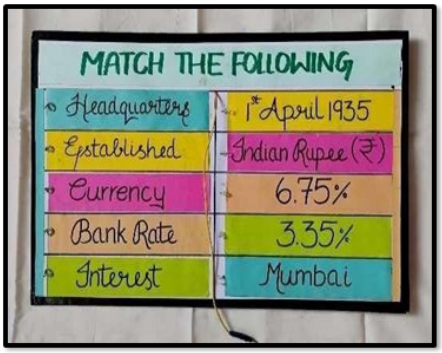
- The students were made to observe maps for exploring different places
- It is an excellent way to visually explore and analyze geographic, social, environmental, and cultural patterns.
- Using observation method students were able to understand to locate various palces by their own.

Day 8 : Role Play

- The students were given a situation or a topic like “classroom scenario” where they should enact that role accordingly.
- It helps students to experience situations, practice skills, and explore different perspectives.
- It improves communication and builds confidence in handling real-life challenges.

Day 9 : Statement To Expressions

- To convert statements to expressions the students were asked to remember the keywords along with their meaning.
- To make them familiar with key word charts were used.



POST TEST

Post test was conducted in the classroom to test the knowledge of the students.

STATISTICAL ANALYSIS

Table 1 : Showing comparison between Pre and Post Test scores

S.NO	NAME OF THE STUDENTS	PRE-TEST SCORE (20 MARKS)	POST-TEST SCORE (20 MARKS)	DIFFERENCE (PRE & POST TEST)
1	AKASH R	4	15	11
2	KISHORE KANNA R	3	16	13
3	DHARANI KUMAR	3	16	13
4	KUMARESAN V	1	10	9
5	NISANTH P	1	12	11
6	SANTHOSH KU-MAR S	2	18	16
7	AVINASH A	3	15	12
8	NARANI KUMAR M	3	18	15
9	KANISH I	2	17	15
10	DEEPAN D	4	11	7
11	KARAN P	1	10	9
12	PRASANNA P J	1	13	12
13	DHANUSH I	3	16	13
14	SUBESH P	2	13	11
15	MOHEETH V	2	12	10
16	RITHICK PALAN I	2	16	14
17	JAGAN N R	4	14	10
18	ABDUL MUKEETH S	2	15	13

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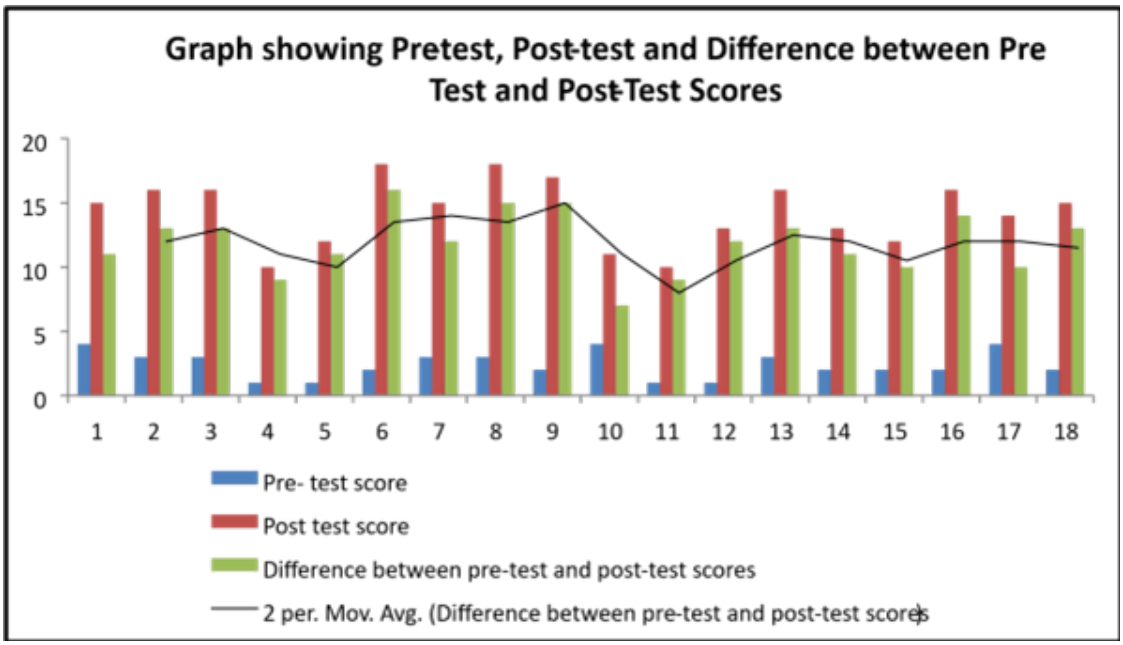
INTERPRETATION

From **Table 1** it is very clear that there is more deviation from pre-test to post-test which signifies that there is a significant change in the student's level of understanding by adopting active learning methods which has been reflected through their marks in pre and post-test.

Diagram showing difference between Pre Test and Post Test scores



LIMITATIONS OF THE STUDY

- Due to time constraint all the concepts were not covered with relevant active learning tools and strategies.
- specialized methods and techniques will require a lot of time.

CONCLUSION

The concepts in commerce can be understood with relevant examples which is given in text book. When new methods such as role play, field study, activities like puzzle, match board etc and group discussions will enable the students to get more involved in the process of understanding and learning the concepts.

As long as the students start rote memorizing, they will be happy as they are offered good marks. The student's community such as their friends and family, their parents also support their students and encourage them to score highest marks but forget to give them conceptual clarity. To attain the fruit of education a student should first understand the concept, relate with real-life examples, engage themselves with the teaching-learning materials and thus leads to quality education with sound knowledge in the areas/ fields which they have chosen. The role of teacher is significant wherein they should not merely act as information provider but also transmitter of knowledge along with conceptual clarity which could be effectively obtained through adopting active learning methods.

SUGGESTIONS FOR FURTHER IMPROVEMENT

- Use of ICT tools can be encouraged in order to improve teaching-learning experience.
- Active learning methods can be followed in all subjects in order to increase the level of understanding of students.
- Requires support from parents, students and teachers in order to overcome the misconception of securing good marks through rote memorization.

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STUDENTS' PROBLEM IN SPEAKING ENGLISH

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ABSTRACT

The study investigates the reasons for a student's problems and need to explore and learn a new language or foreign language. How they cope with their fear and anxiety of speaking English in class and learning it. According to the hypothesis, cultural dominance, local surroundings, and no proper place to do things they learn, could be the sole reason for the fear of learning, or it could be said that, it's their love for the native language or the first language that becomes the barrier to their learning. The study also examines the teacher's perspectives and reactions towards the learner's problems and investigates the student's perspectives on the teacher's reaction to their feelings and fear. Theoretical framework, Data collection involves observations and interviews indicate the barriers of speaking foreign language. This investigation took place at "RSM girls higher secondary school" Lingi Chetty Street, Chennai, Tamil Nadu and involved testing a few students from class 6th B who are very weak at speaking but want to learn and few students who are not interested in speaking English in a classroom.

INTRODUCTION

Learning new languages in a diverse country like India will be a very complex task even for adults. Thus, it is very common that children have a fear of speaking a new language, especially when it is a foreign language. Though people understand the need for English, they still keep the concept that it is not an Indian language. On the basis of culture, people connect language with grace or disgrace. If one knows a foreign language, he or she is respected, and if one can't speak it is ignored many times. This attitude brings rates for foreign languages in people who can't speak English.

NEED OF THE STUDY

Here, in the case of school, students who avoid speaking English belong to poor backgrounds who don't have people to practice with at home. For learning any language, proper and continuous practice is a must, which seems to be little, to these students and in, case of classroom practice the students don't understand whatever is taught by the teacher. Moreover, students are not willing to speak as they feel insulted by their broken English. Students who really want to learn and speak English have low self confidence as there are no other students to accompany them. According to this study, if the above mentioned things, it is the reason for students avoiding speaking English often. Then building up space for daily practice with motivation could build self-confidence in students, which would help them to improve spoken English.

The study is set out to answer the following research questions

1) How to build self-confidence in students learning a new language?

2) What is the difference between the responses to spoken English fear in students at different grades of?

3) What is the teacher's perspective towards students' anxiety when speaking English in class?

4) What is the students' perspective on anxiety about speaking English in class?

Thirty days of spoken English instruction are necessary to pinpoint the precise issue that students have when speaking the language and provide a remedy that will improve learning.

PROBABLE CAUSES FOR THE PROBLEM

Being aware of the challenges pupils confront when speaking English, procedures such as interviews and observation to gauge students' proficiency in spoken English using "self-introduction in English, and greetings in English at different contexts"

Interviewing students in grades 9, 10, and 11 about their fear of speaking English on the first day, these students say they feel excluded when they begin speaking the language because they have no friends with them and are afraid of being insulted or made fun of by their peers. Additionally, the majority of the students are from the COVID batch, so they had very little opportunity to interact with others.

Day 1: (interviewing students in grades 9–11) on their fear of speaking English: According to these students, they feel excluded when they begin speaking English at this grade because they have no friends with them because they are afraid of being insulted or made fun of by their peers. Additionally, the majority of the students are from the COVID batch, which means they had very little opportunity to interact with friends. They claim that they would have spoken English if we had received appropriate speaking instruction and friends to talk to in the lower grades themselves. By which the notion of teaching lower-grade pupils as subjects was developed, provided that the pupils gained some confidence in speaking English. They could then get better by gain self-assurance in speaking English even somewhat. After that, they might freely observe teachers at the higher level of education and get better on their own.

Day 2: Interviewing the 6thB English teacher on the pupils' apprehension about speaking English 'The English teacher, Miss Sundari', claims that although students are eager to learn English, they are unable to do so because they feel embarrassed by their poor English. They may appear to be the odd one out in the class, and students who speak a little have nowhere to practice or apply what they have learned. Additionally, some students come from low-income families whose parents are not very educated, so they are unable to assist their children with their practice or even in class.

Day 3: Thus, to test if students with the above reasons get proper guidance, the chance to practice and motivation would be able to improve or not with class teachers permission to pick out 5 students as the subject for this research from class 6th.

METHODOLOGY

Research Design: First step reducing the fear of English by motivation and learning hacks

- Telling the importance of English
- The role of grammar in English teaching with some tricks to remember parts of speech
- 23 helping verbs in the song, &
- Tense formulas the form story teaching students

These steps to reduce the fear of English in students and to make students think that English is a language the same as any other language they find in India, if one could learn those diverse languages, then English could also be learned. It's not a big deal.

Participants

The participants of this study were students of RSM girls higher secondary school, Lingi Chetty Street, Chennai, Tamil Nadu and involved testing a few students from class 6th B.

SUBJECTS' NAMES

1. S. DHARSHINI (S.D)
2. S. KERUTHIKA (S.K)
3. M. ZUNAIRAH (M.Z)
4. T. ANEEKHATHAMEEMA (T.A)
5. M. FATHIMA HAFSHANA (M.F)

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HYPOTHESIS

Story telling and communication activities will significantly eradicate the fear of speaking English among sixth standard students.

STRATEGIES ADOPTED

Explaining students that with some fun activities, we could learn English like

1. Running stories
2. Telephone conversation
3. Translating your Favorite song
4. Situation plays
5. Table top speech
6. Prepared speech
7. Self introduction
8. Project presentation
9. Rapid questions

To make students understand the need for spoken English at present time through storytelling and these communication activities would help even the students enjoy these activities.

To check student's improvement marking them on

1) Confidence level in speaking English
2) Body gesture
3) Eye contact
4) Creative thinking
5) Way of speaking and how they use the pause while speaking
6) Way of conveying the message
7) Understanding the situation
8) Pronunciation and use of vocabulary
9) Forming sentence
10) Grammatical errors.

(Marking On the firsttime v/s marking after practice) in each activity

PLAN OF ACTION

Activity 1 (Asked students to introduce themselves one by one in English)

Testing the present speaking skill of subject (Self introduction)

Names	1	2	3	4	5	6	7	8	9	10	Total
S.D	0	1	0	1	1	0	1	0	0	0	4
S.K	0	0	0	1	0	0	1	0	0	0	2
M.Z	0	0	0	1	1	1	0	0	1	0	4
T.A	0	0	0	0	0	0	0	0	0	0	0
M.F	0	0	1	1	0	0	0	1	1	0	4

(Explained students the right ways to introduce them to start with greeting, thanking for opportunity, their name, age, class, family, likes and dislikes, hobbies, aims, etc.)

In order to Testing self-introduction after practice

Names	1	2	3	4	5	6	7	8	9	10	Total
S.D	1	1	0	1	1	0	1	0	1	1	7
S.K	0	1	1	0	0	1	0	0	0	0	3
M.Z	1	1	1	1	0	0	0	1	0	1	6
T.A	0	1	1	0	0	1	0	0	0	0	3
M.F	1	1	1	0	1	1	1	0	0	0	6

Rewarding students with stars for the improvement as motivation

Activity 2 (teacher would start a story and students would continue the story line by line) (8m)

Running story

Names	1	2	3	4	5	6	7	8	9	10	Total
S.D	1	0	0	0	0	0	1	0	1	1	4
S.K	0	0	0	0	0	1	0	0	0	0	1
M.Z	1	0	0	1	0	0	0	1	0	1	4
T.A	0	0	0	0	0	1	0	0	0	0	1
M.F	1	0	0	0	1	1	1	0	0	0	4

Running story on the 2nd time

Names	1	2	3	4	5	6	7	8	9	10	Total
S.D	1	0	0	1	1	0	1	0	1	1	6
S.K	1	0	0	1	0	1	1	0	0	0	4`
M.Z	1	0	0	1	1	0	0	1	0	1	5
T.A	1	0	0	1	0	1	1	0	0	0	4
M.F	1	0	0	1	1	1	1	0	0	0	5

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Activity 3(Giving students a situation on which they have to pretend an conversation as if they are planning stuff on spot as a game)

Telephone conversation

Names	1	2	3	4	5	6	7	8	9	10	Total
S.D	0	0	0	0	1	0	1	0	0	0	2
S.K	0	0	0	0	1	0	1	0	0	0	2
M.Z	0	0	0	1	1	1	0	0	0	0	3
T.A	0	0	0	0	0	0	0	0	0	0	0
M.F	0	0	0	1	0	0	0	1	0	0	2

Testing telephone conversation after practice

Names	1	2	3	4	5	6	7	8	9	10	Total
S.D	1	0	0	1	0	1	1	0	1	1	6
S.K	1	0	0	0	1	1	1	0	0	0	4
M.Z	1	0	0	1	1	1	1	1	1	0	7
T.A	1	0	0	1	1	1	1	0	0	0	5
M.F	1	0	0	1	1	1	1	0	0	0	5

Rewarding students with stars for the improvement as motivation

Activity 4 (Asking students pick four lines form any song they like and try to translate in English, that would sound funny and make students to enjoy English language)

Names	1	2	3	4	5	6	7	8	9	10	Total
S.D	1	0	0	1	0	0	0	0	0	0	2
S.K	0	0	0	0	0	0	0	0	0	0	0
M.Z	0	0	0	1	1	0	0	0	1	0	3
T.A	1	0	0	0	0	0	0	0	0	0	1
M.F	0	0	0	0	0	0	0	0	1	0	1

Translating song

Telephone conversation

Names	1	2	3	4	5	6	7	8	9	10	Total
S.D	1	0	0	1	1	0	1	0	0	0	4
S.K	1	0	0	1	1	0	1	0	0	0	4
M.Z	1	0	0	1	1	0	1	0	0	0	4
T.A	1	0	0	1	1	0	1	0	0	0	4
M.F	1	0	0	1	1	0	1	0	0	0	4

Rewarding students with stars for the improvement as motivation

Activity 5 (group activity giving a situation or old story to students they have act and recreate it. Situation play

Names	1	2	3	4	5	6	7	8	9	10	Total
S.D	0	1	0	1	1	0	1	0	0	0	4
S.K	0	0	0	1	0	0	1	0	0	0	2
M.Z	0	0	0	1	1	1	0	0	0	0	3
T.A	0	0	0	0	0	0	0	0	0	0	0
M.F	0	0	1	1	0	0	0	0	0	0	2

Rewarding students with stars for the improvement as motivation

After practice

Names	1	2	3	4	5	6	7	8	9	10	Total
S.D	1	1	1	1	1	1	1	0	0	0	7
S.K	1	0	1	0	1	1	1	0	0	0	5
M.Z	1	1	1	1	1	1	0	0	0	0	6
T.A	1	1	1	0	0	1	1	0	0	0	5
M.F	1	1	1	1	1	0	1	0	0	0	6

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Activity 6 (asking students to talk on things that they find in classroom for two minutes)
Table top speech

Names	1	2	3	4	5	6	7	8	9	10	Total
S.D	1	1	0	1	1	0	1	0	0	0	4
S.K	1	0	0	1	0	0	1	0	0	0	2
M.Z	1	0	0	1	1	1	0	0	1	0	4
T.A	1	0	0	1	0	0	0	0	0	0	0
M.F	1	0	1	1	0	0	0	1	1	0	4

After practice

Names	1	2	3	4	5	6	7	8	9	10	Total
S.D	1	1	0	1	1	0	1	1	0	0	7
S.K	1	0	0	1	0	0	1	0	0	0	3
M.Z	1	0	0	1	1	1	0	1	1	1	7
T.A	1	0	0	1	0	0	0	0	0	0	2
M.F	1	0	1	1	0	0	0	1	1	0	5

Rewarding students with stars for the improvement as motivation

Activity 7 (giving students time to prepare a speech on a topic given to them)
Prepared speech

Names	1	2	3	4	5	6	7	8	9	10	Total
S.D	1	1	0	1	1	0	1	0	1	1	7
S.K	0	1	1	0	0	1	0	0	0	0	3
M.Z	1	1	1	1	0	0	0	1	0	1	6
T.A	0	1	1	0	0	1	0	0	0	0	3
M.F	1	1	1	0	1	1	1	0	0	0	6

After correction Prepared speech

Names	1	2	3	4	5	6	7	8	9	10	Total
S.D	1	1	1	1	1	0	1	0	1	1	8
S.K	1	1	1	0	0	1	0	0	0	0	4
M.Z	1	1	1	1	1	0	0	1	0	1	7
T.A	1	1	1	0	0	1	0	0	0	0	4
M.F	1	1	1	0	1	1	1	0	0	1	7

Rewarding students with stars for the improvement as motivation

Activity 8 (giving students a model of post box and asked them to explain it as its their project)
Project presentation

Names	1	2	3	4	5	6	7	8	9	10	Total
S.D	1	1	1	1	1	0	1	0	1	1	8
S.K	1	1	1	0	0	1	0	0	0	0	4
M.Z	1	1	1	1	1	0	0	1	0	1	7
T.A	1	1	1	0	0	1	0	0	0	0	4
M.F	1	1	1	0	1	1	1	0	0	1	7

After giving one demo on how to present a project

Names	1	2	3	4	5	6	7	8	9	10	Total
S.D	1	1	1	1	1	1	1	0	0	1	8
S.K	1	0	1	1	0	1	1	0	0	0	5
M.Z	1	0	1	1	1	1	0	0	1	1	7
T.A	1	0	1	1	0	1	0	0	0	0	4
M.F	1	0	1	1	0	1	0	1	1	1	7

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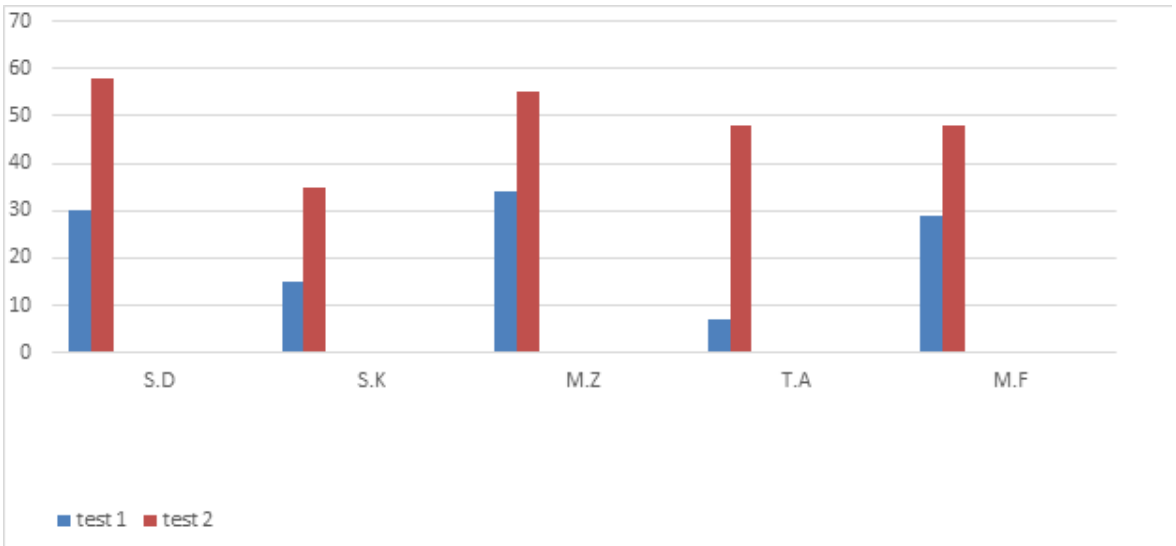
Activity 9 (asking the students to form a line among which one would ask question and others would answer it till the last person then the next person would ask questions all)

Names	1	2	3	4	5	6	7	8	9	10	total
S.D	1	0	0	0	1	0	1	0	0	0	3
S.K	0	0	0	0	0	0	1	0	0	0	1
M.Z	1	0	0	0	1	1	0	0	0	0	3
T.A	0	0	0	0	1	1	0	0	0	0	2
M.F	1	0	0	0	0	0	0	1	0	0	2

Interpretation of Data and Results

	Run-ning stories	Telephone conver-sa-tion	Trans-lat-ing song	Situation plays	Table top speech	Prepared speech	Self-in-tro-duc-tion	Project presen-ta-tion	Rapid ques-tion	Total
S.D	6	6	4	7	7	8	7	8	6	58
S.K	4	4	4	5	3	4	3	5	4	35
M.Z	5	7	4	6	7	7	6	7	7	55
T.A	4	5	4	5	2	4	3	4	4	34
M.F	5	5	4	6	5	7	6	7	4	48
	10	10	10	10	10	10	10	10	10	90

Diagram showing the difference between Test 1 and Test 2



Interpretation

The table shows consistent improvement in spoken English skills of all five students after the implementation of strategies to improve their speaking ability of English. The difference column reflects a positive gain in every student's score, confirming the effectiveness of the intervention.

CONCLUSION

Based on the above research, the student's and teacher's interviews. I came up with the problems students face while talking English or what makes them avoid talking English.

* Low self-confidence,
* No proper environment to practice,
* Feeling of being left out or being an odd one out amongst friends,
* No proper guidance

According to the above-mentioned issues, if one could get proper guidance, motivation as well as continuous practice at their lower grade itself, the students could improve in spoken English. To test the above hypothesis, nine fun-based activities have been conducted. In each activity, students have been tested twice. Once before giving guidance, then after guidance and practice, they have been marked on 10 qualities. By conducting activities for 20 days in spoken English class, we could identify a positive improvement in students. Though the growth in students is not much but still it could be developed if they get more days for continuous practice, motivation and guidance. Therefore, the action research gave a positive result as a sign of success.

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THE ROLE OF PEER-ASSISTED LEARNING IN DEVELOPING COMMUNICATION SKILLS AMONG STUDENTS

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ABSTRACT

This action research explores the effectiveness of Peer-Assisted Learning (PAL) strategies in enhancing communication skills among students. The study investigates how structured peer interactions influence students' confidence in speaking, vocabulary acquisition, sentence construction, pronunciation, grammar, fluency, and active listening. Through various peer-led discussions, collaborative tasks, and feedback sessions, students engaged in meaningful communication activities that fostered both verbal and non-verbal skill development. The research findings indicate that peer support plays a significant role in building a comfortable learning environment, encouraging self- expression, and promoting linguistic growth. The study concludes that PAL is a powerful pedagogical tool in developing comprehensive communication skills, making it a valuable addition to language classrooms.

INTRODUCTION

"Tell me and I forget. Teach me and I remember. Involve me and I learn."

– Benjamin Franklin

In the dynamic landscape of education, communication skills stand as a cornerstone for academic achievement and lifelong success. The ability to articulate thoughts clearly, listen actively, and engage in meaningful dialogue is essential in the 21st-century classroom. However, many students struggle to express themselves confidently, particularly in second-language contexts. To address this, peer-assisted learning (PAL) has emerged as a collaborative strategy that fosters mutual learning, active participation, and a supportive environment.

Peer-assisted learning, as defined by Topping and Ehly (1998), is "the acquisition of knowledge and skill through active helping and supporting among status equals or matched companions." This approach encourages students to work together, exchange ideas, and support each other in mastering content and improving communication. It aligns with Vygotsky's Zone of Proximal Development, where learners advance more effectively through social interaction with peers who offer guidance just beyond their current level.

Moreover, peer interaction helps demystify language learning, making it more relatable and less intimidating. As Paulo Freire aptly noted, "Education must begin with the solution of the teacher- student contradiction, by reconciling the poles of the contradiction so that both are simultaneously teachers and students." In peer-assisted settings, students take ownership of their learning, becoming both learners and facilitators.

This research investigates how PAL can be a catalyst in enhancing students' communication skills. It aims to explore the impact of peer collaboration on verbal expression, vocabulary usage, grammar, listening skills, and overall confidence in English communication. Through this inquiry, the study seeks to highlight PAL as an effective pedagogical tool that bridges gaps in traditional language instruction and empowers learners to communicate with clarity and confidence.

REVIEW OF RELATED LITERATURE

Topping and Ehly (1998) describe PAL as "a structured interaction between peers with the goal of promoting learning and achievement." This collaborative approach helps in building not only subject knowledge but also essential communication skills through continuous dialogue, questioning, and clarification.

Vygotsky's (1978) Social Development Theory emphasizes the significance of social interaction in learning. According to his concept of the Zone of Proximal Development (ZPD), learners can achieve higher levels of understanding when supported by more capable peers. In peer-assisted settings, this theory manifests through scaffolded learning, where language skills such as speaking, listening, and vocabulary are developed through guided collaboration.

According to Gillies (2006), cooperative learning structures such as PAL significantly enhance oral communication skills as students engage in discussions, articulate thoughts, and receive immediate feedback. This peer engagement fosters an inclusive environment where learners feel safe to express ideas and experiment with language, contributing to increased confidence and fluency.

A study by Nattiv (1994) found that students involved in peer tutoring programs showed marked improvement in vocabulary usage, sentence formation, and verbal interaction. The interactive nature of peer learning allows for contextualized use of language, making vocabulary acquisition more meaningful and lasting.

Moreover, McDonough and Shaw (2013) highlight the value of peer feedback in language classrooms. They argue that when students provide and receive constructive feedback, they become more aware of their linguistic strengths and areas for improvement. This ongoing exchange plays a vital role in refining pronunciation, grammar, and overall speaking proficiency.

Non-verbal communication is another aspect influenced by PAL. As observed by Slavin (1995), collaborative tasks often require students to interpret facial expressions, gestures, and tone, thereby enhancing their ability to communicate beyond words.

NEED OF THE STUDY

1. Lack of Confidence in Speaking English

Many students, especially second-language learners, struggle with self-expression due to fear of judgment or limited exposure. There is a growing need to create a low-anxiety, supportive environment to boost their confidence. Peer-assisted learning provides such a space where students feel more comfortable speaking with equals.

2. Limited Vocabulary and Structural Proficiency

Traditional classroom instruction may not provide enough opportunities for students to actively use new vocabulary or experiment with sentence structures. This study aims to address this gap by promoting peer interactions that facilitate natural and contextual language development.

*3. Inadequate Practice in Pronunciation and Flue*ncy

Students often have few chances to practice speaking with real-time feedback. Through peer feedback, learners can reflect on and improve their pronunciation, grammatical accuracy, and fluency in a non- threatening setting.

4. Underdeveloped Listening Skills

Active listening is a critical component of effective communication, yet it is rarely emphasized in typical language lessons. Peer-led activities encourage attentive listening and comprehension, which are essential for meaningful dialogue.

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5. Need for Holistic Communication Development

Communication is more than speaking; it includes tone, clarity, and non-verbal cues such as gestures and eye contact. Structured peer interactions help students become more aware of these aspects and improve overall communicative competence.

6. Empowerment Through Collaborative Learning

Peer-assisted learning empowers students by giving them agency in their learning process. It fosters mutual respect, responsibility, and social interaction—skills that are essential not just for academics but for real-world communication as well.

7. Support for Low-Achieving or Shy Learners

This study recognizes that some learners benefit more from peer support than from traditional teacher- led instruction. PAL can help bridge the achievement gap by providing tailored, peer-based support that encourages participation from all students.

PROBABLE CAUSES OF THE PROBLEM

* ***Fear of Making Mistakes and Peer Judgment*** - Many students hesitate to speak in English due to the fear of being ridiculed for incorrect grammar, pronunciation, or usage. This fear often results in silence and avoidance of speaking tasks.

* ***Lack of Real-Life Speaking Opportunities -*** Traditional classroom setups often emphasize reading and writing over speaking and listening. As a result, students receive limited chances to engage in meaningful communication.

* ***Overdependence on Teacher-Led Instruction -*** When classrooms are dominated by teacher talk, students become passive recipients of information rather than active communicators, limiting their confidence and initiative.

* **Limited Vocabulary and Poor Sentence Structure -** A weak foundation in vocabulary and grammar restricts students from constructing coherent sentences, which makes them hesitant to communicate.

* ***Low Exposure to English Outside the Classroom -*** Many students do not have an English-speaking environment at home or in their peer groups, which affects their fluency and natural language acquisition.

* ***Lack of Motivation or Engagement in Language Learning -*** Without interactive or student-centered methods like peer-assisted learning, students may find language learning monotonous and disengaging.

* ***Poor Listening Habits -*** Communication is a two-way process, and poor listening skills hinder meaningful interactions. Students often fail to respond appropriately because they are not trained in active listening.

* ***Shyness and Introverted Personality Traits -*** Anxiousness, prevents them from participating actively in group discussions or oral tasks.

METHODOLOGY

1. Research Design

This study follows an action research design, aiming to bring about practical improvement in students' communication skills through the implementation of peer-assisted learning (PAL) strategies. The research was conducted in a natural classroom setting, involving cycles of planning, action, observation, and reflection.

2. Participants

The participants of this study were students from class 8 of St Matthias Anglo Indian Higher

Secondary School, Vepery, consisting of 35 learners of mixed abilities in English language proficiency. The sample was purposefully selected to include students who showed varying levels of confidence and participation in oral communication tasks.

3. Duration of the Study

The action research was conducted over a period of 2 weeks with regular peer-assisted activities integrated into the English classes.

4. Tool Used: Student Questionnaire

A student questionnaire was designed as a primary tool to assess students' perceptions, confidence levels, and self-evaluated improvements in communication skills as a result of participating in Peer-Assisted Learning activities. The questionnaire contained both Likert- scale and open-ended questions focusing on areas such as vocabulary development, speaking confidence, listening comprehension, peer interaction, and the usefulness of peer feedback. The dimensions of the questionnaire were:

a. Holistic Communication Development
b. Active Listening Skills
c. Pronunciation, Grammar, and Fluency
d. Building Linguistic Skill
e. Building Confidence

This questionnaire was administered twice during the study — once as a pre-test at the beginning of the intervention to understand students' initial attitudes and skill levels, and again as a post-test after the completion of the Peer-Assisted Learning activities to evaluate the perceived changes and benefits experienced by the students through the program.

5. Data Collection Tools

To measure the impact of the intervention, both qualitative and quantitative data collection tools were used:

- Pre-test and Post-test assessments to evaluate improvement in speaking and listening skills
- Observation checklists to monitor participation, fluency, and engagement
- Student-teacher field notes to record observations during activities
- Peer feedback forms to analyze the quality and frequency of feedback exchanges.

6. Data Analysis

Quantitative data from the pre- and post-tests were analyzed using basic statistical methods to identify improvements in communication performance. Qualitative data from journals, feedback forms, and student-teacher notes were thematically analyzed to identify patterns in student behavior, peer support, and language use.

HYPOTHESIS

Peer-Assisted Learning (PAL) will significantly enhance the communication skills of students by improving their confidence, vocabulary usage, grammatical accuracy, pronunciation, fluency, and active listening abilities.

STRATEGIES ADOPTED

The intervention involved the structured use of peer-assisted learning methods such as:

- Peer discussions on selected topics.
- Paired speaking tasks.
- Peer-feedback sessions focusing on pronunciation, grammar, and fluency.

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- Role plays and dialogues in pairs or small groups.
- Listening and response games facilitated by peers.
- Students were trained on how to provide constructive feedback to one another.

1. ***Think-Pair-Share:*** Students were given a question or topic to think about individually, then discussed their thoughts with a partner before sharing with the larger group. This encouraged idea formulation, active listening, and verbal expression.
2. ***Peer Tutoring:*** Stronger students were paired with peers who needed more support. The tutor explained concepts, modeled correct language use, and guided practice, allowing both partners to reinforce their skills.
3. ***Paired Role-Play Activities:*** Students worked in pairs to perform real-life conversational scenarios (e.g., shopping, interviews, phone calls). This enhanced fluency, vocabulary application, tone, and body language.
4. ***Peer Feedback Sessions:*** After speaking tasks, students exchanged structured feedback using prepared checklists focusing on pronunciation, sentence structure, clarity, and body language. This built critical thinking and self-awareness.
5. ***Collaborative Storytelling:*** In groups, students created and narrated stories. Each peer contributed a part, promoting spontaneous speaking, logical sequencing, and creativity in language use.
6. ***Group Discussions and Debates:*** Small group discussions on given topics helped students practice respectful disagreement, supporting opinions, and turn-taking in conversation.
7. ***Peer-Assisted Listening Tasks:*** Students listened to short audio clips and discussed comprehension questions in pairs, reinforcing active listening and response accuracy.
8. ***Error Spotting and Correction Games:*** Peers identified errors in each other's sentences and corrected them collaboratively, enhancing grammar and vocabulary awareness.
9. ***Peer Interview Tasks:*** Students prepared and conducted interviews with classmates, simulating real-world speaking practice and developing question framing and active engagement skills.

PLAN OF ACTION

Week 1: Activities List

Day 1 – *Orientation and Baseline Assessment*

- Briefed students on the concept of peer-assisted learning and its purpose.
- Conducted a pre-test to assess speaking and listening skills (through picture description, short speech, and listening comprehension tasks).
- Formed peer pairs or small groups based on mixed ability.
- Carried out an icebreaker activity, "Two Truths and a Lie" to make students comfortable speaking.

Day 2 – *Vocabulary Building through Peer Activities*

- Conducted a Think-Pair-Share activity on the topic "My Favorite Place / Food / Movie."
- Provided a list of topic-related vocabulary for reference.
- Peers helped each other frame sentences using the new words.
- Concluded with short individual presentations followed by oral peer feedback.

Day 3 – *Sentence Formation and Grammar Practice*

- Organized peer tutoring sessions where students corrected each other's spoken or written sentences using guided worksheets.

- Focused on grammar concepts like Simple Past vs. Present Perfect Tense
- Conducted error spotting in dialogues and peer corrections.
- Ended with pair presentations using the correct structures learned.

Day 4 – *Pronunciation and Fluency Activities*

- Organized role-play exercises based on real-life situations (e.g., at a restaurant, asking for directions).
- Peers practiced and performed, focusing on tone and pronunciation.
- Used verbal peer feedback through simple checklists on fluency, pauses, and clarity.
- Student-teacher modeled correct pronunciation, and students echoed the examples.

Day 5 – *Listening Skills and Peer Reflection*

- Conducted an audio-based activity where students listened to a short clip or story.
- In pairs, students answered comprehension questions and summarized the clip orally.
- Organized peer interviews, after which each student introduced their partner to the class.
- Distributed reflection sheets for students to record what they learned, challenges faced, and how their peer supported them.

Week 2:

Day 6 – *Peer Storytelling and Descriptive Language*

- In pairs, students created a short story using 5 given vocabulary words.
- Used a story cube or prompt cards for inspiration.
- Presented their story orally to another pair or to the class.

Results: Vocabulary retention improved, coherence in narration developed, and students exhibited enhanced confidence in public speaking.

Day 7 – *Peer Debates and Expressing Opinions*

- Students formed pairs and debated light topics such as 'Online classes vs. Offline classes'.
- Provided sentence starters to help express opinions and polite disagreement.

Results: Students demonstrated better sentence construction, active participation, and improved body language. Speech spontaneity also increased.

Day 8 – *Peer Listening Quizzes and Response Building*

- Played a short dialogue or story.
- In pairs, students answered comprehension questions and created new questions based on the content.
- Practiced paraphrasing and summarizing what they heard.

Results: Listening accuracy, attention to detail, verbal recall, and critical thinking improved noticeably.

Day 9 – *Peer Feedback and Role Reversal*

- Repeated Day 4's role-play activity with roles reversed.
- After each task, students provided oral peer feedback using structured rubrics.

Results: Pronunciation and fluency improved. Students became more open to feedback and demonstrated greater collaboration and respect for peers' suggestions.

Day 10 – *Post-Test and Group Reflection*

- Conducted a post-test to assess progress in speaking and listening skills.
- Held a group reflection session where students discussed how PAL activities helped them.
- Collected final feedback orally and via reflection sheets.

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Results: There was measurable improvement in verbal and non-verbal communication, heightened student confidence, and stronger collaborative peer relationships observed by the end of the study.

INTERPRETATION OF DATA AND RESULTS

Comparison of Pre-Test and Post-Test Scores

Pre-Test and Post-Test Score Analysis

S.No	PreTest score (25)	Post Test score (25)	Difference
Student 1	12	18	6
Student 2	10	17	7
Student 3	14	19	5
Student 4	9	15	6
Student 5	11	18	7
Student 6	13	19	6
Student 7	8	14	6
Student 8	10	16	6
Student 9	9	15	6
Student 10	11	17	6
Student 11	12	19	7
Student 12	13	20	7
Student 13	10	16	6
Student 14	11	18	7
student 15	12	18	6
student 16	14	20	6
student 17	10	20	10
student 18	11	18	7
student 19	12	19	7
student 20	9	15	6
student 21	13	19	6
student 22	12	18	6
student 23	8	14	6
student 24	10	16	6
student 25	11	17	6
student 26	9	15	6
student 27	13	19	6
student 28	14	20	6
Mean	11.07	17.39	6.32

Interpretation

The table shows consistent improvement in the communication skills of all 28 students after the Peer-Assisted Learning sessions. The difference column reflects a positive gain in every student's score, confirming the effectiveness of the intervention.

Student Participation and Engagement

Observation data showed increased voluntary participation in speaking activities, peer feedback exchanges, and group discussions. This rise in engagement suggests that PAL created a comfortable, supportive environment that encouraged risk-taking and reduced speaking anxiety.

Quality of Peer Feedback

Analyzed feedback forms used by students during paired activities (accuracy, constructiveness, and relevance). The quality of feedback improved over the sessions, showing that students became more reflective and supportive learners, contributing to their own and their peers' growth.

Listening Comprehension

Compared listening activity scores and qualitative feedback on peer discussions. Active listening improved as students learned to understand, respond, and build on peer inputs, which is crucial for effective two-way communication.

Confidence and Expression

Reflection sheets and interviews indicated changes in students' confidence levels. Most students reported feeling more confident in speaking, using new vocabulary, and correcting mistakes without fear, validating the emotional benefits of PAL.

Peer Observation and Student-teacher's Notes

Student-teacher logs recorded shifts in language use, collaboration, and classroom dynamics. The classroom evolved into a more student-centered space, where learners supported each other, making language learning more natural and authentic.

Component Wise Analysis: Pre Test and Post Test Scores

Objectives	Pretest (10)	Post test (10)	Difference
Holistic Communication Development	3	9	6
Active Listening Skills	4	9	5
Pronunciation, Grammar, and Fluency	1	9	8
Building Linguistic Skill	2	8	6
Building Confidence	1	6	5

INTERPRETATION

The data reflects a highly effective intervention that significantly enhanced communication and language skills across all measured objectives. The most notable success is in Pronunciation, Grammar, and Fluency, where the score rose from 1 to 9, an 8-point difference, highlighting the intervention's strength in improving technical speaking abilities. Holistic Communication Development and Building Linguistic Skill also saw robust improvements (6 points each), underscoring gains in broader communication and language proficiency.

While Active Listening Skills improved from 4 to 9 (a 5-point gain), their higher starting point suggests they were already a relative strength, with less room for growth compared to weaker initial areas. Building Confidence, however, presents an interesting contrast: despite a 5-point increase from 1 to 6, its post-test score remains the lowest. This may indicate that confidence, unlike technical skills, develops more gradually or requires distinct strategies beyond those used for skill enhancement.

Overall, the intervention appears to have been particularly adept at addressing initial weaknesses, bringing most objectives to high post-test levels (8 or 9 out of 10). The exception of confidence suggests a potential area for further focus in future interventions.

Strength: PAL is widely recognized for boosting confidence, vocabulary and pronunciation.

Weakness: Students report dissatisfaction with peer feedback quality, active listening outcomes, and systemic preparation for Peer Assisted Learning.

DISCUSSION

The findings of the study strongly support the effectiveness of Peer-Assisted Learning (PAL) as a strategy for enhancing students' communication skills. One of the most notable impacts was the boost in students' confidence when speaking English. The supportive and non-threatening environment created through peer interactions enabled even the shy and hesitant learners to express themselves without fear of judgment.

Students became more fluent and spontaneous in their speech as they engaged in meaningful dialogues, debates, and storytelling tasks with their peers. PAL encouraged regular use of vocabulary and structures introduced in class, leading to better retention and usage. Through consistent practice, learners were able to internalize grammatical forms and improve sentence construction, which positively affected their overall clarity in communication.

An important aspect of the positive impact was the constructive nature of peer feedback. Students not only became more aware of their own speaking patterns and mistakes but also developed critical listening and evaluative skills by observing their peers. The feedback mechanism also cultivated a sense of mutual responsibility, where students actively contributed to each other's growth. Moreover, active listening skills improved significantly as students participated in peer discussions and listening-response tasks. They learned to pay attention, interpret, and respond appropriately, which enhanced the two-way nature of communication.

Finally, PAL nurtured collaborative learning, empathy, and leadership skills. Stronger students learned to support others with patience, while others were motivated to catch up through cooperative efforts rather than competition. Overall, the classroom became more inclusive, interactive, and student- driven, leading to a richer, more effective language learning experience.

SUGGESTIONS

- Peer-assisted learning strategies should be embedded into the regular English language curriculum. Activities like pair discussions, peer feedback, and collaborative storytelling can be scheduled weekly to ensure continuous speaking practice.
- Students should be guided on how to provide respectful, meaningful feedback. Simple feedback rubrics or checklists can be introduced to ensure focus on language aspects like fluency, grammar, and clarity.
- Pairing students with mixed abilities allows peer tutoring to occur naturally. Teachers should rotate pairs periodically to ensure all students benefit from varied peer interactions and develop interpersonal communication.
- Role-playing real-life scenarios such as interviews, phone conversations, and public speaking tasks can significantly enhance spontaneous communication and build learner confidence.
- Students should maintain reflection journals or exit cards to document what they learned from each peer interaction. This helps internalize the learning process and builds self-awareness.

- Teachers must cultivate a non-judgmental space where students feel safe to make mistakes and learn. Encouragement and positive reinforcement are crucial to fostering participation.
- While autonomy is encouraged, teacher monitoring ensures that discussions remain purposeful. Scaffolding support, such as sentence starters or topic cards, helps less confident students participate actively.
- Regular assessments of speaking and listening skills can help track progress and adjust strategies accordingly. Both peer and teacher assessments can

LIMITATIONS OF THE STUDY

* The study was conducted over a short period (two weeks), which may not have been sufficient for all students to show significant, long-term improvement in communication skills.
* The research involved a limited number of students, making it difficult to generalize the findings to a broader population.
* Not all students participated with equal enthusiasm. Some students were less responsive to peer feedback or reluctant to speak, which may have affected the overall results.
* Some students tended to be overly positive or hesitant to correct their peers, which may have limited the effectiveness of peer feedback.

CONCLUSION

The findings of this action research clearly indicate that Peer-Assisted Learning (PAL) is an effective strategy for enhancing communication skills among students. Through structured peer interactions, students not only developed greater confidence in speaking but also improved in key areas such as vocabulary usage, sentence construction, pronunciation, grammar, fluency, and active listening.
The collaborative nature of PAL created a supportive and engaging learning environment where students felt safe to express themselves, make mistakes, and learn from one another. It also promoted critical thinking, responsibility, and mutual respect, which are essential for both academic and social development.

Although the study had certain limitations—such as time constraints and varying student motivation—the overall outcomes suggest that PAL holds great potential as a student-centered, inclusive approach to language learning. By giving students an active role in each other's learning process, PAL not only enhanced communicative competence but also built essential life skills like teamwork, empathy, and confidence.

This action research encourages educators to integrate PAL strategies more consistently into the language classroom, as it fosters real engagement, authentic communication, and a sense of ownership over learning.

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COMPARATIVE ANALYSIS OF TEACHING METHODS FOR DIAGRAM-BASED BIOLOGY CONCEPTS

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ABSTRACT

This action research study seeks to compare three distinct teaching methodologies— image-based explanation, animation-based explanation, and teacher-drawn schematic explanation—to determine which approach is most effective in improving students' understanding and retention of biology diagrams-based topics. The research is driven by the hypothesis that active engagement, stepwise diagram construction, and interactive instruction lead to better comprehension and recall than passive learning through static images or animations. By systematically assessing the impact of each teaching method through pre- tests, instructional interventions, and retention tests, this study aims to provide empirical evidence on the most effective strategy for teaching biology diagrams to higher secondary students. By conducting this action research, the ultimate goal is to enhance the quality of biology education by identifying a teaching approach that not only improves learning outcomes but also fosters a deeper appreciation for the subject. The study's results will contribute to the ongoing effort to make biology education more meaningful, engaging, and effective for students in higher secondary education.

INTRODUCTION

Biology is an inherently visual subject, with diagrams playing a crucial role in illustrating complex concepts, structures, and processes. Effective teaching of biology requires students to develop a deep understanding of diagram-based concepts, which are foundational for mastering topics such as cell biology, genetics, anatomy, physiology, and ecology. However, one of the key challenges in biology education is identifying the most effective method to teach diagram-based concepts in a way that enhances student engagement, understanding, and long-term retention. The choice of instructional methodology significantly impacts how well students grasp and recall visual content.

In the current educational landscape, various teaching methods have been developed to enhance the learning process. Traditional chalk-and-board teaching has been a longstanding method in biology instruction, allowing teachers to construct diagrams step by step while simultaneously explaining key ideas. With advancements in technology, newer methods such as digital image-based instruction and animation-based teaching have emerged, offering dynamic and visually appealing ways to present biological diagrams. While these modern techniques offer several benefits, there is still ongoing debate about which method is the most effective for fostering deep learning and concept retention in students.

Understanding the effectiveness of different teaching methodologies is critical, as biology is a subject that requires students to develop strong visualization skills. The ability to interpret, analyse, and reproduce diagrams is essential for success in examinations and practical applications. Moreover, as students advance in their education and careers, diagram- based understanding becomes even more significant in fields such as medicine, biotechnology, environmental science, and research.

Despite the growing use of technology in classrooms, it is important to evaluate whether digital teaching tools truly enhance learning outcomes or whether traditional, interactive methods still hold greater value. The findings of this research will provide valuable insights for educators, curriculum developers, and policymakers, helping them refine teaching strategies to maximize student engagement and retention. Furthermore, the study will offer practical recommendations on how to integrate the most effective instructional methods into daily teaching practices.

NEED FOR THE STUDY

The study of biology is highly dependent on visual learning, as many fundamental concepts are best understood through diagrams. From the microscopic structures of cells to the macroscopic organization of ecosystems, biology involves numerous intricate visual representations. These diagrams serve as essential tools in facilitating conceptual clarity, helping students understand spatial relationships, functional mechanisms, and hierarchical structures within living organisms. However, despite the centrality of diagrams in biology education, many students struggle to grasp and retain visual information effectively. This challenge highlights the need for research to determine the most efficient teaching methodology for enhancing students' learning experiences with diagram-based biology concepts.

In traditional classrooms, teachers often rely on static images from textbooks or projected slides to illustrate biological structures. While this method provides students with clear visual representations, it often lacks an interactive component, making learning passive rather than active. Additionally, the use of pre-prepared images does not allow students to witness the stepwise construction of diagrams, which is crucial for deeper understanding. As a result, many students may memorize the diagrams without fully comprehending the underlying biological principles, leading to superficial learning and low retention rates.

In recent years, animation-based teaching methods have gained popularity in biology education. Animations offer dynamic representations of biological processes, such as cell division, DNA replication, and physiological mechanisms. These visual tools allow students to observe step-by-step changes, making abstract concepts more tangible. However, despite the advantages of animation, it has limitations. Some students find animations overwhelming due to their fast-paced nature, leading to cognitive overload. Additionally, since animations are pre-made, students may not actively engage in constructing their own mental models, potentially reducing retention and conceptual internalization.

Conversely, traditional chalk-and-board teaching, where the teacher draws diagrams in real-time while explaining concepts, has been widely practiced for decades. This method allows for a gradual, structured presentation of biological diagrams, enabling students to follow the logical flow of information. When teachers draw diagrams in front of students, they encourage real-time participation, questioning, and interaction. This engagement fosters active learning, which has been shown to enhance comprehension and retention. Furthermore, drawing diagrams manually reinforces the spatial and structural relationships within biological systems, making it easier for students to recall the information later.

Given the variety of teaching methodologies available, it is essential to systematically analyse their effectiveness in improving student learning outcomes. This study is particularly important in the context of higher secondary education, where students are required to master a vast amount of biological knowledge within a limited timeframe. The findings of this research will provide valuable insights for educators, allowing them to make informed decisions about the best instructional strategies for teaching biology diagrams. By identifying the most effective approach, this study aims to bridge the gap between traditional and modern teaching methods, ensuring that students receive high-quality education that enhances both comprehension and retention.

Moreover, the study's findings will be beneficial for curriculum developers and policymakers in shaping instructional guidelines that emphasize effective diagram-based teaching techniques. Ultimately, this research seeks to contribute to the ongoing improvement of biology education by equipping teachers with evidence-based strategies to maximize student learning outcomes. By addressing the challenges associated with diagram-based biology instruction, the study aims to enhance the overall quality of science education and foster a deeper appreciation for biological concepts among students.

PROBABLE CAUSES FOR THE PROBLEM

A sample of 11 students of class XI in St. Matthias Anglo Indian Higher Secondary School, Chennai was identified through the pre-test conducted before the action research. Effective learning in

biology heavily relies on a student's ability to interpret and understand diagrams. However, various factors hinder students' ability to grasp and retain diagram-based concepts effectively. These factors range from instructional shortcomings to cognitive limitations and learning environment constraints. Identifying the probable causes behind the challenges in teaching and learning biology diagrams is crucial for developing effective solutions.

One probable cause is the passive learning environment created by image-based explanations. In many classrooms, teachers present pre-prepared images from textbooks or slides without actively engaging students in the diagram-drawing process. This passive approach results in limited student interaction, reducing their ability to internalize and recall the information. Students often resort to rote memorization rather than conceptual understanding, leading to poor retention.

Another significant challenge is the cognitive overload associated with animation- based teaching. While animations provide dynamic visuals that illustrate biological processes effectively, they can sometimes move too quickly for students to fully absorb the information. Rapid transitions in animations may prevent students from developing a mental model of the concept, leading to gaps in comprehension. Furthermore, since animations are pre-designed, students are passive recipients of information rather than active participants in the learning process.

Other factors include students' lack of drawing skills, difficulties in understanding complex structures, and insufficient time allocation for practicing diagram-based concepts. Additionally, variations in individual learning styles mean that some students struggle with visual-based instruction, requiring alternative teaching methods to enhance their understanding.

By addressing these challenges through effective teaching strategies, educators can improve students' ability to grasp and retain biological diagrams, leading to better academic performance and a deeper understanding of the subject.

OBJECTIVES OF THE ACTION RESEARCH

The main objectives of this action research are:

1. To compare the effectiveness of three teaching methodologies in teaching biology diagrams.
2. To assess student retention and comprehension using a pre-test and post-test model.
3. To determine which teaching method leads to the highest-class average performance and conceptual clarity.
4. To provide recommendations for optimizing biology teaching methods by integrating the most effective approach.
5. To explore student engagement levels and participation across different teaching methodologies and their impact on learning outcomes.

HYPOTHESIS OF THE STUDY

The null hypotheses of the action research are listed below.

1. There is no significant difference between pre-test and post-test scores in student performance on biology diagrams.
2. There is no significant difference in student performance across the three teaching methods (Image-Based, Animation-Based, and Teacher-Drawn) for teaching biology diagrams.

TOOLS USED FOR DATA COLLECTION

The following tools were used to conduct the action research:

a. Pre-test – Questionnaire: A baseline assessment to evaluate students' prior knowledge of diagram-based concepts before implementing different teaching methodologies.

b. Post-test – Conducted after instruction in each methodology to measure concept retention and assess improvements in understanding.

c. Statistical Analysis – Quantitative measures to compare and contrast the effectiveness of each methodology, ensuring data-driven conclusions.

STRATEGIES ADOPTED

There are three teaching methodologies were used to explain the concept of Biology.
They are as follows:

Method 1: Image-based explanation.

Method 2: Animation-based explanation.

Method 3: Teacher-drawn explanation on board.

a. Image-Based Explanation: Static images were presented with verbal explanations. The teacher displayed pre-designed images on slides, explaining key points without drawing the diagrams. This approach relied heavily on visual memory and theoretical understanding.

b. Animation-Based Explanation: Animated videos demonstrating biological concepts were used. This method utilized motion graphics and simulation models to explain the stepwise progression of biological structures and processes, providing a dynamic learning experience.

c. Teacher-drawn explanation on board: The instructor manually drew diagrams step by step on the board while explaining the concept interactively. This method allowed students to visualize the construction process of diagrams in real-time and encouraged active participation, questioning, and deeper engagement.

PLAN OF ACTION

Day 1. ***Pre-Test : Selection of Biology Concepts***

Various basic Biology topics related to the human eye such as the anatomy of the human eye, accommodation mechanism of the lens and visual processing, suitable for the senior secondary students were chosen where diagrams played a crucial role. A pre-test was administered to students aged 16–18 years to assess their foundational understanding of the selected biology concepts.

Day 2. ***Pre-Test Administration***

Conducted to assess prior knowledge and establish a baseline.

Day 3. ***Implementation of Teaching Methods: Methodology I (Image-Based Explanation)***

The anatomy of the human eye was taught using 3D images to provide a visually rich and static representation of the biological structures.

Day 4. ***Methodology II (Animation-Based Explanation)***

The accommodation mechanism of the lens was taught using animated videos, offering dynamic visualization of biological processes.

Day 5. ***Methodology III (Teacher-Drawn Explanation on Board)***

The concept of visual processing was taught through live, hand-drawn diagrams on the board by the teacher, allowing stepwise construction and interactive explanation.

Day 6. ***Retention Test***

Retention test was conducted to measure understanding, recall, and retention. A retention test was conducted one month later to evaluate long-term retention of the concepts among the same group of students.

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STATISTICAL ANALYSIS OF DATA

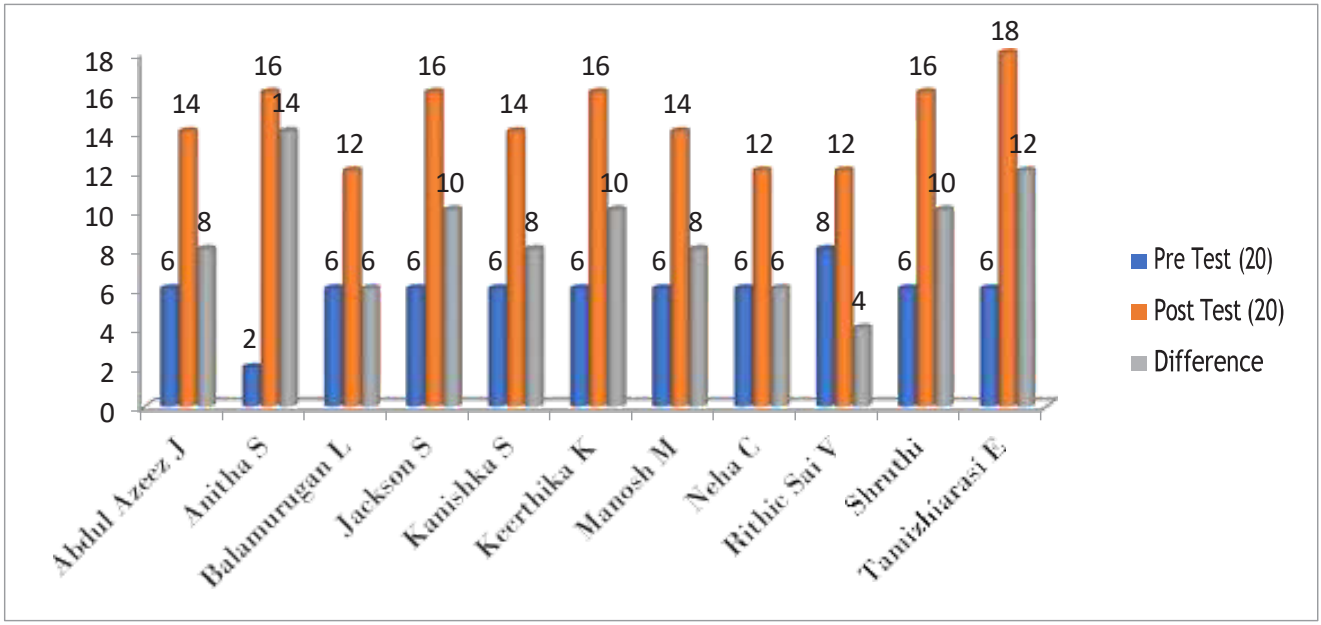
Statistical analysis in research entails the structured process of gathering, examining, and interpreting data to uncover patterns, trends, and relationships. It serves as an essential instrument for informed decision-making, drawing reliable conclusions, and extracting meaningful insights from data. In this action research, various methods of teaching biological science concepts are used to evaluate the effectiveness of instructional strategies. A comparison was made between pre-test and post-test scores, as summarized in Table 1.

Table - 1

Difference between Pre-Test and Post-Test Scores

S.No.	Name of the student	Pre Test (20)	Post Test (20)	Difference
1.	Abdul Azeez J	6	14	8
2.	Anitha S	2	16	14
3.	Balamurugan L	6	12	6
4.	Jackson S	6	16	10
5.	Kanishka S	6	14	8
6.	Keerthika K	6	16	10
7.	Manosh M	6	14	8
8.	Neha C	6	12	6
9.	Rithic Sai V	8	12	4
10.	Shruthi	6	16	10
11.	Tamizhiarasi E	6	18	12

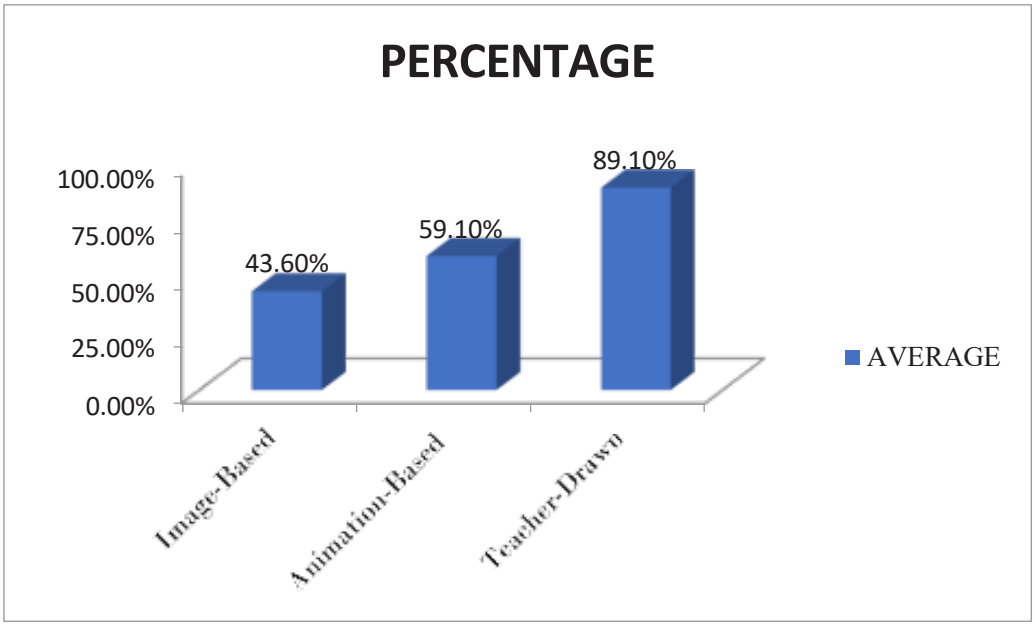
Comparison of Pre-Test and Post-Test



Comparative Analysis of Student Performance across Teaching Methods

Name of the student	Method I (20)	Method II (20)	Method III (20)
Abdul Azeez J	12	10	20
Anitha S	6	16	20
Balamurugan L	10	8	16
Jackson S	10	12	18
Kanishka S	14	16	18
Keerthika K	6	16	16
Manosh M	6	10	16
Neha C	8	8	20
Rithic Sai V	8	12	12
Shruthi	10	10	20
Tamizhiarasi E	6	12	20
AVERAGE	**43.6%**	**59.1%**	**89.1%**

Comparative Analysis of Student Performance across Teaching Methods



DISCUSSION AND INTERPRETATION

From the above table and figure, it is evident that there was a significant positive improvement in the students' test scores. This indicates that the methods adopted for teaching biological science concepts were effective in enhancing their understanding of biological diagrams.

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It is evident that there was a significant positive improvement in the students' test scores. The effectiveness of the teacher-drawn method is particularly notable: the high average score (89.1%) under this approach suggests that direct, teacher-generated visuals may have better clarified biological science diagrams for students. In contrast, the animation-based method achieved a moderate average (59.1%), indicating that dynamic representations help but possibly lack the clarity or engagement of teacher- crafted visuals. The lowest average (43.6%) for the image-based method suggests that static visuals might not fully engage students or provide sufficient context for learning diagrams. This pattern supports the hypothesis that more interactive and guided methods enhance learning, aligning with active learning research that shows improved engagement through structured methods.

LIMITATIONS OF THE STUDY

Every research study comes with inherent limitations, and this action research is no exception. Despite the systematic approach taken to compare the effectiveness of different teaching methodologies, several constraints must be acknowledged to contextualize the findings and suggest future improvements.

* ***Sample Size and Generalizability:*** One of the primary limitations of this study is the sample size.
* ***Time Constraints:*** The duration of the study was another limiting factor.
* ***Teacher Influence and Subjectivity:*** Since one teacher conducted all three instructional methods, there is a possibility of unintentional bias.
* ***Student Engagement and Learning Preferences:*** Students have diverse learning preferences, and some may naturally respond better to specific teaching methods.
* ***Assessment Limitations:*** The study utilized a pre-test and a post-test to measure learning outcomes.

SUGGESTIONS FOR FURTHER IMPLEMENTATION

a. Integrate a Blended Approach – Combine teacher-drawn explanations with selective animations to reinforce complex processes while maintaining active engagement.

b. Expand the Study Scope – Conduct research across multiple schools and diverse student populations to validate findings on a broader scale.

c. Long-Term Retention Assessment – Include follow-up assessments to measure knowledge retention over an extended period.

d. Interactive Digital Platforms – Develop digital tools that simulate the teacher-drawing method for online and hybrid education.

e. Professional Development – Train educators in effective board-drawing techniques to enhance instructional delivery and engage students more actively.

f. Further Statistical Analysis – Employ advanced statistical methods, such as ANOVA and regression analysis, to measure the significance of differences between teaching methodologies.

g. Student-Centered Learning Techniques – Encourage students to reconstruct diagrams independently after teacher demonstrations to reinforce learning and improve cognitive processing.

By adopting these strategies, biology educators can enhance student comprehension and engagement, making biology diagrams more accessible and effective learning tools. Future studies should explore the integration of AI-driven educational tools that combine interactive drawing simulations with traditional board-based instruction, ensuring an optimized learning experience for all students.

CONCLUSION

The data indicates that intervention significantly enhances students' ability to interpret and draw biology diagrams, with an average gain of nearly 9 points. These findings align with established education research on active learning, testing effects, and drawing-based strategies. Though limited by the small sample size and absence of a control group, the results support the value of integrating diagrammatic assessments and drawing activities into science instruction. The study concluded that the teacher-drawn schematic ex-

planation was the most effective method, achieving the highest retention rates among students. The active engagement, real-time questioning, and stepwise diagram construction significantly enhanced conceptual understanding and knowledge retention.

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PICTUES TAKEN DURING THE PERIOD OF ACTION RESEARCH

Methodology I – Image Based Explanation

Methodology II – Animation Based Explanation

Methodology III – Teacher-drawn explanation on board

Post Test

A STUDY ON THE IMPACT OF CONTEXTUAL GRAMMAR TEACHING ON SENTENCE CONSTRUCTION

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ABSTRACT

This action research deals with the contextual grammar teaching and to examine whether it has any impact on sentence construction skills among students. Conventional grammar instruction often isolates rules from actual application, making it difficult for learners to construct meaningful, coherent sentences. On the other hand, contextual grammar teaching integrates grammar instruction with real-life contexts and authentic language use. The main objective behind this research is to analyze whether contextualized grammar instruction can significantly enhance the ability of students to construct sentences compared to conventional instruction.

The research spanned over a period of 3 months with higher secondary school students. Data were gathered using tools like pre-tests, post-tests, classroom observations, and sentence construction exercises. Results showed a significant improvement in students' sentence accuracy, variety, and fluency. The students were more confident and had a higher ability to construct sentences following contextual grammar instruction. Overall, this study points out the significance of meaningful grammar teaching for effective communication skills and provides classroom implications in education

INTRODUCTION

Effective communication is essential for success in both personal and professional domains, and for students whose second or third language is English, mastering sentence construction is particularly vital. Constructing meaningful, grammatically accurate sentences involves organising words and phrases according to specific rules to convey clear, coherent messages. For non-native English speakers, proficiency in sentence construction empowers them to articulate their thoughts more effectively, enhancing confidence in communication and reducing misunderstandings.

Grammar plays a foundational role in communication. It governs how words come together to form phrases, clauses, and sentences, enabling learners to convey ideas clearly and accurately. For students

learning English as a second language, understanding grammar not only facilitates better writing but also aids in understanding texts, engaging in conversations, and participating meaningfully in discussions. Mastery of grammar helps them produce varied, polished writing while fostering deeper reading comprehension by making it easier to decipher complex sentence structures.

DEFINITION

Contextual grammar teaching is an instructional approach where grammar rules and concepts are taught within real-life or meaningful contexts rather than in isolation. This approach helps students perceive grammar as an organic part of communication rather than a set of disconnected rules to memorise.

NEED OF THE STUDY

- To enhance clarity and coherence in communication
- To enable students to apply grammar naturally, leading to well-structured, intelligible sentences.
- To improve reading comprehension and writing proficiency

- To help learners better understand the practical application of grammar
- To facilitate comprehension of complex texts
- To help students construct intricate sentence patterns

PROBABLE CAUSES OF THE PROBLEM

Several factors contribute to students' difficulties in constructing grammatically accurate and meaningful sentences. These issues often stem from gaps in knowledge, practice, and exposure. The following are some probable causes:

- Lack of Grammar Awareness: Many students struggle with sentence construction because they lack a basic understanding of essential grammar rules, such as subject-verb agreement, tenses, etc., resulting in incomplete or awkward sentences.
- Language Interference: Native language structures often influence how non-native students construct sentences in English. Differences in grammar, syntax, and sentence patterns between the native language and English can lead to errors.
- Fear of Making Mistakes: Many non-native speakers feel apprehensive about making grammatical errors, which discourages experimentation and creativity in sentence formation. This fear limits their willingness to engage in sentence construction activities.
- Limited Vocabulary: A restricted vocabulary makes it difficult for learners to express ideas fully and accurately, which directly affects their sentence construction abilities.
- Limited Exposure to Varied Sentence Structures: Students who are primarily exposed to simple and repetitive sentence patterns may struggle to develop complexity and variety in their writing. Exposure to diverse sentence structures is essential for improving fluency and creativity in communication.
- Insufficient Practice in Applying Grammar Rules: Even when students are taught grammar, they may not have enough opportunities to practice applying these rules in meaningful contexts. A non-native learner might spend all their time memorising theoretical grammar rules but may not apply these in real life, hence making it harder to internalise the same when using it for sentence construction.

OBJECTIVES OF THE ACTION RESEARCH

The primary goals of this action research are as follows:

* Assessing the Effectiveness of Contextual Grammar Teaching

This study will look for the effectiveness of contextual grammar teaching in helping non-native learners understand grammatical rules better and use them with confidence in sentence construction.

* Identifying Improvement in Students' Sentence Construction Skills

By comparing pre-test and post-test results, this research seeks to measure the extent of improvement in sentence construction accuracy, complexity, and variety.

* Enhancing Engagement with Sentence Construction Activities

The research seeks to explore how contextual grammar teaching strategies can make sentence construction activities more engaging, motivating students to participate without fear of failure.

* Encouraging Transfer of Learning

Another objective is to assess whether students can apply grammar knowledge gained in contextual exercises to other areas of communication, such as writing essays, participating in discussions, or crafting creative content.

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*** Language Interference Issues**

The research aims to identify specific errors arising from native language interference and develop targeted strategies to address them.

*** Building Confidence in Sentence Construction**

By offering practical activities, the research aims to foster a positive learning environment that encourages experimentation and reduces the fear of making mistakes.

HYPOTHESIS OF THE ACTION RESEARCH

Non-native English-speaking students exposed to contextual grammar teaching will demonstrate enhanced sentence construction abilities compared to those receiving traditional rule-based grammar instruction.

TOOLS USED

Pre-test and Post-test Assessments

Classroom Observations

Student Surveys

Teaching Learning Materials

STRATEGIES ADOPTED

i. Integration of Grammar Lessons with Authentic Texts

- Using newspaper articles, short stories, and extracts from novels to highlight specific grammatical concepts.
- Encouraging students to analyse sentence structures and identify grammar patterns within the text.
- Assigning creative tasks such as rewriting paragraphs with different grammatical focuses (e.g., using past tense instead of present tense).

ii. Scaffolded Practice Activities

- **Sentence Combining Exercises:** Students combined simple sentences into complex and compound sentences using appropriate conjunctions.
- **Sentence Expansion Tasks:** Students were given a basic sentence and asked to expand it by adding descriptive phrases or clauses.
- **Gap-Fill Exercises:** Contextual gap-fill activities required students to apply correct gram matical forms in real-life scenarios (e.g., filling in dialogue in a conversation).

iii. Peer Feedback Sessions

- Students reviewed and provided constructive feedback on each other's written work, focus ing on sentence construction and grammar accuracy.
- Peer editing helped reinforce learning as students identified and corrected grammatical er rors together.

iv. Daily Sentence Construction Challenges

- Students were tasked with writing sentences based on prompts drawn from current events, literary themes, or personal experiences.

- These activities encouraged the practical application of grammar rules and allowed for immediate feedback and correction.

v. Contextual Role-Play Activities

- Students engaged in role-playing activities in which they were required to use target grammatical structures naturally within dialogue.

vi. Grammar Games and Interactive Activities

- Games such as grammar bingo and sentence races reinforced grammar rules in a fun and engaging way.
- Interactive activities encouraged collaboration and kept students motivated.

PLAN OF ACTION

Pre-Test

Objective: Assess students' baseline grammar knowledge, particularly in subject-verb agreement, conjunctions, and tenses.

Format: Sentence correction tasks and multiple-choice grammar quizzes.

Time: 40 minutes

Day 1

- **Content:** Explanation of subject-verb agreement rules (singular/plural subjects and verbs).
- **Teaching Strategy:** Storytelling using everyday scenarios to demonstrate correct subject-verb pairings.
- **Activity: "Fix the Story":** students correct errors in a short story where subject-verb agreement mistakes are highlighted.

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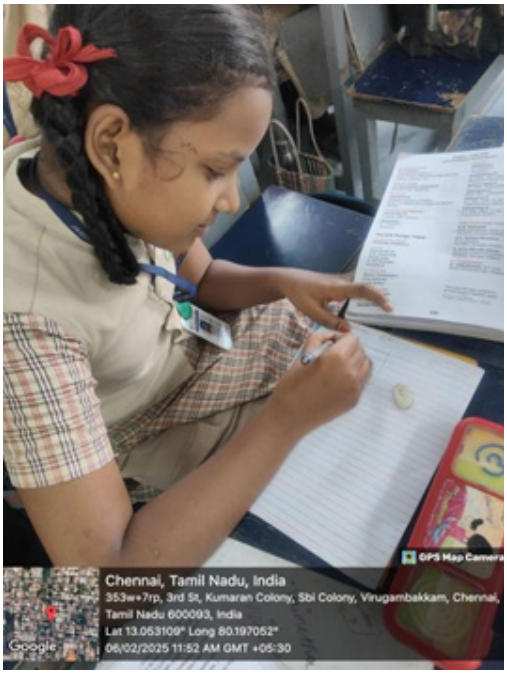
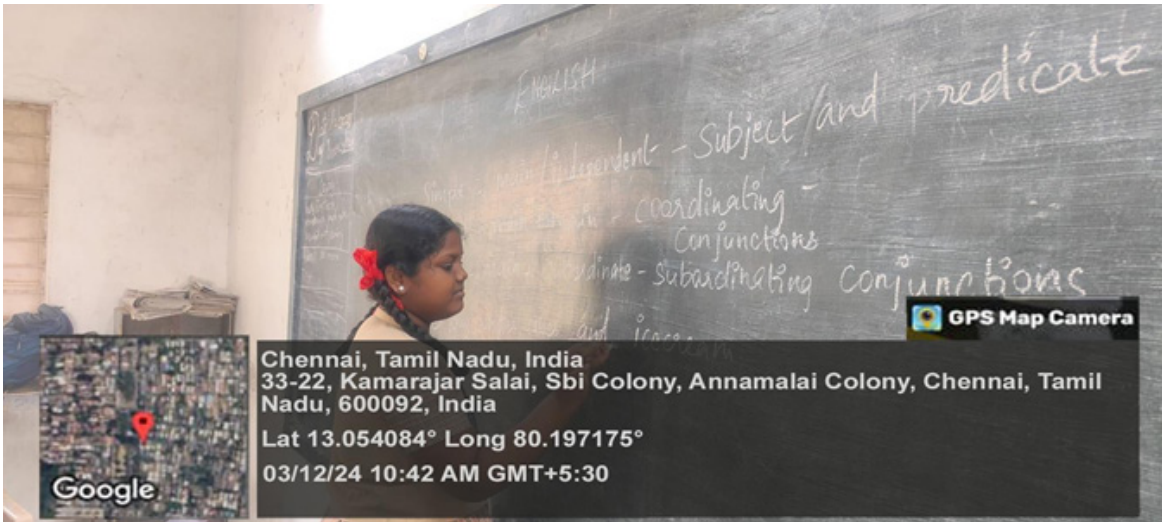
Day 2

- **Content:** Exceptions and challenging cases (collective nouns, indefinite pronouns).
- **Teaching Strategy:** Group discussions and examples on exceptions.
- **Activity:** Comic Strip Creation: Students create a 4-frame comic strip incorporating correct sub ject-verb agreement.



Day 3

- **Content:** Definition and usage of conjunctions (focus on FANBOYS: For, And, Nor, But, Or, Yet, So).
- T**eaching Strategy:** Collaborative sentence formation.
- **Activity: "Sentence Relay":** teams form complete sentences using coordinating conjunctions in a relay format.



Day 4

- **Content:** Combining independent clauses with conjunctions.
- **Teaching Strategy:** Analysis of conjunctions in short reading passages.
- **Activity: Group task:** Rewrite a paragraph by combining simple sentences using coordinating con junctions.

Day 5

- **Content:** Definition and examples of subordinating conjunctions (e.g., because, although, while).
- **Teaching Strategy:** Examples drawn from popular stories or fables.
- **Activity: "Role Play":** Students act out scenes while narrating using conjunctions.

Day 6

- **Content:** Explanation of simple tenses and their functions in communication.
- **Teaching Strategy:** Visual aids and timeline diagrams.
- **Activity:** Students identify tense usage in short stories.

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Day 7

- **Content:** Reinforcement of tense rules with creative tasks.
- **Teaching Strategy:** Peer teaching and storytelling.
- **Activity:** "Rewrite the Past/Future": students rewrite a short story in a different tense (from past to future or vice versa).

Day 8

- **Content:** Explanation of progressive and perfect tenses with examples.
- **Teaching Strategy:** Guided practice with real-life contexts.
- **Activity: "Diary Entry":** students write a diary entry using progressive and perfect tenses to de scribe events over the week.

Day 9

Content: Review of subject-verb agreement, conjunctions, and tenses.

Teaching Strategy: Comprehensive grammar tasks.

Activity: Students link the pairs to the corresponding conjunctions.

Day 10

Post-Test

- Post-test was conducted in the classroom to test the acquired knowledge of the pupil.
- **Assessment Format:** Similar to pre-test (sentence correction, paragraph writing, grammar quiz).

- **Reflection:**

- Class discussion on challenges, insights, and favourite activities.
- Feedback on contextual grammar teaching strategies.

DATA ANALYSIS

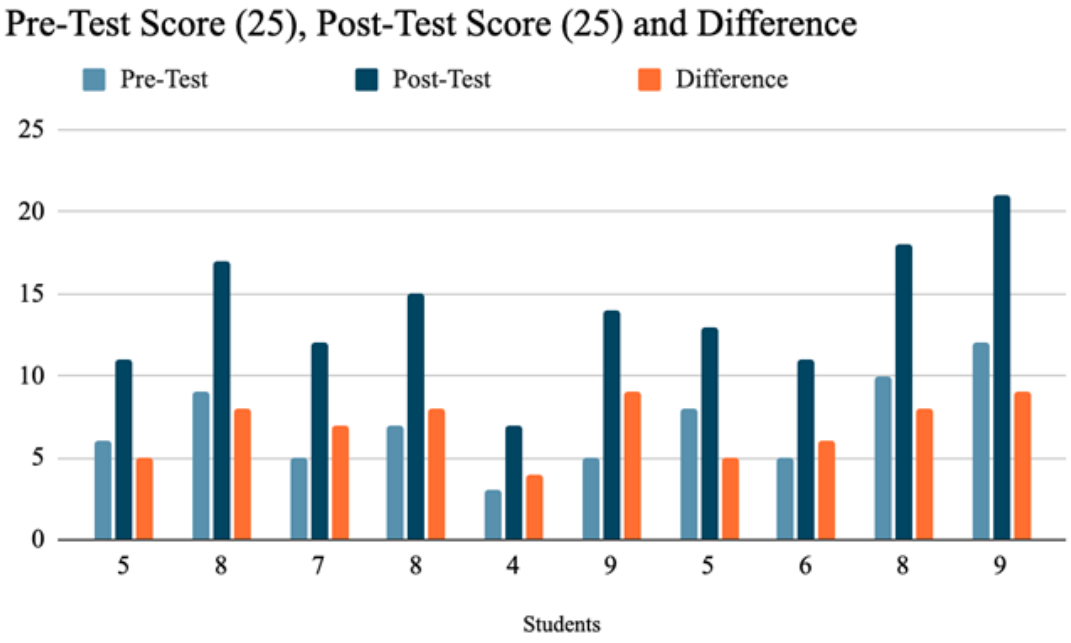
- Compare pre-test and post-test results.
- Analyse qualitative feedback from student reflections and peer reviews.

FINDINGS

- Improved use of subject-verb agreement, conjunctions, and tense consistency.
- Increased student engagement and confidence in writing tasks.

Pre-Test and Post-Test Scores:

Students	Pre-Test Score (25)	Post-Test Score (25)	Difference (Post test-Pre test)
Dhanya Sree N	6	11	5
Dharani A	9	17	8
Jafiya Mahjamin R	5	12	7
Janani S	7	15	8
Kayalvizhi N	3	7	4
Madhumitha M	5	14	9
Oviya S	8	13	5
Sandhiya S	5	11	6
Shalamath A	10	18	8
Sharnika K	12	21	9



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IMITATIONS OF THE STUDY

Although the research highlighted notable improvements in the sentence construction skills of non-native English speakers, certain limitations were observed:

i. Time Constraints for Comprehensive Implementation

» The intervention was limited to a two-month duration, restricting opportunities for reinforcing grammar concepts over time.

» A longer study period might have provided deeper insights into sustained improvements and al lowed for more gradual mastery of sentence construction techniques.

ii. Variability in Student Learning Styles

» Students exhibited diverse preferences and learning paces, making it challenging to design activities that engaged all learners equally.

» Some students responded positively to contextual, interactive tasks such as storytelling and role-playing, while others preferred more structured, rule-based grammar exercises.

iii. External Factors Impacting Consistency

» Classroom disruptions, such as school events and occasional absenteeism, affected the continuity of instruction.

» Variations in students' motivation levels influenced the effectiveness of contextual grammar activities.

CONCLUSION

This action research showed that contextual grammar teaching, when integrated into the curriculum, significantly improves sentence construction skills among non-native speakers. The findings of the study showed that the students were more accurate, varied, and fluent in sentence formation when grammar instruction was embedded in meaningful contexts such as literature discussions, creative writing tasks, and real-world communication scenarios. This approach makes grammatical concepts more practical and natural to apply rather than isolated rule-based lessons.

In addition, regular authentic sentence construction opportunities reinforced grammar rules and encouraged student engagement. Storytelling, peer feedback exercises, and collaborative learning strategies improved sentence construction abilities while fostering a supportive and dynamic learning environment. The findings emphasize the need to move toward a contextual, interactive approach to grammar instruction for sustained language development among non-native learners.

SUGGESTIONS FOR FUTURE IMPLEMENTATION

* Conducting research over a longer period would help assess the lasting impact of contextual grammar teaching on sentence construction skills. This would provide insights into how students retain and apply grammar concepts in their writing over time.

* Incorporating interactive learning platforms and educational apps can provide personalised grammar practice and instant feedback for students.

* Digital storytelling tools and grammar games may further enhance student engagement.

* Tailoring activities to accommodate diverse learning styles and abilities would ensure that all students benefit from contextual grammar teaching.

* Using visual aids, audio content, and kinaesthetic tasks to support different learner needs.

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BEYOND MEMORIZATION: IMPROVING STUDENT UNDERSTANDING OF ALGEBRAIC IDENTITIES

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ABSTRACT

The study investigates how different teaching methodologies such as visual representations, real-world applications, inquiry-based learning, and interactive activities can help students grasp the logic behind algebraic identities. By actively engaging students in problem-solving and pattern recognition, the research seeks to improve their ability to apply identities flexibly in various mathematical contexts. A sample of 10 students of class VIII in C.S.I. St. Paul's Higher Secondary School, Vepery were selected. Questionnaire, Teaching and learning materials, Laptop and Chalkboard and Mathematical software GeoGebra were used as assessment tools. Findings proved that there was a significant positive improvement in the test scores of the students. This indicates that the strategies and techniques implemented were effective in enhancing their understanding of algebraic identities.

INTRODUCTION

"The study of algebraic expressions is nothing less than the study of structures, and structures are what give mathematics its power."

— Saunders Mac Lane

Action research is a research method that aims to simultaneously investigate and solve an issue. In other words, as its name suggests, action research conducts research and takes action at the same time. There are two types of action research those are: Participatory and Practical action researches.

Mathematics, particularly Algebra, is often taught in a way that emphasizes memorization rather than deep understanding. Many students struggle with algebraic identities because they focus on rote learning rather than conceptual comprehension. This action research aims to explore and implement strategies that move beyond memorization to enhance students' understanding of algebraic identities.

The study investigates how different teaching methodologies such as visual representations, real-world applications, inquiry-based learning, and interactive activities can help students grasp the logic behind algebraic identities. By actively engaging students in problem-solving and pattern recognition, the research seeks to improve their ability to apply identities flexibly in various mathematical contexts.

Through classroom observations, student feedback, and performance assessments, this research will evaluate the effectiveness of alternative teaching strategies in fostering a deeper conceptual understanding. The ultimate goal is to bridge the gap between memorization and meaningful learning, equipping students with the skills necessary for advanced mathematical reasoning.

Algebraic Identities

Algebraic identities are mathematical equations that hold true for all values of the variables involved. These identities are used to simplify expressions, factorize polynomials, and solve algebraic problems efficiently. Understanding algebraic identities is crucial for students as they form the foundation for advanced topics in algebra, calculus, and beyond.

Common Algebraic Identities

1. Square Identities

$$(a+b)^2 = a^2 + 2ab + b^2$$

$$(a-b)^2 = a^2 - 2ab + b^2$$

2. Product Identities

$$(a+b)\ (a-b) = a^2 - b^2$$

3. Cube Identities

$$(a+b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$$

$$(a-b)^3 = a^3 - 3a^2b + 3ab^2 - b^3$$

4. Expansion and Factorization Identities

$$a^3 + b^3 = (a+b)\,(a^2 - ab + b^2)$$

$$a^3 - b^3 = (a-b)\,(a^2 + ab + b^2)$$

5. Other Important Identities

$$(x+a)\,(x+b) = x^2 + (a+b)x + ab$$

These identities are widely used in algebraic manipulations, including simplification of expressions, solving equations, and proving mathematical theorems.

A deep understanding of algebraic identities helps students move beyond memorization, allowing them to apply these concepts effectively in problem-solving.

NEED OF STUDY

Mathematics is often perceived as a challenging subject by students due to various factors related to its concepts. One major reason is the visual resemblance among different mathematical identities, properties, and formulas, which makes it difficult for students to distinguish between them. This study aims to identify the specific challenges students face in learning mathematics, particularly in recognizing and differentiating similar algebraic identities. By analysing these difficulties, the research seeks to develop strategies to enhance students' understanding and improve their ability to apply mathematical concepts effectively.

CAUSES OF THE PROBLEM

A sample of 10 students of class VIII in C.S.I. St. Paul's Higher Secondary School, Vepery was closely observed and personally interviewed. Some of the probable causes for the problem are given below.

- The resemblance in notations, identities, and formulas used in Mathematics.
- Students' lack in focus and concentration during lessons.
- Lack of interest among students in learning Mathematics.
- Inadequate understanding of mathematical concepts.
- Influence of human perception laws.

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- Difficulty in distinguishing different mathematical identities.
- Other external or indirect factors.

OBJECTIVES OF THIS ACTION RESEARCH

The main objectives of this action research are:

* To find out the challenges students face in Algebra.
* To examine the difficulties in Mathematics caused by the similarity of different algebraic identities.
* To assist students in recognizing different algebraic identities.
* To support students in distinguishing between similar algebraic identities.
* To use various strategies and methods in teaching to algebraic expression and equations.

HYPOTHESIS OF THIS ACTION RESEARCH

Significant positive knowledge inculcation in learning and differentiating algebraic identities is evident among the high school students.

TOOLS

The following resources were used to carry out the action research:

i. Questionnaire
ii. Teaching and learning materials
iii. Laptop and Chalkboard
iv. Mathematical software GeoGebra

PLAN OF ACTION

Day 1: Introduction to Algebraic Identities

Method: Storytelling & Simple Examples

- Algebraic identities using simple real-life examples (e.g., area of squares and rectangles).
- Short story or analogy to introduce the concept of patterns in Algebra.
- Simple numerical examples before introducing variables.

Day 2: Visual Learning through Drawings & Models

Method: Geometric Approach

- Demonstrate using cut-out squares.
- Draw and colour different algebraic expressions.

Day 3: Hands-on Learning with Objects

Method: Activity-Based Learning

- Algebra tiles or paper cut-outs to model identities physically.
- Matchstick or LEGO puzzles to build algebraic patterns.
- A group activity where students arrange number patterns.

Day 4: Discovering Patterns on Their Own

Method: Inquiry-Based Learning

- Numerical expressions to find similarities.
- Derive identities by observing patterns.
- Step-by-step guided worksheets to make them think critically.

Day 5: Relating Identities to Daily Life

Method: Real-Life Applications

- Role of algebraic identities in architecture, speed calculations, or banking.
- Story problems to apply identities.
- Real-life examples of algebra (e.g., area of rooms).

Day 6: Learning with Technology & Videos

Method: Digital Learning

- GeoGebra or animation videos to show algebraic identities in motion.
- Interactive math games online where students solve identity-based puzzles.
- Verifying answer using calculators or apps.

Day 7: Fun with Games and Quizzes

Method: Gamification

- Play Bingo with algebraic expressions and answers.
- Matching game to pair algebraic expressions with their expansions.
- Rapid-fire quiz to quickly recognize and apply identities.

Day 8: Learning from Each Other

Method: Peer Teaching & Group Work

- Group activities to explain identities to each other.
- Conduct a role-play activity as teachers to teach their peers.
- Group discussions and sharing of different problem-solving method.

Day 9: Applying Algebraic Identities to Problem-Solving

Method: Higher-Order Thinking

- Challenging puzzles that require combining identities.
- Forming question on algebra and swap them with classmates.
- Step-by-step guided worksheets for practice.

Day 10: Revision & Confidence Boosting

Method: Mixed Approach

- Summarizing all identities using flashcards and quick recaps.
- Fun quiz competition to reinforce concepts.
- Motivational feedback to make students feel confident in algebra.

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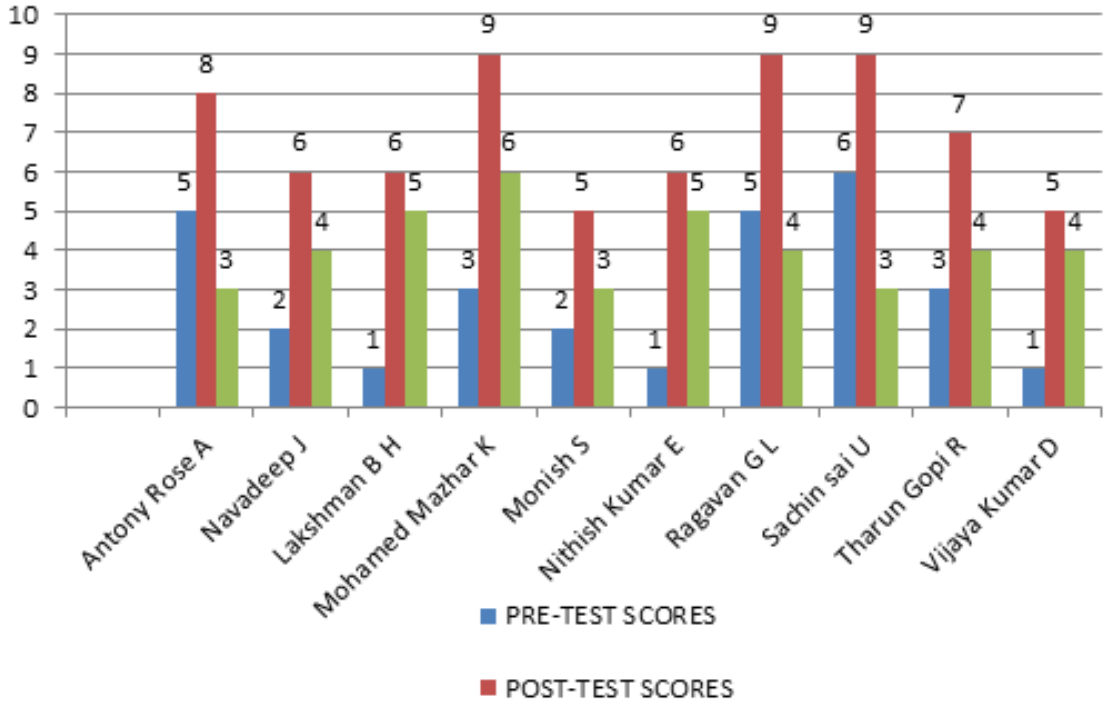
STATISTICAL ANALYSIS

Statistical evidences are to support the view pints of the investigator on the interpretation of the results availed after the conduct of the research on the selected topics using the specific tools designed or adapted. In this action research the score difference is considered to find the difference in performance of the school children with respect to their writing skills ability in using the algebraic expression. The comparison is done between the pre-test and post-test scores and presented in the following table 1.

Pre-Test and Post-Test Scores

S.No	Name of the student	Pre-test	Post-test	Difference
1	Antony Rose A	5	8	3
2	Navadeep J	2	6	4
3	Lakshman B H	1	6	5
4	Mohamed Mazhar K	3	9	6
5	Monish S	2	5	3
6	Nithish Kumar E	1	6	5
7	Ragavan G L	5	9	4
8`	Sachin Sai U	6	9	3
9	Tharun Gopi R	3	7	4
10	Vijaya Kumar D	1	5	4

Comparison of Pre-Test and Post-Test Scores



DISCUSSION AND INTERPRETATION

From Table 1 and Figure 1, it is evident that there was a significant positive improvement in the test scores of the students. This indicates that the strategies and techniques implemented were effective in enhancing their understanding of algebraic identities. The notable progress observed confirms that the objective of this action research was successfully achieved by focusing on key concepts and employing targeted instructional methods to strengthen students' mathematical skills in terms of Algebra.

DELIMITATIONS OF THE STUDY

- Due to the time constraint the minimal aspects of were focused.
- Sporadic attendance of the students.
- The careless attitude and interest of students.

SUGGESTIONS FOR FUTURE IMPLEMENTATION

- The study can be expanded by allocating more time for research sessions within the academic schedule.
- Flexible learning approaches, such as after-school programs or weekend workshops, can be introduced.
- The framework can be enhanced by integrating technology-based tools to improve student engagement.
- Collaborative learning methods, including peer tutoring and group activities, can be implemented.

CONCLUSION

Mathematics serves as a fundamental tool across various fields, including science, engineering, medicine, and social sciences. Therefore, it is crucial for students to develop a strong foundation in mathematical concepts learned in school. This action research aimed to enhance students' understanding of algebraic identities through the implementation of effective teaching strategies and techniques. The findings indicate significant improvement in students' comprehension and performance, highlighting the effectiveness of the methods used. By incorporating interactive and structured approaches, teachers can help students grasp complex mathematical concepts more effectively, ultimately strengthening their problem-solving skills and overall academic success.

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EFFECTIVE TECHNIQUES FOR ENHANCING THE RETENTION OF PHYSICS FORMULAS AMONG HIGHER SECONDARYSTUDENTS

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ABSTRACT

This research aims to explore and analyze the effective strategies that can improve students' retention of Physics formulas. By identifying the challenges students face and evaluating various retention techniques, this study seeks to provide practical solutions for educators and learners alike. The study is conducted among the higher secondary students and the formulas were taught using visual aids, mnemonics, gamification and group learning strategies. Pre-test and Post-test were conducted before and after the implementation of the strategies. Findings revealed significant improvement in the students' scores. The findings will contribute to the development of better teaching practices, ultimately enhancing students' engagement and performance in Physics.

INTRODUCTION

Physics is a fundamental subject that helps students understand the natural world through mathematical relationships and scientific principles. However, many high school students struggle with retaining Physics formulas, which are essential for problem-solving and academic success. The inability to recall and apply these formulas effectively often results in decreased confidence, lower performance in exams, and a lack of interest in the subject.

Traditional methods of memorization, such as rote learning, may not be effective in ensuring long-term retention. Instead, incorporating innovative techniques like visualization, mnemonic strategies, active learning, and technology-based approaches can significantly enhance students' ability to remember and apply Physics formulas.

NEED OF THE STUDY

In the beginning of sixteen-weeks internship, the researcher observed struggles faced by students of class XI in memorizing formulas. The major problem was identified was lack of understanding about the formulas. Physics is a subject that requires both conceptual understanding and the ability to recall and apply numerous formulas. Many high school students struggle with retaining Physics formulas, which affects their problem-solving abilities and overall academic performance. Poor retention of formulas may lead to a lack of confidence, reduced interest in Physics, and lower scores in examinations. Hence, this study aims to explore effective techniques to enhance students' ability to remember and apply Physics formulas efficiently.

PROBABLE CAUSES FOR THE PROBLEM

i. **Lack of Conceptual Understanding –** Students often memorize formulas without understanding their derivation and application.
ii. **Rote Learning Methods –** Traditional memorization techniques may not be effective in long-term retention.
iii. **Limited Practice and Application –** Insufficient problem-solving practice prevents reinforcement of formulas.
iv. **Lack of Mnemonic Techniques –** Students are not exposed to memory- enhancing strategies like mnemonics or visualization.

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v. **Cognitive Overload –** Too many formulas to remember at once may overwhelm students.

vi. **Absence of Engaging Learning Tools –** Lack of interactive and engaging learning methods, such as games or digital tools, hinders retention.

OBJECTIVES OF THE ACTION RESEARCH

- To identify the challenges faced by higher secondary students in retaining Physics formulas.
- To explore and implement innovative techniques such as visualization, mnemonic devices, and active learning strategies.
- To evaluate the effectiveness of different retention techniques through student performance analysis.
- To develop a structured approach that helps students retain and apply Physics formulas with ease.
- To recommend best practices for Physics educators to enhance students' memory retention skills.

HYPOTHESIS OF THE ACTION RESEARCH

The implementation of memory-enhancing techniques, such as mnemonics, visualization, and active learning, significantly improves the retention of Physics formulas among higher secondary students.

This research aims to provide practical solutions that can be integrated into Physics education to improve students' learning experiences and academic performance.

STRATEGIES ADOPTED

- Visual aids
- Mnemonics
- Gamification
- Group learning

PRE-TEST

During the test, Grade XI students were required to answer a set of questions. Based on their performance, they were classified into different categories and provided with the necessary support to enhance their retention of Physics formulas.

PLAN OF ACTION

DAY 1 – Introduction to Physics Formulas

Students are introduced to the fundamental Physics formulas, their significance, and their applications in problem-solving. This session aims to build a strong conceptual foundation and highlight the importance of formula retention.

DAY 2 – Group-Based Reading of Formulas

Students are divided into small groups and encouraged to read, discuss, and familiarize themselves with key Physics formulas. Collaborative learning helps in better understanding and initial memorization of the concepts.

DAY 3 – Visualization Using Formula Cards

Formula cards with diagrams, real-life applications, and step-by-step breakdowns are used to help students visualize and connect formulas with practical scenarios, enhancing retention.

DAY 4 – Using Mnemonics

Students are taught mnemonic techniques such as acronyms, rhymes, and memory associations to make recalling Physics formulas easier and more engaging.

DAY 5 – Gamification Methods

Interactive games and competitive learning activities are introduced to make the process enjoyable and reinforce formula retention in a fun and engaging way.

DAY 6 – Group Learning

Students participate in peer discussions and collaborative exercises to reinforce formulas through group-based learning strategies.

DAY 7 – Repetition and Retention

A structured review session is conducted where students repeatedly practice formulas through written exercises, verbal recall, and conceptual application to strengthen long-term memory.

DAY 8 – Individual Evaluation

Each student undergoes an individual assessment to measure their progress and retention level. Personalized feedback and additional support are provided based on their performance.

POST-TEST

The students' scores showed significant improvement after reattempting the same questions in the post-test. This valuable experience has empowered them with essential skills, enhancing their academic performance and preparing them for higher studies.

STATISTICALANALYSIS AND GRAPHICAL REPRESENTATION

NAMES	PRE-TEST (50)	POST-TEST (50)	DIFFERENCE
Student 1	12	46	34
Student 2	14	44	30
Student 3	8	40	32
Student 4	10	44	34
Student 5	16	48	32
Student 6	8	38	30
Student 7	10	42	32
Student 8	6	34	28
Student 9	12	42	30
Student 10	6	38	32
Total	102	416	314
Percentage	**20.4%**	**83.2%**	**62.8%**

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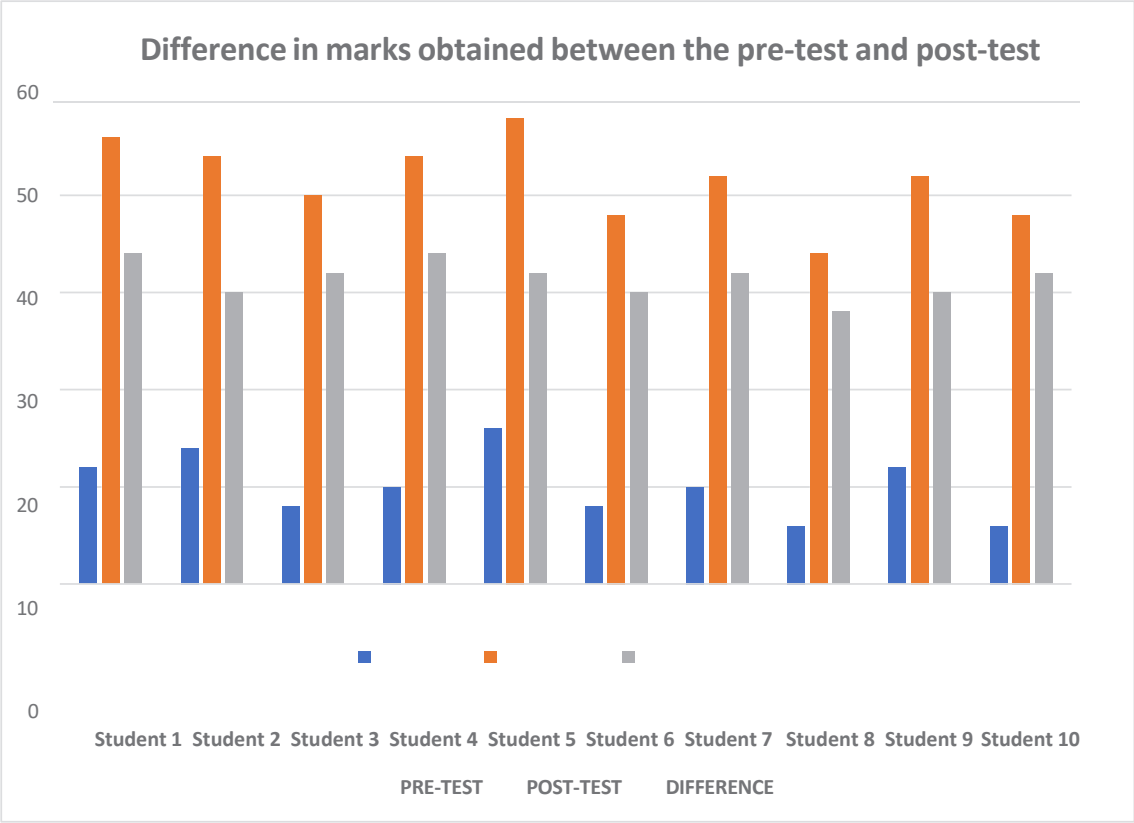

INTERPRETATION

The marks scored by the students in the pre-test (20.4%) and the post-test (83.2%) indicate significant development in their retention of formulas. However, the significant difference in percentage (62.8%) between the pre-test and post-test indicates a significant improvement in students' performance.

FINDINGS OF THE STUDY

- Students demonstrated a significant improvement in retaining and recalling Physics formulas after implementing various learning techniques.
- Visualization, mnemonics, gamification, and group learning proved to be highly effective in en hancing formula retention.
- Students showed increased confidence in solving Physics problems, leading to better academic performance.
- Repetition and active engagement played a crucial role in strengthening long-term memory.
- The interactive and structured approach helped reduce students' reliance on rote memorization.

INFERENCE

The study confirms that innovative learning techniques positively impact students' ability to retain and apply Physics formulas. By integrating visual aids, memory-enhancing strategies, and collaborative learning, students not only improve their recall but also develop a deeper understanding of the subject.

LIMITATIONS OF THE STUDY

- The study is limited to eleventh standard students only.
- It is undertaken only for Physics students.
- Only English medium students have been taken into consideration.

SUGGESTIONS FOR FURTHER IMPLEMENTATION

- Educators should incorporate diverse learning strategies such as mnemonics, visual representations, and gamified learning to enhance students' retention skills.
- Schools can introduce structured formula retention programs to help students prepare for competitive exams.
- The use of technology, such as interactive apps and simulations, can further strengthen the learning process.
- Further research can explore the long-term impact of these techniques and its effectiveness across different subjects.

CONCLUSION

The research highlights the significance of implementing effective retention techniques significantly improves students' ability to remember and apply Physics formulas. By making learning more engaging and interactive, students develop confidence and perform better academically. These findings suggest that a structured approach to formula retention can be a valuable addition to Physics education, benefiting students in both their current studies and future academic pursuits.

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THE IMPACT OF GAMIFIED LEARNING ON STUDENTS' UNDERSTANDING OF BASIC GRAMMAR

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ABSTRACT

Gamification involves applying game design elements, such as points, rewards, competition, and levels, to non-game contexts, creating a more interactive and motivating learning experience. This method taps into the intrinsic motivations of students, fostering a sense of achievement and fun while also facilitating deeper learning. This research seeks to explore the impact of gamified learning on students' understanding of basic grammar. By using game-like elements, the study aims to assess whether such approaches can enhance students' retention and application of grammatical rules, increase motivation, and promote a positive attitude toward learning grammar. The findings could provide valuable insights into the effectiveness of gamification as a tool for improving grammar and gives recommendations for integrating game-based learning strategies in the classroom.

INTRODUCTION

Action research is a method of inquiry where researchers work collaboratively with participants (often in real-world settings) to address specific problems or improve practices. It is a cyclical process that involves identifying an issue, planning a course of action, implementing the plan, observing the results, and reflecting on the outcomes. The key feature of action research is its focus on practical solutions, and it often leads to immediate changes or improvements within the context in which the research is conducted. Probing on teaching basic grammar using gamified learning is one section in an English Classroom for which action research proves to be effective.

In recent years, the integration of gamified learning into educational practices has gained significant attention as an innovative approach to enhance student engagement and improve learning outcomes. Gamification involves applying game design elements, such as points, rewards, competition, and levels, to non-game contexts, creating a more interactive and motivating learning experience. This method taps into the intrinsic motivations of students, fostering a sense of achievement and fun while also facilitating deeper learning. Traditional grammar instruction, often perceived as monotonous and rule-driven, can lead to disengagement and hinder students' ability to apply grammatical concepts effectively. The introduction of gamification aims to address this issue by turning grammar lessons into more dynamic and enjoyable experiences, where students actively participate, compete, and receive immediate feedback. This research seeks to explore the impact of gamified learning on students' understanding of basic grammar. By using game-like elements, the study aims to assess whether such approaches can enhance students' retention and application of grammatical rules, increase motivation, and promote a positive attitude toward learning grammar. The findings could provide valuable insights into the effectiveness of gamification as a tool for improving grammar education and offer practical recommendations for integrating game-based learning strategies in the classroom.

NEED OF THE STUDY

Increase Student Engagement: Gamification makes grammar lessons more interesting, helping students stay engaged.

Better Retention: Using games may help students remember grammar rules more effectively.

Active Learning: Gamification encourages students to actively practice and apply grammar, improving their understanding.

Instant Feedback: Games provide quick feedback, helping students correct mistakes and learn faster.

Cater to Different Learning Styles: Gamification can appeal to different types of learners through interactive activities and multimedia.

Evaluate Gamification's Effectiveness: The study will explore how well gamified learning works for teaching grammar.

PROBABLE CAUSES FOR THE PROBLEM

i. **Lack of Motivation:** Students often find grammar hard and unexciting, leading to low motivation to learn.

ii. **Difficulty in Applying Rules:** Grammar rules can be abstract and hard for students to apply in real-life situations.

iii. **Fear of Mistakes:** Grammar is often seen as a subject where mistakes are penalized, leading to anxiety and hesitation in students.

iv. **Lack of Immediate Feedback:** Students might not get timely feedback to correct their mistakes, leading to confusion or misunderstanding of grammar rules.

v. **Overemphasis on Memorization:** Focusing too much on memorizing grammar rules rather than understanding them may reduce students' ability to apply those rules effectively.

OBJECTIVE OF THE ACTION RESEARCH

To explore the impact of gamified learning on improving students' understanding and retention of basic grammar concepts.

HYPOTHESIS OF THE ACTION RESEARCH

Gamified learning will significantly improve students' understanding, retention, and application of basic grammar concepts compared to traditional teaching methods.

TOOLS USED

1. Observation
2. Questionnaire
3. Game

STRATEGIES ADOPTED

1. ***Gamified Grammar Activities:*** Incorporating interactive game-based activities like quizzes, puzzles, and challenges to teach grammar concepts in a fun and engaging way.
2. ***Points and Rewards System:*** Using a points system, badges, or rewards to motivate students and recognize their progress in mastering grammar rules.
3. ***Real-Time Feedback:*** Providing instant feedback during game activities to help students understand their mistakes and correct them immediately.
4. ***Incorporating Storylines:*** Creating narrative-driven activities where students unlock new grammar lessons or levels by progressing through a story, adding excitement and context to learning.
5. ***Friendly Competitions:*** Holding fun competitions where students can challenge each other to see who can answer grammar questions correctly the fastest.

PLAN OF ACTION

Day 1: Generally tests are conducted to gauge student progress and identify learning gaps. For this study

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first a pre-test on basic grammar concepts like verb tenses, sentence structure, punctuation, and parts of speech was conducted to students of class-VIII to assess their understanding and usage of it. Based on the result of this test, 10 students who were not able to perform well in the test were identified and selected for Action Research.

Day 2: ***Nouns*** **-** The investigator conducted a treasure hunt for the selected students where they had to find and list nouns around them – like names of persons, things, places.

Day 3: ***Verbs*** **–** The investigator encouraged the students to play charades! Students acted out verbs like "run," "sleep," or "dance," and others guessed them.

Day 4: ***Tenses*** **-** The investigator conducted a ball toss game. One student gave a sentence in present tense, and the next had to change it to past tense.

Day 5: ***Adjectives*** **-** One student described an object using adjectives, another had to draw it based on the description and others tried to guess it. It was fun and helped them learn describing words.

Day 6: ***Parts of Speech*** **–** The investigator divided the students into two groups; gave each group word cards to sort them into noun, verb, tense, adjective, etc. – as a team challenge.

Day 7: ***Sentence Structure*** **-** A sentence-building relay game was conducted. Each student added one word to build a correct and meaningful sentence.

Day 8: ***Punctuation*** **-** Students were grouped into pairs and were given unpunctuated sentences. They became 'punctuation detectives' – fixing the errors in pairs.

Day 9: ***Error Correction*** **-** Students were encouraged to play Grammar Bingo where they had to spot grammar errors and mark the correct ones on bingo cards.

Day 10: ***Sentence Rearrangement*** **-**The investigator divided the students into two teams. Each team was given jumbled words of sentences. They had to race to form proper sentences to win.

Day 11: ***Articles (a, an, the) - Article Basket Toss*** **-** Students were asked to pick words and throw a ball into baskets labelled 'a', 'an', or 'the' based on words they picked.

Day 12: ***Prepositions - Position it Right!*** **-** Using classroom objects (like a pen and box), students acted out or guessed prepositions like 'in', 'on', 'under', 'between' etc.

Day 13: ***Subject-Verb Agreement - Correct or Crack!*** **-** Sentences were shown on flashcards. Students had to stand if the subject-verb match was correct, sit if wrong.

Day 14: ***Pronouns - Pronoun Swap*** **-** Students were given sentences with repeated nouns and had to rewrite or say them using proper pronouns. Peer correction added fun.

Day 15: ***Review Day*** **–** The investigator held a Grammar Quiz with all the topics covered. It helped the students to recall all they had learned.

POST - TEST

A post - test was conducted to assess the improvement in students' understanding, retention, and application of basic grammar concepts.

STATISTICAL ANALYSIS

STUDENT	PRE - TEST SCORE (14)	POST - TEST SCORE (14)	DIFFERENCE
Student 1	6	11	5
Student 2	8	13	5

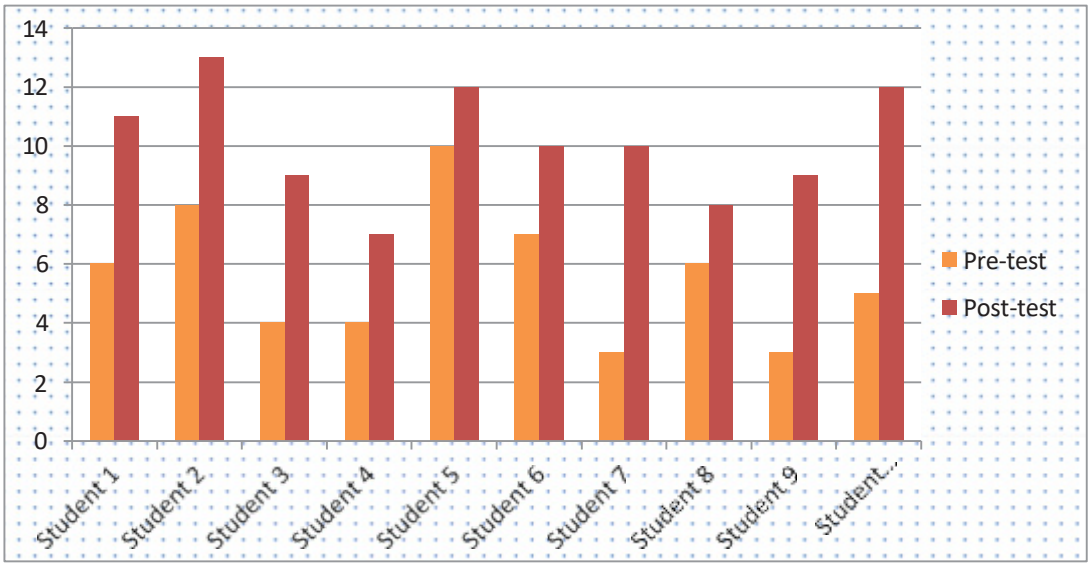
Student 3	5	12	7
Student 4	4	7	3
Student 5	10	12	2
Student 6	7	10	3
Student 7	3	10	7
Student 8	6	8	2
Student 9	3	9	6
Student 10	4	9	5
AVERAGE	**5.6**	**10.1**	**4.5**

INTERPRETATION

The comparison of pre-test and post-test scores shows a significant improvement in students' understanding of basic grammar after implementing gamified learning strategies. All the students demonstrated progress, with the average score increasing from 5.6 in the pre-test to 10.1 in the post-test. The average improvement was 4.5 points, indicating that gamified learning had a positive impact.

GRAPHICAL REPRESENTATION

Comparison of Pre-Test and Post-Test Scores



FINDINGS OF THE STUDY

- All the students showed an increase in their post-test scores compared to the pre-test, indicating a clear improvement in their understanding of basic grammar concepts after the use of gamified learning strategies.
- Through classroom observation, it was noted that students were more enthusiastic, actively participated in activities, and showed a positive attitude toward grammar lessons when game-based elements were included.

- Students felt more comfortable participating, asking questions, and practicing grammar in a game-based setting.

INFERENCE

The study shows that gamified learning has a positive impact on students' understanding of basic grammar. It made learning more engaging, reduced fear and hesitation, and helped students grasp concepts more quickly. The improvement in post-test scores proves that using games in grammar lessons can be an effective teaching strategy, especially for students who struggle with traditional methods.

SUGGESTIONS FOR FUTURE IMPLEMENTATION

Include More Digital Tools: Use apps or online platforms to create grammar games that offer interactive and self-paced learning experiences.

Blend Gamification with Traditional Methods: Combine games with regular grammar teaching to ensure both fun and structure in learning.

Customize Games for Different Levels: Design grammar games based on students' skill levels so all learners can benefit and stay motivated.

CONCLUSION

The action research clearly shows that gamified learning is an effective method for improving students' understanding of basic grammar. It made the lessons more enjoyable, increased student participation, and helped reduce fear and boredom related to grammar. The improvement in post-test scores proves that gamification can enhance learning outcomes. Therefore, using game-based methods in the classroom is a valuable strategy for teaching grammar more effectively.

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ENHANCING STUDENTS' LEARNING AND UNDERSTANDING BY CONCEPTUALIZATION AND MIND MAPPINGS

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ABSTRACT

This action research investigates the implementation of conceptualization and mind mapping strategies in classroom instruction to determine their influence on students' academic performance and depth of understanding. The study involves closely monitoring students' levels of engagement, comprehension of the material, and responses through structured feedback. By analyzing these elements, the research aims to generate practical recommendations for educators who are looking to adopt innovative, student-centered approaches that promote active learning, improve retention of concepts, and create a more meaningful and engaging educational experience.

INTRODUCTION

In today's rapidly evolving educational environment, the focus has gradually shifted from rote memorization to meaningful learning. With the explosion of information and the complexity of subjects, students often struggle to retain, relate, and apply knowledge effectively. Conceptualization and mind mapping have emerged as powerful cognitive tools to enhance understanding, foster deeper learning, and improve memory retention. Conceptualization involves organizing ideas into coherent frameworks, enabling students to see the connections between concepts. Mind mapping, developed by Tony Buzan, is a visual representation of information that mimics the way the brain processes data—through associations and patterns.

By integrating these methods into the classroom, students are not just passive recipients of information but become active participants in their learning journey. Mind maps encourage creativity and help students visualize relationships among ideas, thus making abstract concepts more tangible. When used regularly, these strategies help in building critical thinking, improving problem-solving skills, and promoting a deeper grasp of content.

Despite their proven benefits, conceptualization and mind mapping are underutilized in many traditional classrooms, which still emphasize lecture-based and textbook-driven learning. There is a need to explore how these strategies can be more systematically integrated into classroom practices to improve learning outcomes.

This action research focuses on applying conceptualization and mind mapping techniques in the classroom to identify their effect on students' understanding and academic performance. By analyzing students' engagement, comprehension levels, and feedback, this study aims to provide practical insights for educators seeking to make learning more effective, engaging, and meaningful.

NEED OF THE STUDY

The need for this study arises from a growing concern regarding students' inability to grasp and retain complex academic content, especially in subjects requiring critical thinking and conceptual clarity. Despite their efforts, many students find it difficult to make meaningful connections between topics, leading to superficial learning and poor academic performance.

In classroom observations and feedback sessions, it was found that students tend to memorize information for exams without truly understanding the concepts. This method fails in the long run, as students

often forget the material quickly and cannot apply the knowledge in real-life scenarios or interdisciplinary contexts. The traditional method of teaching—where teachers dictate notes and students reproduce them—does not accommodate different learning styles, nor does it engage higher-order thinking skills.

Conceptualization and mind mapping offer a promising solution to this issue. These techniques appeal to visual, kinesthetic, and analytical learners alike. By organizing content visually and logically, they help students break down complex information into manageable chunks, identify relationships between ideas, and reconstruct the material in a personally meaningful way.

Furthermore, today's learners are digital natives and respond better to interactive and visually engaging content. Mind maps and conceptual frameworks align well with these preferences and can be integrated with digital tools and apps to further enhance learning.

This study is needed to examine whether the systematic implementation of these techniques can genuinely improve understanding, promote long-term retention, and enhance classroom engagement. It will also explore the practicality of applying these tools in a real classroom setting and assess students' perceptions of their usefulness.

PROBA BLE CAUSES FOR THE PROBLEM

i. **Overemphasis on Rote Learning:** One of the most significant contributors to the lack of deep understanding among students is the emphasis on rote memorization. Students often prioritize remembering facts over understanding concepts, leading to shallow learning.

ii. **Lack of Visual Learning Tools:** Many classrooms rely heavily on textbook-based and lecture-driven instruction. Visual aids such as diagrams, mind maps, and charts are either absent or used occasionally, leaving visual learners underserved.

iii. **Limited Teacher Awareness or Training:** Not all educators are familiar with or trained in modern teaching strategies like conceptualization and mind mapping. As a result, these techniques are rarely introduced or effectively applied in classrooms.

iv. **Inflexible Curriculum and Time Constraints:** The pressure to complete the syllabus within a limited timeframe discourages teachers from experimenting with new teaching techniques, even if they are beneficial in the long term.

v. **Passive Learning Environment:** Traditional teaching methods foster passive learning, where students are expected to listen and take notes rather than engage actively with the content. This approach hinders deep processing and long-term retention.

vi. **Lack of Student Motivation**: When students find content abstract or unrelated to their lives, they often disengage. Conceptualization and mind mapping make learning more relatable and interactive, which can potentially improve motivation.

vii. **Assessment Patterns:** Standardized assessments focus more on factual recall than conceptual understanding. This encourages surface-level learning rather than deep engagement with the subject matter. Cognitive Overload: When students are bombarded with a large amount of disconnected information, it can lead to cognitive overload. Mind mapping helps in organizing this information into structured, digestible pieces.

OBJECTIVES OF THE ACTION RESEARCH

- To assess the effectiveness of mind mapping and conceptualization techniques in improving students' understanding of academic content.
- To evaluate the impact of these strategies on students' engagement and motivation in the classroom.
- To compare academic performance before and after the implementation of mind mapping techniques.
- To identify students' attitudes and preferences toward visual learning strategies.

- To enhance teachers' capacity to implement mind mapping and conceptual frameworks in daily teaching.
- To promote independent and self-directed learning among students through these tools.

HYPOTHESES OF THE ACTION RESEARCH

This action research hypothesizes that the incorporation of conceptualization and mind mapping strategies in classroom instruction will lead to a significant improvement in students' comprehension, retention, and academic performance. It is anticipated that these tools will promote active engagement, better organization of information, and enhanced critical thinking skills. Furthermore, the study predicts that students will show a more positive attitude toward learning when these strategies are implemented consistently. The hypothesis also assumes that both high-achieving and struggling students will benefit from these visual learning approaches.

STRATEGIES ADOPTED

1. Mind Mapping Workshops: Regular workshops were conducted to train students on how to create effective mind maps across subjects.
2. Conceptual Framework Templates: Teachers designed and distributed conceptual templates to guide students in organizing and connecting ideas.
3. Interactive Visual Tools: Use of digital tools (e.g., MindMeister, Coggle) in the classroom to promote collaborative mind mapping and real-time brainstorming. 4. Reflective Learning Journals: Students maintained journals to reflect on how conceptualization and mapping helped them understand lessons better.

This study reaffirms the importance of innovative teaching methods in the 21st-century classroom. When students are actively involved in their learning process, they become more motivated and perform better academically.

Conceptualization and mind mapping are not only effective but also adaptable tools that can be applied across subjects and grade levels. They bridge the gap between theory and practice, making abstract concepts more accessible and memorable.

As educational environments continue to evolve, it is imperative for educators to embrace such strategies and create a learning atmosphere that is inclusive, engaging, and conducive to long-term success. Future research may focus on expanding this approach across different age groups and subjects to assess its universal applicability and effectiveness

PRE-TEST

During of pre -test, the grade 11 students were asked to answer set of questions. Based on their performances, they were classified into different categories and provided with the necessary support to enhance their performances.

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PLAN OF ACTION (8 Days)

Day 1: Introduction to Mind Mapping and Conceptualization - Brief students about the goals of the project.

- Demonstrate the concept of mind mapping and conceptual frameworks using simple examples.
- Conduct a pre-assessment test to evaluate existing understanding.

Day 2: Training Session on Creating Mind Maps

- Teach students how to create effective mind maps manually and digitally.
- Provide hands-on practice with guided examples from familiar topics.
- Encourage collaborative mapping in small groups.

Day 3: Application in Core Subjects and topics

- Integrate mind mapping with Science topic.
- Students create mind maps in groups and present them to the class.
- Provide feedback and suggestions for improvement.

Day 4: Application in Core Subjects in different topics

- Use conceptualization strategies to explore different topics.
- Allow students to build conceptual charts and flow diagrams.
- Emphasize problem-solving and logical structuring.

Day 5: Independent Mind Mapping Activity

- Assign a topic from the syllabus for individual mind map creation.
- Encourage creativity and use of color/imagery.
- Evaluate mind maps using a rubric.

Day 6: Reflective Discussion and Peer Review

- Organize a peer-review session where students exchange and critique each other's maps.
- Conduct a reflective journal activity where students note their learning experiences.

Day 7: Integration with Digital Tools

- Introduce digital tools like MindMeister or Coggle for creating mind maps.
- Guide students in creating digital mind maps and saving/sharing them.

Day 8: Post-Assessment and Feedback

- Conduct a post-assessment test to measure improvement.
- Gather feedback through a student questionnaire on the effectiveness of the strategies.
- Summarize findings and discuss future applications with the class.

POST TEST

The students scores showed significant improvements after reattemting the same questions from pre- test.

STATISTICAL ANALYSIS AND GRAPHICAL REPRESENTATIONS

NAMES	PRE-TEST (50)	POST-TEST (50)	DIFFERENCE
Student 1	12	46	34
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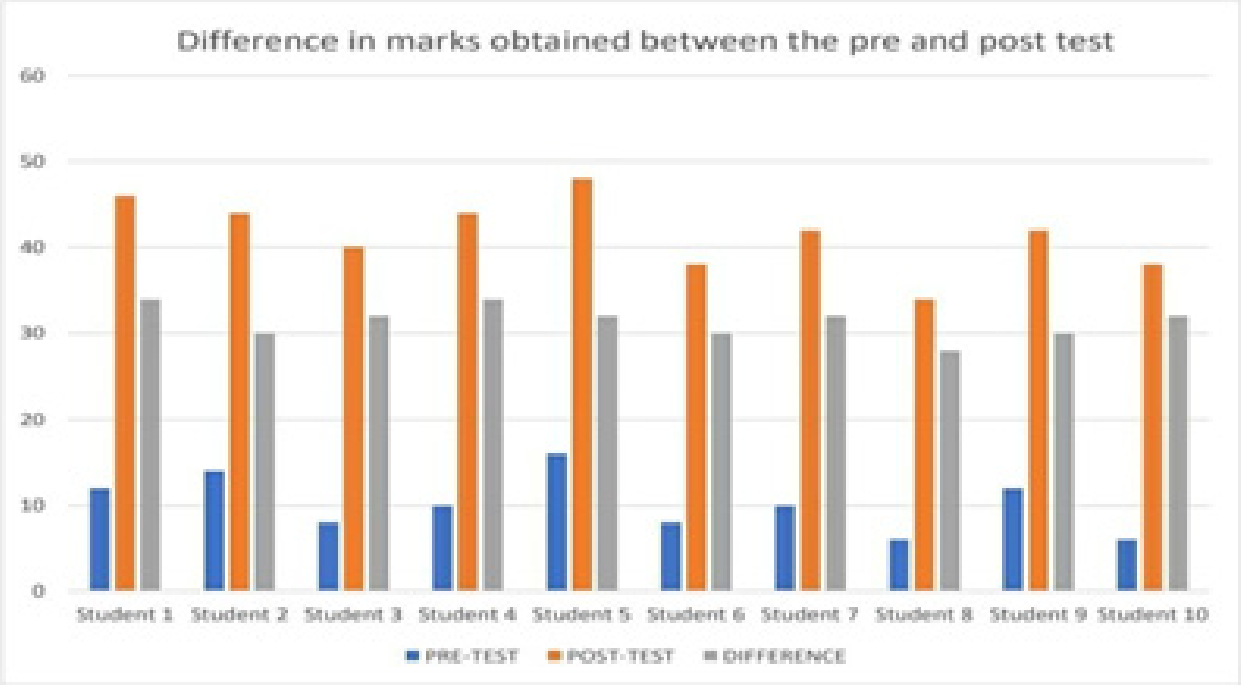

INTERPRETATION

The data collected during the implementation of conceptualization and mind mapping techniques revealed significant insights into student learning behavior and academic improvement. Pre- and post-assessments demonstrated a marked increase in students' understanding of core concepts across subjects. Students reported higher levels of engagement and expressed greater confidence in approaching complex topics when mind maps were used.

Classroom observations indicated that students were more attentive, participative, and proactive in their learning. They demonstrated improved critical thinking, better organization of thoughts, and an ability

to relate topics more meaningfully. The visual representation of knowledge appeared to reduce cognitive overload and helped students retain and recall information more effectively.

Peer feedback and reflective journal entries revealed that students appreciated the creative freedom and autonomy mind mapping offered. Many students highlighted that these tools helped them revise content quickly and more enjoyably. Teachers also noted that weaker students particularly benefited, as mind mapping provided a scaffold for them to build understanding gradually.

Overall, the study showed that these strategies not only enhanced cognitive comprehension but also fostered a positive learning environment. The interpretation of the data suggests that integrating conceptualization and mind mapping into the teaching-learning process is a practical and effective approach that benefits diverse learners.

FINDINGS OF THE STUDY

- There was a significant improvement in students' understanding and retention of concepts after using mind mapping techniques.
- Students showed increased engagement and participation in class activities.
- Conceptualization techniques helped in breaking down complex topics into simpler, manageable parts.
- The use of visual tools boosted the confidence of low-performing students.
- Teachers reported a noticeable shift in students' ability to connect ideas and think critically.
- Students found revision easier and more enjoyable using mind maps.

INFERENCE

From the results of this study, it can be inferred that conceptualization and mind mapping strategies serve as powerful pedagogical tools. These strategies address multiple learning styles, particularly benefiting visual and kinesthetic learners. They foster independent thinking, creativity, and deeper understanding, enabling students to become more effective learners. The enhanced comprehension and confidence among students reflect that when learning is student-centered and visually supported, academic outcomes improve significantly. These findings suggest that such methods are valuable additions to any modern classroom.

SUGGESTIONS FOR FUTURE IMPLICATIONS

- Teachers should be trained in creating and integrating mind maps and conceptual frameworks into their lesson plans.
- Curriculum designers should consider including mind mapping activities as part of the formal syllabus.
- Digital mind mapping tools should be introduced in classrooms to enhance accessibility and collaboration.
- Periodic workshops can be organized for both students and teachers to refine their mind mapping skills.
- Further research should be conducted across various age groups and subjects to establish broader applicability.

CONCLUSION

In conclusion, the integration of conceptualization and mind mapping strategies in the classroom significantly enhances students' learning experience. These techniques cater to multiple learning styles and promote active engagement with academic content. Mind maps provide a visual structure that helps students organize and retain information more effectively, while conceptualization fosters a deeper understanding of interrelated topics. The results from this action research indicate improvements in student comprehension, retention, and participation.

Through various strategies such as workshops, visual tools, and reflective practices, students became

more independent learners and demonstrated an increased ability to connect ideas and think critically. Teachers also benefited from understanding how these tools can be applied practically within the curriculum to address diverse student needs.

This study reaffirms the importance of innovative teaching methods in the 21st-century classroom. When students are actively involved in their learning process, they become more motivated and perform better academically. Conceptualization and mind mapping are not only effective but also adaptable tools that can be applied across subjects and grade levels. They bridge the gap between theory and practice, making abstract concepts more accessible and memorable.

As educational environments continue to evolve, it is imperative for educators to embrace such strategies and create a learning atmosphere that is inclusive, engaging, and conducive to long-term success. Future research may focus on expanding this approach across different age groups and subjects to assess its universal applicability and effectiveness.

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EFFECTIVE USE OF LAB EQUIPMENTS AND TEACHING LEARNING MATERIALS PROMOTING ACTIVE LEARNING IN SCIENCE CLASSROOM

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ABSTRACT

Active learning has emerged as a crucial pedagogical approach in science education, aiming to foster deeper student engagement, conceptual understanding and critical thinking skills. Science is a practical subject by nature, students' understanding of it is greatly enhanced when they have the chance to observe, experiment and apply theories in real-time situations. The primary objective of this action research is to enhance effective usage of lab equipment and teaching learning materials in Science classrooms. For this purpose, a sample of 11 students of class VIII in Chennai Corporation Boys Higher Secondary School, Purasawalkam, Chennai was randomly selected. Pre-test and post-test were conducted before and after the strategies implemented in the classroom. Results revealed a significant difference between the pre-test and post-test scores proving the effectiveness of lab equipment and teaching learning materials.

INTRODUCTION

Active learning has emerged as a crucial pedagogical approach in science education, aiming to foster deeper student engagement, conceptual understanding and critical thinking skills. Science is a practical subject by nature, students' understanding of it is greatly enhanced when they have the chance to observe, experiment and apply theories in real-time situations. The effective use of laboratory equipment and teaching-learning materials (TLMs) plays a significant role in promoting this approach within science classrooms. Laboratory tools enable experiential learning through observation and experimentation, while TLMs such as models, charts and digital resources support visualization and comprehension of complex scientific concepts. This research paper explores how the integration of lab equipment and TLMs enhances active learning, improves student participation and contributes to better academic outcomes in science education.

Acids and bases are two significant categories of chemical substances with different properties. Acids are sour to taste and make blue litmus red, whereas bases are bitter, slippery and make red litmus blue. In order to determine whether a substance is an acid or a base, we employ indicators. Indicators are specific substances that undergo color change in the presence of an acid or base. Litmus, phenolphthalein, and turmeric are some common indicators. They help us easily detect the nature of a substance. Indicators are widely used in laboratories and daily life. Knowledge of acids, bases, and indicators is critical in the study of chemical reactions and their uses in everyday life.

NEED OF THE STUDY

Science education thrives on observation, experimentation and inquiry. In the context of teaching Acids and Bases, the use of laboratory equipment and teaching-learning materials (TLMs) is especially crucial for promoting active learning. These concepts involve chemical properties that are best understood through direct experience, such as observing color changes with indicators.

Traditional lecture-based methods often fail to engage students meaningfully or develop a practical understanding of scientific phenomena. Therefore, this study is needed to explore how the effective use of lab tools (like test tubes, droppers, pH paper, etc.) and TLMs (like charts, models, digital simulations,

and natural indicators) can enhance student participation, curiosity and conceptual clarity. By focusing on active, hands-on learning, this research aims to improve both the teaching process and student outcomes in science classrooms.

PROBABLE CAUSES OF THE PROBLEM

A sample of 11 students of class VIII in Chennai Corporation Boys Higher Secondary School, Purasawalkam, Chennai was closely observed and personally interviewed. Some of the probable causes for the problem are given below,

* Insufficient training for teachers on how to use lab equipment and TLMs.
* Inadequate laboratory supplies and equipment.
* Reliance on theoretical instruction rather than hands-on techniques.
* Effective, subject-specific TLMs are not widely available.
* Academic schedule time constraints.
* Managing practical work in large classrooms can be challenging.
* Low student involvement as a result of passive learning strategies

OBJECTIVES OF THE ACTION RESEARCH

The main objectives of this action research study are as follows,

* To encourage active learning in the subject Acids and Bases.
* To enhance student comprehension through proper utilization of lab equipment and TLMs.
* To increase student involvement and participation in science classes.
* To evaluate the effectiveness of hands-on activities on learning outcomes.
* To facilitate inquiry-based and experiential learning approaches.

HYPOTHESIS OF THE ACTION RESEARCH

There is a significance difference between the Pre- test and Post-test scores of VIII standard students.

TOOLS USED

The following tools were used to conduct the action research.

i. Questionnaire
ii. Teaching learning materials
iii. Pen drive & Projector
iv. Blackboard & Whiteboard
v. Smart Science Lab Software
vi. Lab Equipment and
vii. Student Activity Sheets.

STRATEGIES ADOPTED

The following Strategies were adopted to perform my action research:

1. Demonstration Method.
2. Models (TLMs).

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3. Educational videos.
4. Activities.
5. Group activities.
6. Interactive Questioning.
7. Hands-on Experiments.

PLAN OF ACTION

DAY -1

- Conducted the short Pre-test to assess students' prior knowledge.
- The students were assigned to take a Pre-test.
- The teacher corrected the paper and analyzed the weakness in the student's test.
- Then the students were selected and brought together
- Strategies and techniques to be adopted were designed.

DAY – 2

- Introduced the topic Acids and Bases with simple examples from daily life.
- The topic was introduced using real-life examples and a KWL *(Know-Want to Know- Learned)* chart to activate prior learning.

DAY -3

- Explained the concept of acids and bases using colorful charts, models, and digital images.
- Introduced natural and synthetic indicators, emphasizing their importance in everyday applications.

DAY – 4

- Demonstrated the testing of substances using red and blue litmus paper, turmeric and other indicators.
- Encouraged students to predict outcomes and observe color changes.

DAY – 5

- Students tested 4–5 common household items using litmus paper and recorded the results.
- Focused on safety, corrected the procedure, and drew conclusions from observations.\

DAY -6

- Provided turmeric solution or extract. In groups, students tested various items and noted the color changes.
- Promoted co-operative learning and observation skills.

DAY-7

- Introduced phenolphthalein and methyl orange.
- Let the students observe the color changes when the indicators were added to acidic and basic solutions.

DAY -8

- Used a laptop to show animated videos or interactive simulations of acid & base reactions.
- Paused for explanation, held discussions and conducted a Q&A session.

DAY -9

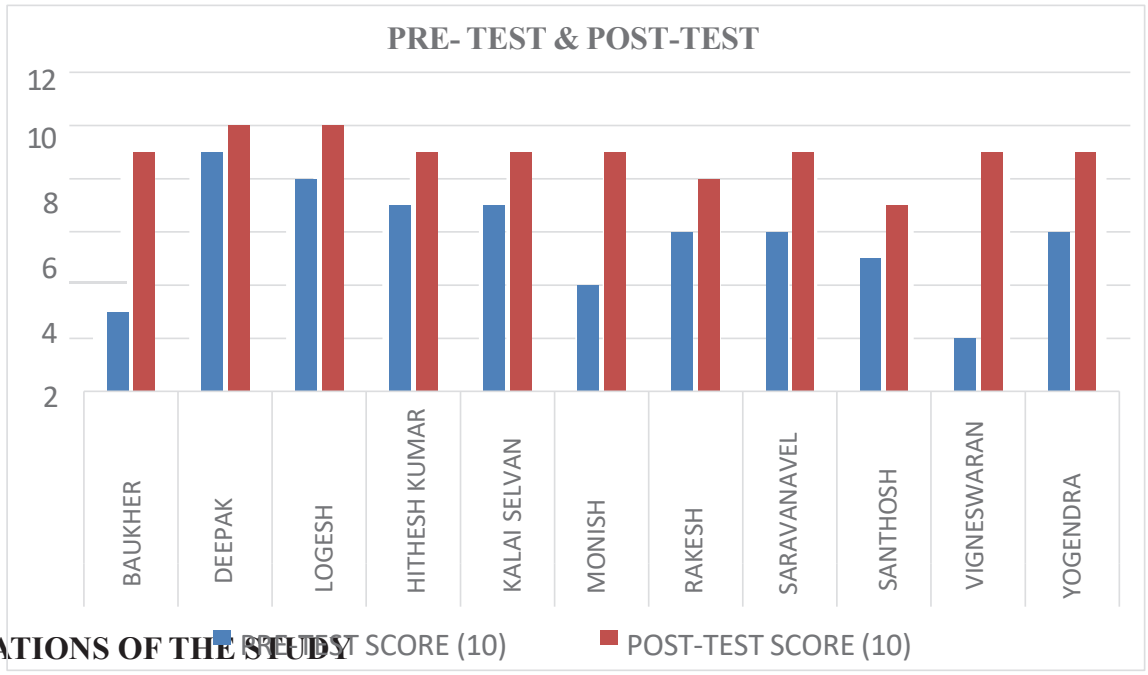
- Conducted a Post-test to evaluate their improvement.
- Collected the student feedback through a short form or reflection activity to assess interest, understanding and suggestions.
- Summarized learning outcomes and closed the unit.

Table showing the Pre-Test and Post-Test Scores

S.NO	NAME	PRE-TEST SCORE (10) T1	POST-TEST SCORE (10) T2	DIFFERENCE T1-T2
1	BAUKHER	3	9	6
2	DEEPAK	9	10	1
3	LOGESH	8	10	2
4	HITHESH KUMAR	7	9	2
5	KALAI SELVAN	7	9	2
6	MONISH	4	9	5
7	RAKESH	6	8	2
8	SARAVANAVEL	6	9	3
9	SANTHOSH	5	7	2
10	VIGNESWARAN	2	9	7
11	YOGENDRA	6	9	3

STATISTICAL ANALYSIS

Graph Showing Pretest and Post-Test Scores



LIMITATIONS OF THE STUDY

- The research was carried out within a short period of 9 days, limiting more thorough investigation of subtopics.
- The sample size was limited and restricted to one class, and therefore, the generalizability of the results could be limited.
- Lab equipment and teaching-learning materials availability was limited because of school resources.
- Certain students took longer and needed more guidance to comprehend experimental techniques.

SUGGESTIONS FOR FURTHER IMPLEMENTATION

- Science teachers must be provided with training on developing and utilizing low- cost, student-centered teaching aids effectively.
- ICT tools such as simulations and interactive videos must be incorporated on a regular basis to facilitate visual and conceptual learning.
- Increased hands-on and group-based activities must be incorporated in science lesson plans to foster collaboration and inquiry.
- Regular monitoring of the effect of TLMs and laboratory activities can assist in enhancing teaching strategies and results. Regularly assess and modify teaching methods based on student feedback.
- Other techniques can also be used and by providing detailed step-by-step explanations for identity derivations can be very useful.

CONCLUSION

The research highlights "Effective use of Lab Equipment's and teaching-learning materials in promoting active learning in science classroom" significantly increased students' engagement, inquiry and comprehension of scientific principles. It encouraged experiential learning, fostered inquiry and rendered abstract concepts more significant and relevant. This method turned out to be an effective technique in encouraging active learning and enhancing general classroom interaction and achievement.

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PRE-TEST

LABORATORY CLASS

DEMONSTRATION

ACTIVITY

ICT TOOLS & TLM's

POST-TEST

EFFECTIVENESS OF MULTIMODAL TEACHING STRATEGIES IN BIOLOGICAL CONCEPTS

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ABSTRACT

Biology is built upon several fundamental concepts that form its theoretical and practical framework. These include the cell theory, the genetic basis of inheritance, the theory of evolution, homeostasis, and the interdependence of ecosystems. Biological concepts deal with the fundamental principles that explain how living organisms function, grow, interact, and evolve. These concepts provide a framework for understanding life at various levels, from molecules to ecosystems. The goal is to cater to diverse learning styles and improve both comprehension and retention of key concepts. Various strategies like quizzes, lab activities and discussions had been adopted for the multimodal teaching in the concept of cellular respiration in Biology for higher secondary students. Findings revealed that students engaged in multimodal instruction demonstrate higher levels of participation, motivation, and conceptual understanding compared to those taught using traditional methods.

INTRODUCTION

"The more I learn about biology, the more I realize how incredibly beautiful life is."

- E.O. Wilson

Biological science, also known as biology, is the branch of science that studies life and living organisms. The term "Biology" in Greek is divided into two parts - bios = life; logos = study, which translates into study of life.

Biology is a part of science, and its commonly referred to as "Life Sciences". It encompasses a wide range of fields that focus on understanding the structure, function, growth, evolution, distribution, and behaviour of living things. Biology seeks to explain how the organisms' function, interact with their environment, and evolve over time.

According to the Oxford Dictionary, biology is defined as "the study of living organisms, divided into many specialized fields that cover their morphology, physiology, anatomy, behaviour, origin, and distribution."

The meaning of biology is the study of life and living organisms. It examines how organisms function, grow, reproduce, and interact with each other and their environments. Biology also explores the genetic, molecular, and ecological processes that govern life on Earth. In essence, biology helps us understand the natural world and the complex systems that sustain life.

Biology is built upon several fundamental concepts that form its theoretical and practical framework. These include the cell theory, the genetic basis of inheritance, the theory of evolution, homeostasis, and the interdependence of ecosystems.

Biologists can study life at multiple levels of organization, from the molecular biology of a cell to the anatomy and physiology of plants and animals, and the evolution of populations. Hence, there are multiple subdisciplines within biology, each defined by the nature of their research questions and the tools that they use. Like other scientists, biologists use the scientific method to make observations, pose questions, generate hypotheses, perform experiments, and form conclusions about the world around them.

DEFINITIONS

"Biology is the study of life and the factors that influence its existence, especially microorganisms and their role in disease and fermentation." ***- LOUIS PASTEUR***

"Biology is the science of the forms of life and their interrelations." ***-ERNST HAECKEL***

"Biology is the study of life at the level of genes, organisms, and populations, focusing on the evolution and natural selection that shape life on Earth." ***-RICHARD DAWKINS***

BIOLOGY – A LIFE SCIENCE

Biology, often referred to as the science of life, is one of the most fundamental and expansive fields of study in the natural sciences. As a life science, biology touches nearly every aspect of our lives, providing essential insights into health, medicine, agriculture, ecology, and more. At its core, biology is the study of life. It encompasses the investigation of living organisms, their physical and biochemical processes, and their relationships with one another and the environment. Biology is often divided into various sub-disciplines, each focusing on a specific aspect of life. These include genetics, ecology, evolutionary biology, microbiology, physiology, biochemistry, and many others.

CORE CONCEPTS IN BIOLOGY

Biology is grounded in several key concepts that form the foundation for understanding living organisms:

Cell Theory: One of the most fundamental ideas in biology, cell theory posits that all living organisms are composed of cells. Cells are the basic structural and functional units of life, and their properties—such as growth, metabolism, and reproduction—are essential to understanding life at all levels.

Genetics and Heredity: Genetics focuses on the study of heredity, explaining how traits are passed from parents to offspring through genes. This concept is fundamental to understanding biological inheritance and variation, as well as the molecular mechanisms behind diseases and disorders.

Evolution: The theory of evolution, proposed by Charles Darwin, is central to modern biology. It explains how species change over time through processes like natural selection, leading to the diversity of life we see today. Evolution provides insights into the adaptation of organisms to their environments and the interrelatedness of all living beings.

Homeostasis: Homeostasis refers to the ability of living organisms to maintain a stable internal environment despite external changes. This concept is crucial in understanding how organisms regulate temperature, pH, and other factors to survive.

Ecology and Interdependence: Ecology studies the interactions between organisms and their environment. It emphasizes the interconnectedness of all life, from individual organisms to entire ecosystems. The health of an ecosystem depends on the balance and interactions between species, including humans.

Metabolism and Energy Flow: Biology also focuses on how organisms acquire and use energy. Metabolism refers to the chemical processes that occur within living cells to sustain life. The study of how energy flows through ecosystems, from producers (plants) to consumers (animals), is a critical component of ecology.

NEED OF THE STUDY

- To know the interest of the pupil on biological concepts
- To know the difficulty in learning the concepts of Biology.
- To check the understanding level of the pupil on biological concepts.
- To know the attitude of the pupil towards learning Biology.
- To know my effectiveness of multimodal teaching strategy of teaching biological concepts.

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- To portrait the difficult biological concept as an easy one to students.
- To check whether the pupil knows the purpose of learning biological concepts.
- To accommodate diverse learning style in learning Biology
- To enhance the conceptual understanding in biological concepts.
- To foster collaborative learning among students in learning biological concepts.

PROBABLE CAUSES FOR THE PROBLEM

The need for multimodal teaching when explaining complex biological concepts like cellular respiration arises from several factors that can make this topic challenging for students to fully comprehend. Cellular respiration is a multifaceted process involving biochemical reactions that occur in various cellular compartments, and it requires a deep understanding of both molecular biology and energy dynamics.

i. Complexity of the Process

Cellular respiration involves several intricate stages—glycolysis, the citric acid cycle, and oxidative phosphorylation (including the electron transport chain and ATP synthesis). These processes occur in different parts of the cell (cytoplasm and mitochondria), and understanding how they are interrelated can be difficult without multiple ways of presenting the information.

ii. Abstract Molecular Interactions

The process of cellular respiration occurs at the molecular level, and many students may struggle to conceptualize how atoms and molecules interact in biochemical reactions. For instance, the transformation of glucose into pyruvate or the movement of electrons through the electron transport chain is difficult to grasp without seeing it in action.

iii. Different Learning Styles

Students have diverse learning preferences. Some students may find it easier to learn by reading and listening, while others need visual or interactive experiences to fully understand the material. Relying on just one teaching modality, such as a lecture, may leave some students disengaged or struggling to make sense of the material.

iv. Difficulty in Relating Concept to Real-Life Applications

Students may struggle to connect the concept of cellular respiration to real-world contexts, making the material seem distant or irrelevant. While learning about energy production in cells is critical for understanding metabolism and health, the abstract nature of the process can make it hard for students to see its application in everyday life.

v. Challenge in Retaining and Recalling Information

Due to the multi-step nature of cellular respiration and the need to remember specific enzymes, intermediates, and their respective roles, many students find it difficult to retain this information long-term. The use of multiple teaching methods can help reinforce the material and improve retention.

vi. Engagement and Motivation

The topic of cellular respiration, while essential, may not always seem exciting or engaging to students, especially when presented through traditional lectures or textbooks alone. The difficulty of grasping abstract biological processes can lead to disinterest or frustration.

vii. **Technological Advances**

The advancement of technology in biology education provides opportunities to enhance the teaching of complex concepts like cellular respiration. Students today are accustomed to using digital tools and devices, and incorporating these into biology lessons can boost their understanding and enthusiasm for the subject.

OBJECTIVE OF THE ACTION RESEARCH

The main objective of multimodal teaching of biological concept in cellular respiration concept is to create a comprehensive and engaging learning experience that enhances students' understanding of this complex process through various teaching methods and learning tools. The goal is to cater to diverse learning styles and improve both comprehension and retention of key concepts.

- To enhance the understanding of complex concepts like glycolysis, Krebs cycle etc...
- To enhance the diverse learning style of students.
- To enhance the retention of the difficult biological concepts which are at molecular level.
- To foster active and collaborative learning among students.
- To increase student engagement and motivation in learning complex concepts of biology.
- To clarify the role of cellular respiration in energy production.
- To facilitate the various concept integration in cellular energy production.

HYPOTHESIS OF THE ACTION RESEARCH

There is a significant difference among the student's learning ability in learning the complex concepts of cellular respiration in biology.

TOOLS

- Questionnaire was prepared by the investigator.
- Teaching learning materials was utilized.
- Charts depicting the concepts of cellular respiration was used.
- Flash cards illustrations was used to explain HMP pathway.
- Digital visual learning was utilized for the concept of Krebs cycle explanation.
- Active learning techniques like collaborative learning was enhanced to learn the pathways of cellular respiration.
- Various gaming techniques were utilized for retension of the concepts of cellular respiration.

STRATEGIES ADOPTED

The various strategies adopted for the multimodal teaching in the concept of cellular respiration are:

i. Blackboard usage
ii. Creative chart work
iii. Flashcards
iv. Visual learning: Power point presentation
v. Experimental activities in laboratory
vi. Activities
vii. Learning tasks like Oral test, Peer teaching activities.
viii. Collaborative learning among students
ix. Video presentation
x. Gaming techniques like quiz and debate.
xi. Practice through mnemonics

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PLAN OF ACTION

DAY 1: ***Introduction to Cellular Respiration and Assessment of Prior Knowledge Objective***

To introduce the topic of cellular respiration and assess students' existing knowledge of the concept.

Activities

- Brief lecture on the basics of cellular respiration (structure, function of cells, and energy production).
- Pre-assessment quiz to gauge prior knowledge
- Introduction to learning outcomes and the importance of cellular respiration.

Class Discussion

Ask students what they already know about energy production in cells.

DAY 2-3: ***Visual Learning – The Stages of Cellular Respiration***

Objective

To provide a visual overview of the stages of cellular respiration.

Activities

- Show a creative chart depicting glycolysis, citric acid cycle, and oxidative phosphorylation.
- Interactive diagrams: Present a labeled diagram of the mitochondrion and its role in cellular respiration.
- Visual aid exercise: Have students label a blank diagram of cellular respiration on paper or digitally.

Class discussion

Review the stages and how ATP is produced at each step.

DAY 4-5: ***Kinesthetic Learning – Hands-on Activity: Yeast Fermentation***

Objective

To demonstrate cellular respiration in real life through hands-on experimentation.

Activities

- Conduct a hands-on lab experiment showing how yeast performs fermentation (anaerobic respiration).
- Use differing sugar concentrations to observe fermentation rates through CO2 production.
- Students record their findings and observations in a lab notebook.
- Class discussion:
- Relate the experiment to the stages of aerobic and anaerobic respiration, emphasizing ATP production.

Day 6-7: ***Collaborative Learning – Lecture and Peer Explanation***

Objective

To reinforce the stages of cellular respiration through lecture and peer explanation.

Activities

- Lecture: Discuss glycolysis, the citric acid cycle, and oxidative phosphorylation in detail.
- Provide the lecture for students to listen to at home for reinforcement.
- Guided notes: Students take notes on key concepts during the lecture and learn through peer tutor.

Interactive discussion

Listen to a real-world example (e.g., the role of cellular respiration in muscle cells) and discuss as a class.

Day 8-9: ***Visual + Auditory – Animation and Group Discussion***

Objective

To enhance comprehension by combining visual and auditory learning.

Activities

- Watch a step-by-step animation showing the electron transport chain and ATP synthesis.
- After watching, have students engage in group discussions to summarize and explain the process in their own words.
- Assign each group a specific stage of cellular respiration to explain in a mini-presentation using visuals.
- Peer teaching: Groups present their explanations to the class.

Day 10-11: ***Game based Learning – Bingo***

Objective

To engage students in exploring cellular respiration through Game based learning.

Activities: ***Cellular Respiration Bingo***

A fun classroom activity where students use Bingo cards to identify different aspects of cellular respiration.

How it works?

- Each Bingo card contains terms related to cellular respiration (e.g., glucose, ATP, NADH, mitochondrion, enzymes).
- The teacher calls out clues or describes processes (e.g., "This molecule is produced during glycolysis and is used in the citric acid cycle"), and students mark their cards.
- First student to fill a row or column calls "Bingo!" and wins.

Educational Benefit: This game reinforces key terms and concepts while providing a quick, engaging review session of cellular respiration.

Day 12-13: ***Kinesthetic – Build a Concept Map***

Objective

To facilitate deeper understanding by creating a concept map of cellular respiration.

Activities

- In small groups, students build a concept map that shows the connections between different stages of cellular respiration, enzymes involved, and energy produced.
- Physical activity: Have students physically arrange pieces of a concept map on a board, creating a kinesthetic experience.
- Peer review: Each group presents their concept map, and students provide constructive feedback on clarity and completeness.

Day 14: ***Review and Collaborative Learning – Quiz and Group Reflection***

Objective

To assess student understanding and encourage collaborative learning through quiz.

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Activities

- Quiz: Use a digital quiz platform (e.g., Kahoot) to assess students' understanding of cellular respiration.
- Group reflection: After the quiz, engage students in a group discussion about their learning journey, challenges faced, and insights gained.
- Encourage students to reflect on how different teaching methods (visual, auditory, kinesthetic, digital) helped them understand the concept better.

Day 15: ***Post - Assessment and Feedback***

Objective

To assess overall understanding and gather feedback on the multimodal teaching strategies used.

Activities

- Post-assessment quiz: Administer a final quiz to assess students' understanding of the cellular respiration process and compare results to the pre-assessment quiz.
- Survey: Use a short survey to gather feedback on the effectiveness of multimodal teaching strategies (i.e. What worked well? Which methods helped the most?).

Class discussion

There is a wrap-up discussion, asking students to summarize what they learned about cellular respiration and how their understanding has evolved.

Data Collection and Analysis

Throughout the 15-day period, gather data on student engagement, participation, and understanding using:

- Pre- and post-assessments (quizzes).
- Observation during group activities, discussions, and lab experiments.
- Student feedback via surveys or reflection journals.
- Lab reports and group presentations to assess comprehension of the topic.

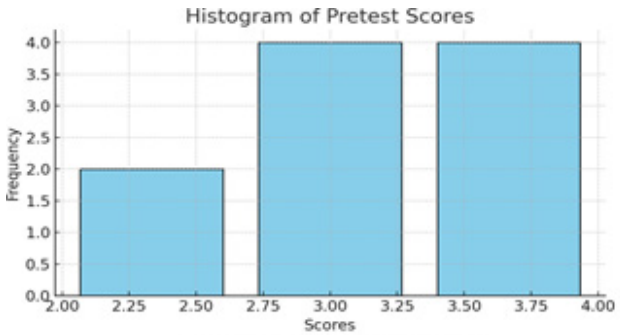
After completing the action research, the data to evaluate the effectiveness of multimodal teaching strategies in improving students' understanding of cellular respiration were analyzed.

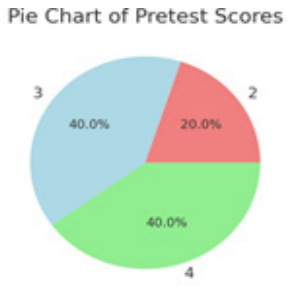
STATISTICAL ANALYSIS

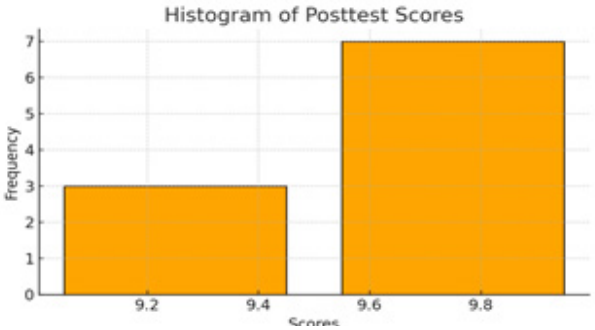
SI. NO	NAME OF STUDENTS	PRE-TEST SCORE (10)	POST- TEST SCORE (10)	DIFFERENCE
1	ATCHAYA P	2	10	8
2	DEEPIKA S	3	10	7
3	KANNIGARANI M	4	10	6
4	KESHVANI A	2	10	8
5	SARANYA V	4	10	6

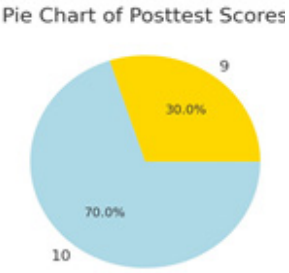
6	SWETHA T	3	9	7
7	MAHADEVAN K	3	9	7
8	MOHAN S	4	10	6
9	SALMAN ALAM M D	4	9	6
10	SIVAKUMAR I	3	10	7

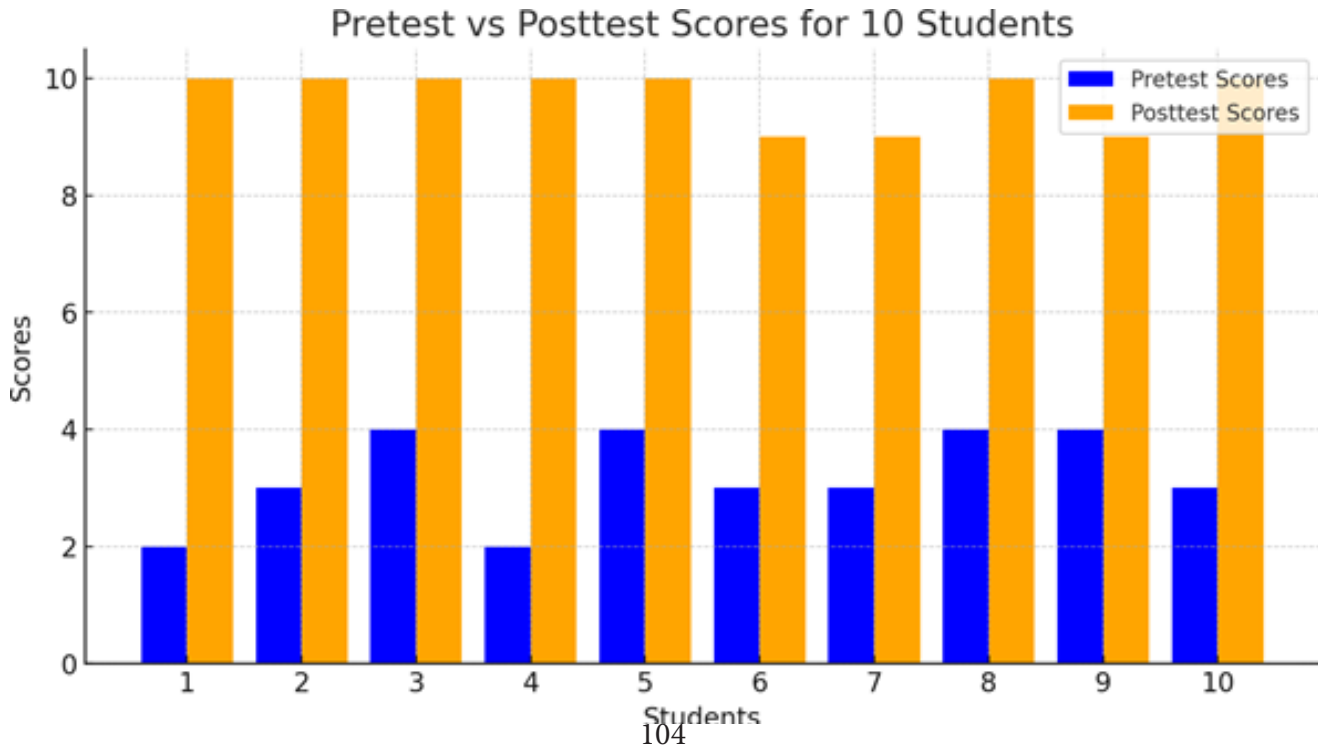
COMPARISION ANALYSIS











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LIMITATIONS OF THE STUDY

- **Time Constraints –** Implementing multiple teaching strategies and assessing their effectiveness within a short period may not provide a comprehensive evaluation.
- **Variability in Learning Styles –** Students have diverse learning preferences, and some may respond better to specific modalities than others, making it hard to measure overall effectiveness.
- **Resource Availability –** Access to technology, visual aids, hands-on materials, and interactive tools may vary, potentially limiting the full implementation of multimodal approaches.
- **Student Engagement and Participation –** Some students may be less engaged or resistant to certain teaching methods, affecting the overall effectiveness of the strategies.
- **Assessment Challenges –** Measuring the true impact of multimodal teaching on students' understanding can be complex and may require multiple assessment methods beyond traditional tests.

SUGGESTIONS FOR FUTURE IMPLEMENTATION

- ***Expand the Study to Larger Sample Sizes*** : Conduct the research with a more diverse group of students across different grade levels and educational institutions to improve the generalizability of findings.
- ***Integrate Technology More Effectively:*** Utilize virtual labs, interactive simulations, augmented reality (AR), and artificial intelligence (AI)-based tools to enhance multimodal learning experiences in biology.
- ***Long-Term Study for Better Evaluation :*** Implement multimodal teaching strategies over an extended period to assess their long-term impact on student learning and retention.
- ***Customization Based on Learning Styles :*** Conduct pre-assessments to identify students' preferred learning styles and tailor multimodal strategies accordingly for maximum effectiveness.
- ***Incorporate Real-World Applications :*** Link biological concepts with real-life examples, field trips, and hands-on projects to enhance student engagement and understanding.
- ***Develop More Comprehensive Assessment Methods :*** Use a combination of formative assessments, project-based evaluations, and student feedback to measure the true impact of multimodal teaching approaches.
- ***Encourage Collaborative Learning :*** Implement peer discussions, group activities, and cooperative learning strategies to reinforce biological science concepts through social interaction.
- ***Address Challenges in Resource Availability :*** Ensure that schools and institutions have access to necessary materials, technology, and laboratory equipment to fully implement multimodal teaching strategies.

CONCLUSION

The study on the Effectiveness of Multimodal Teaching Strategies in Biological Science Concepts highlights the significant role that diverse instructional approaches play in enhancing student learning. By integrating visual, auditory, kinesthetic, and interactive learning methods, multimodal strategies cater to different learning preferences, leading to improved comprehension and retention of biological concepts.

The findings suggest that students engaged in multimodal instruction demonstrate higher levels of participation, motivation, and conceptual understanding compared to those taught using traditional methods. However, the effectiveness of these strategies depends on factors such as teacher expertise, resource availability, and students' adaptability to various teaching modalities.

Despite some limitations, the research underscores the importance of incorporating varied teaching techniques to address diverse learning needs in biological science education. Future studies with larger sample sizes and extended implementation periods can further validate the impact of multimodal teaching on student performance. Educators are encouraged to adopt and refine these strategies to create more engaging and effective learning environments in science classrooms.

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FROM ROTE LEARNING TO PROFICIENCY: IMPLEMENTING TARGETED TEACHING STRATEGIES IN GRAMMAR INSTRUCTION

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ABSTRACT

Grammar plays a crucial role in language learning, yet students often struggle with complex grammatical structures such as reported speech. This action research aimed to explore the effectiveness of interactive and contextualized teaching methods in enhancing students' understanding of reported speech. The study was conducted with a group of students, beginning with a pre-test to assess their initial knowledge. Over a period of ten days, various innovative teaching strategies were implemented, including the use of teaching-learning materials, real-time conversation techniques, and roleplaying activities. These approaches were designed to make learning more engaging and practical, allowing students to internalize grammatical rules through meaningful interactions. Following the intervention, a post-test was conducted to measure improvements in student performance. The results indicated a significant increase in students' ability to correctly convert direct speech into reported speech, demonstrating the positive impact of the chosen methodologies. Additionally, classroom observations revealed heightened student participation, confidence, and enthusiasm towards grammar learning. The findings suggest that traditional rote-learning methods may not be as effective as interactive strategies that provide students with opportunities to apply grammar rules in real life contexts. This research underscores the importance of adopting student-centered pedagogical approaches in English language teaching. It highlights the role of experiential learning in grammar instruction and provides valuable insights for educators seeking to enhance their teaching practices. The study concludes that incorporating innovative, activity-based teaching techniques can lead to better student engagement and understanding, ultimately improving overall language proficiency.

INTRODUCTION

"The greater parts of the world's troubles are due to questions of grammar."

— Michel de Montaigne

Action research is a reflective process conducted by educators to improve their teaching practices and enhance student learning. In English language teaching, action research focuses on identifying challenges, testing innovative strategies, and assessing their impact on student engagement and comprehension. By integrating methods such as interactive teaching, contextualized learning, and real-life applications, teachers can address difficulties in grammar, vocabulary, and communication skills. This approach fosters a student-centered learning environment, making language acquisition more effective and meaningful.

English is a global lingua franca, playing a crucial role in communication, education, business, technology, and international relations. As the most widely spoken second language, it bridges cultural and linguistic gaps, enabling people from different backgrounds to connect. In today's digital era, proficiency in English opens doors to academic and career opportunities, as most scientific research, global media, and online content are in English. Its influence extends to various fields, making it an essential skill for personal and professional growth.

Reported speech is essential in effective communication, allowing speakers to convey messages, stories, and information accurately. It is widely used in journalism, academic writing, legal discourse, and everyday conversations to report statements, questions, and commands from one person to another. Mastering reported speech enhances clarity, coherence, and credibility in spoken and written communication. In

learning English, understanding reported speech helps students develop better storytelling, summarization, and comprehension skills, improving their overall language proficiency.

REVIEW OF RELATED LITERATURE

Reported speech is a complex grammatical structure that often challenges learners due to changes in tense, pronouns, and word order. A study by Richards and Schmidt (2010) indicates that students learn reported speech more effectively when exposed to roleplaying and real-world communication exercises. Furthermore, Swan (2005) emphasizes the importance of contextual learning, noting that students retain grammatical rules better when they are applied in practical scenarios.

NEED OF THE STUDY

- To know the interest of the students in grammar.
- To know the difficulty in learning the concept of reported speech.
- To check the student's understanding of the value of English.
- To know the effectiveness of innovative methods in teaching English
- To check whether the students know the purpose of grammar.

PROBABLE CAUSES OF THE PROBLEM

* Complexity of structural changes
* Limited exposure to practical usage
* Confusion between direct and reported speech
* Teacher-centered instruction
* Fear of making mistakes
* Mother tongue interference

METHODOLOGY

A normal class test was conducted during the English period and the mark analysis helped to split the students from grade 11, with respect to the stratified random sampling group which contain all kinds of learners' i.e. average learners, toppers as well as slow learners. This kind of group helps to reduce bias and improve the accuracy of the sample by capturing the diversity within the students.

OBJECTIVE OF THE ACTION RESEARCH

To shift from rote learning to proficiency by implementing targeted teaching strategies in grammar instruction for better student understanding and engagement.

HYPOTHESIS OF THE ACTION RESEARCH

There is significant difference in the student's learning ability when implementing targeted teaching strategies in grammar instruction.

STRATEGIES ADOPTED

* Worksheets
* Roleplaying Activities
* Real time conversation techniques
* Teaching-Learning materials

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* Movie quotes activity
* Peer interaction and Group discussion

PRE- TEST

During the pre-test, the students from grade 11 had to change the direct speech to reported speech and reported speech to direct speech. Based on the performance students were segregated into different categories and given the necessary support to improve their understanding power.

PLAN OF ACTION

DAY 1:

* Students were introduced to the concept of **reported speech,** including its i**mportance, rules, and structural changes** such as **tense shifts, pronoun changes, and modifications in time expressions.** Examples were provided to help students understand how reported speech is used in real-life communication.

DAY 2:

* Students were divided into **small groups** and provided with **study materials** explaining the rules of reported speech with examples. The **basic transformations of direct to reported speech** were introduced on the blackboard. **Peer interaction and group discussions** were encouraged to reinforce their understanding.

DAY 3:

* Students were tested on their understanding of **basic sentence transformations through worksheet-based exercises.** They were divided into **teams of three,** where they practiced converting simple sentences from **direct to reported speech.** Their performance in this activity motivated them to engage actively in the learning process.

DAY 4:

* Students participated in **roleplaying activities,** where they enacted real-life conversations and then reported what their peers had said. This activity helped them **internalize grammar rules** while making learning more engaging. Additionally, **real-time conversation techniques** were introduced, where students had to immediately report what was said in spontaneous conversations.

DAY 5:

* The students were tested on their ability to transform **30 sentences** using reported speech. The assessment included both **oral and written exercises,** helping evaluate their grasp of the concept. Their **performance analysis helped track their progress,** and they were encouraged to self-correct their errors.

DAY 6:

* Students engaged in **peer interaction and group discussions.** They were given **specific topics** to discuss in groups, after which they had to report their peers' statements using **reported speech.** This activity reinforced **fluency, confidence, and spontaneous application** of grammar rules.

DAY 7:

* Students participated in the **Movie Quotes Activity,** where they were given famous **movie dialogues** and asked to convert them into reported speech. This interactive strategy made learning enjoyable and helped them **apply grammar rules in a relatable context.**

DAY 8:

* A **post-test** was conducted to assess students' overall improvement in reported speech. This was followed by a **reflection session,** where students discussed their learning experiences and how **teaching-learning materials, roleplaying, real-time conversations, and interactive activities** helped them grasp reported speech more effectively.

POST- TEST

The students' score displayed a remarkable improvement after completing the same questions which are given in the pre-test. This valuable experience has equipped students with the necessary skills to excel in their academic levels, higher studies and communication skills.

ANALYSIS AND INTERPRETATION OF THE DATA

NAMES	PRE – TEST (20)	POST- TEST (20)	DIFFERENCE
Student 1	5	13	8
Student 2	7	15	8
Student 3	9	16	7
Student 4	12	19	7
Student 5	3	11	8
Student 6	9	14	5
Student 7	4	12	8
Student 8	3	13	10
Student 9	7	18	11
Student 10	8	17	9
Total	67	148	81
Percentage	33.5 %	74%	40.5%

INTERPRETATION

The marks scored by the students in both the pre-test (33.5%) and the post-test (74%) indicate significant development in their understanding skills and they can now change direct sentence to indirect and indirect to direct sentence. However, the significant difference in percentage (40.5%) between the pre-test and the post-test shows that the students have made a remarkable improvement in their performance.

GRAPHICAL REPRESENTATION

The given bar diagram shows the difference in marks obtained between the pre-test and post-test.

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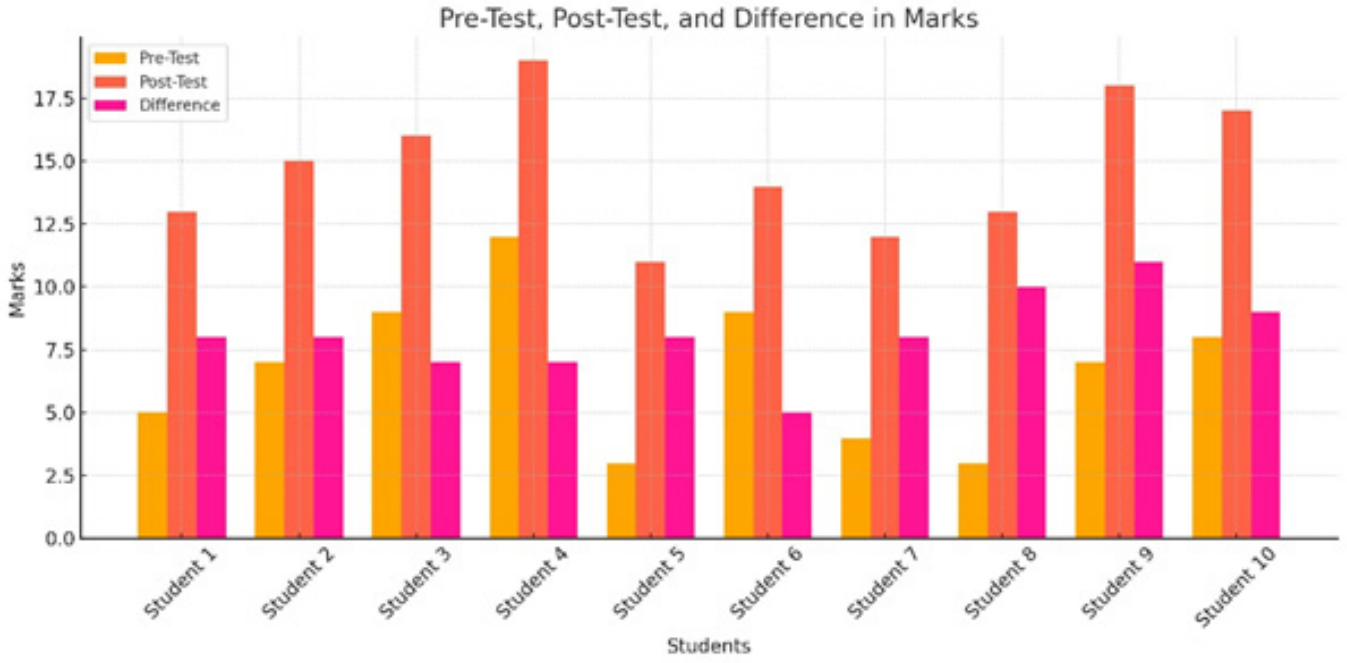

confidence.

- The role-play method helped them visualize conversations and understand how tenses, pronouns, and word order change in reported speech.
- Learning grammar in a real-life context contributed to increased motivation and reduced fear of making mistakes.
- The classroom transformed into a dynamic learning space, promoting collaboration and critical thinking.

SUGGESTIONS

- Teachers can incorporate real-life scenarios and dialogue writing exercises to reinforce the rules of reported speech.
- Interactive tools such as flashcards, games, and storytelling can be used regularly to make grammar lessons more enjoyable.
- Encourage peer teaching, where students explain reported speech transformations to one another.
- Conduct periodic formative assessments to monitor progress and tailor interventions accordingly.
- Teacher training programs should include workshops on innovative grammar teaching strategies.

LIMITATIONS OF THE STUDY

- The study was conducted over a limited period (10 days), which restricted the number of activities that could be implemented.
- Some students were irregular in attendance, affecting their continuity and consistency in learning.
- Time constraints due to the school schedule limited in-depth discussion and extended practice sessions.
- A few students were initially hesitant to participate in activities due to shyness or fear of speaking English.

CONCLUSION

Grammar, especially reported speech, is often perceived as difficult due to its structural complexity. However, this action research proved that interactive and student-centered strategies can transform the way

grammar is taught and learned. The significant improvement in post-test results and classroom participation validates the effectiveness of contextual and engaging teaching methods. The shift from passive to active learning encouraged students to take ownership of their language development. This research underscores the importance of making grammar instruction meaningful, fun, and relevant to real-life communication.

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LINK FOR EDUCATIONAL VIDEOS

1. https://youtu.be/83aKUg0h-X0?si=tOblG_6PWi5kAwEk
2. https://youtu.be/ehkyYanARZ0?si=ynRJSve_Jlg6NtAP
3. https://youtu.be/QotAIwPh_YE?si=whL3z-rxJIlVKlMn

GEO TAGGED PHOTOS

EQUATION ENLIGHTENMENT: UNRAVELING THE MYSTERIES OF PHYSICS EQUATIONS

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ABSTRACT

This action research addressed the gap by implementing innovative and student-friendly strategies to teach physics derivations. These include the use of storytelling to convey conceptual meaning, visual aids to represent abstract ideas, guided derivation flowcharts, and active participation techniques such as peer teaching, experiments, and interactive simulations. For this, a sample of 10 students of class XI from A.J.S. Nidhi Higher Secondary School, Alandhur were selected. The concepts in Physics were taught using concept maps, problem solving method, flow chart method and using worksheet exercises. Pre-test and post- test were conducted to examine the effectiveness of strategies implemented in the classroom. Results showed significant improvement between pre-test and post-test scores which demonstrated that the teaching strategies were effective in solving Physics equations among students without much difficulty.

INTRODUCTION

"Equations are the poetry of Physics."

— Steven Weinberg

Action Research is a dynamic process of inquiry conducted by educators to improve their teaching methods and enhance student learning outcomes. It involves identifying a problem, planning and implementing interventions, and evaluating their effectiveness in a real classroom setting. In this study, action research is used as a tool to explore and refine strategies to help students understand and internalize physics derivations, moving beyond rote memorization to true conceptual clarity.

Physics, as a subject, is deeply rooted in mathematical expressions and derivations that explain how the physical world operates. However, many students struggle with learning these derivations, often viewing them as mere formulae to be memorized rather than logical steps grounded in physical principles. This leads to a shallow understanding and a lack of confidence in solving problems that involve applying these derivations in new contexts.

This action research seeks to address this gap by implementing innovative and student-friendly strategies to teach physics derivations. These include the use of storytelling to convey conceptual meaning, visual aids to represent abstract ideas, guided derivation flowcharts, and active participation techniques such as peer teaching, experiments, and interactive simulations.

The aim is to help students develop a deeper appreciation of the logic behind the equations they use in physics, empowering them to see the "why" behind the "how." By creating a more engaging and conceptually rich learning environment, this research aspires to turn physics derivations from a source of fear into a tool of empowerment and confidence for learners.

Physics Derivations

Physics equations describe how quantities in the physical world are related. These equations are often derived from basic principles using logical steps and mathematical reasoning. Learning the derivation of equations helps students understand the "why" behind the "what", making physics more meaningful and easier to apply in problem-solving.

Common Physics Equations and Their Derivations

1. ***Equations of Motion***

v = u + at
s = ut + 1/2at2
v2 = u2 + 2as

These equations describe the motion of objects under uniform acceleration. They are derived using basic kinematic definitions.

2. Newton's Second Law of Motion

F = ma

This fundamental law links force, mass, and acceleration, derived from the rate of change of momentum.

3. Work-Energy Theorem

W = ΔK.E = 1/2mv2 − 1/2mu2

This is derived using the equations of motion and Newton's laws, relating the work done to change in kinetic energy.

4. Gravitational Potential Energy

U=mgh

Derived from the work done in lifting a body against gravity.

5. Mayer's Relation

Cp - Cv = R

This thermodynamics relation connects the molar specific heats of a gas at constant pressure (Cp) and constant volume (Cv), with the universal gas constant R.

Why Understanding Derivations Matters

These derivations are essential for:

- Understanding where formulas come from
- Connecting physics theory with real-life applications
- Developing problem-solving and analytical thinking skills
- Reducing memorization and increasing conceptual clarity

By focusing on step-by-step logic, derivations help students truly grasp the science behind equations rather than just recalling them for exams.

NEED OF THE STUDY

Physics derivations are often learned by heart without understanding their logical flow or physical meaning. This creates a barrier for students in applying concepts effectively during problem-solving. Many students struggle to connect mathematical steps with physical concepts, leading to confusion and loss of interest. The study aims to identify the difficulties students face in learning derivations and to develop

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strategies that promote conceptual clarity, step-by-step reasoning, and meaningful learning. By doing so, students can gain confidence and improve their problem-solving skills in physics.

CAUSES OF THE PROBLEM

A sample of 10 students of class XI in A.J.S. Nidhi Higher Secondary School, Alandhur was closely observed and personally interviewed. Some of the probable causes for the problem are given below.

- Lack of understanding of the physical meaning behind each step in the derivation.
- Over-reliance on memorizing formulas without conceptual clarity.
- Difficulty in connecting mathematics with real-life physical phenomena.
- Inadequate teaching methods focusing only on results, not the process.
- Disinterest in physics due to perceived difficulty in derivations.
- Limited opportunities for students to ask questions and clarify doubts.
- Other direct or indirect factors.

OBJECTIVES OF THIS ACTION RESEARCH

The main objectives of this action research are:

- To identify the difficulties students' face in understanding physics derivations.
- To help students connect mathematical steps with physical concepts.
- To reduce rote memorization and promote logical thinking.
- To introduce effective teaching strategies for better derivation learning.
- To improve student confidence and performance in solving derivation-based problems.
- To make derivations more engaging using visual aids, analogies, and peer learning.

HYPOTHESIS OF THIS ACTION RESEARCH

There will be a significant improvement in students' understanding and application of physics derivations when taught using concept-based, interactive, and student-friendly strategies.

TOOLS

The following resources were used to carry out the action research:

- Questionnaire for identifying student difficulties
- Concept-mapping and derivation flowcharts
- Chalkboard and worksheets for step-by-step practice
- Pre-test and Post-test assessments

PLAN OF ACTION

Day 1: ***Pre-Test and Diagnostic Questionnaire***

Method: ***MCQ Questionnaire***

* Conduct a pre-test to assess students' existing understanding of derivations.
* Distribute a questionnaire to identify specific learning challenges.
* Analyze responses to guide further teaching methods.

Day 2: ***Introduction to Concept Mapping***

Method: ***Visual Learning***

* Teach students how to organize key terms and relationships visually.
* Assist them in creating their own maps based on the day's topic.
* Encourage discussion to clarify connections.

Day 3: ***Guided Derivation***

Method: ***Flowchart Method***

* Present a step-by-step flowchart outlining a complete derivation.
* Explain each step and its logical link.
* Guide students to replicate or complete a similar flowchart.

Day 4: ***Teacher-Led Session***

Method*: Chalkboard Demonstration*

* Demonstrate a derivation interactively on the board.
* Emphasize the logical progression and reasoning at each step.
* Involve students in completing parts of the derivation.

Day 5: ***Worksheet Practice – Teacher-Supported***

Method: ***Problem Solving method***

* Distribute guided worksheets with incomplete derivations.
* Provide step hints and side notes for support.
* Offer feedback during individual or paired practice.

Day 6: ***Flowchart Completion and Peer Discussion***

Method: ***Peer group method***

* Provide partially completed flowcharts for students to finish.
* Conduct peer discussion on how and why steps are followed.
* Clarify misconceptions through group review.

Day 7: ***Individual Worksheet Practice***

Method: ***Independent Problem Solving***

* Assign worksheets requiring full derivations to be completed independently.
* Include reflection prompts to explain reasoning.
* Allow for self and peer checking.

Day 8: ***Learning from Each Other***

Method: ***Peer Teaching & Group Work***

* Students present derivations to the class in pairs or small groups.

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* Use board or worksheets to explain steps.
* Encourage class discussion and feedback.

Day 9: ***Application of Derivations***

Method: ***Higher-Order Thinking***

* Present contextual problems requiring the use of derivations.
* Guide students in selecting and justifying appropriate methods.
* Focus on conceptual application.

Day 10: ***Revision & Derivation based Questionnaire***

Method: ***Post-Assessment & Self-Reflection***

* Conduct a post-test to measure learning outcomes.
* Compare with pre-test to evaluate progress.
* Ask students to reflect on what methods helped them most.

STATISTICAL ANALYSIS

Statistical evidence is used to support the observations and interpretations made during the course of this action research. The performance of students was evaluated using a pre-test before the implementation of the intervention and a post-test after completing the 10-day action plan.

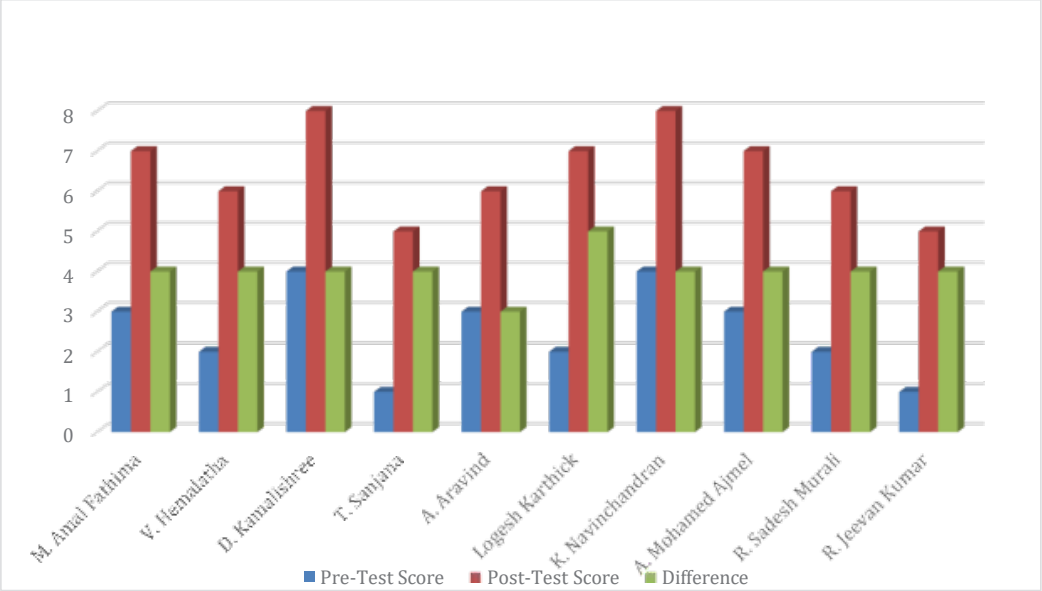
The comparison of the scores helps to understand the effectiveness of the applied methods such as concept mapping, flowcharts, guided worksheets, and peer teaching. A clear improvement in the post-test scores indicates that the students gained a better conceptual understanding of derivations in physics.

The following table shows the difference between pre-test and post-test scores of the selected students.

Table showing the Pre-Test and Post-Test Scores

S. No	Name of the Student	Pre-Test Score	Post-Test Score	Difference
1	M. Amal Fathima	3	7	4
2	V. Hemalatha	2	6	4
3	D. Kamalishree	4	8	4
4	T. Sanjana	1	5	4
5	A. Aravind	3	6	3
6	Logesh Karthick	2	7	5
7	K. Navinchandran	4	8	4
8	A. Mohamed Ajmel	3	7	4
9	R. Sadesh Murali	2	6	4
10	R. Jeevan Kumar	1	5	4

Comparison of Pre-Test and Post-Test



DISCUSSION AND INTERPRETATION

From the pre-test and post-test scores, it is evident that there was a significant improvement in students' understanding of physics derivations. The difference in performance clearly shows that the teaching methods implemented such as concept mapping, flowcharts, guided worksheets, and peer teaching played a crucial role in helping students move beyond rote memorization. Students who initially struggled with understanding the logical steps in derivations were able to follow and reproduce them with confidence by the end of the intervention. Interactive strategies such as flowchart-based explanations and visual representations helped students visualize the connections between concepts and steps. The post-test results reflect that students developed a stronger conceptual foundation and were better able to apply derivations in solving problems. Their reflections and active participation during sessions also indicated a shift in attitude — from fear of derivations to genuine interest and engagement.

DELIMITATIONS OF THE STUDY

- The study was conducted within a limited time frame of 10 working days.
- The research was focused only on selected derivations in the school-level physics syllabus.
- The sample size was restricted to a small group of students for practical feasibility.
- Irregular attendance of some students affected the continuity of learning.
- The study concentrated mainly on conceptual clarity and did not evaluate long-term retention.

SUGGESTIONS FOR FUTURE IMPLEMENTATION

- More time can be allocated in the academic schedule for teaching derivations using interactive methods.
- Technology-based tools like simulations and educational videos can be integrated regularly to enhance visual understanding.
- Concept mapping and flowcharting can be introduced as routine classroom strategies across topics.
- Peer teaching and collaborative learning activities should be encouraged to build confidence and clarity.
- Similar strategies can be extended to other topics in physics and even other science subjects to promote deep learning.

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CONCLUSION

Physics is a subject that requires both logical reasoning and conceptual clarity. Derivations, which form the backbone of many physical laws and equations, are often perceived as difficult and are memorized without understanding. This action research aimed to bridge that gap by introducing student-centered strategies that promote meaningful learning. Through the use of concept maps, flowcharts, guided worksheets, peer discussions, and interactive sessions, students began to engage with derivations not as mechanical procedures but as logical explanations of physical phenomena. The improvement in post-test scores, along with student reflections, clearly indicates that these methods were effective in enhancing understanding and confidence. By shifting the focus from rote memorization to conceptual exploration, this study demonstrates that even complex topics like derivations can be made accessible, engaging, and enjoyable for students. This approach can serve as a model for teaching other abstract concepts in physics and beyond.

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FROM FEAR TO FOCUS: STRATEGIES TO OVERCOME MATHEMATICS ANXIETY AND BOOST STUDENT CONFIDENCE

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ABSTRACT

Mathematics anxiety is a common issue among students, leading to decreased confidence and poor academic performance. This action research investigates strategies to reduce mathematics anxiety and improve student confidence through positive reinforcement, interactive learning techniques, and stress-reduction methods. A comparative analysis between traditional teaching and anxiety-reducing strategies was conducted using pre-test and post-test evaluations. The findings suggest that targeted interventions significantly enhance students' mathematical confidence and performance.

INTRODUCTION

Mathematics is often perceived as a challenging subject, leading to anxiety and avoidance among students. Many learners experience a sense of fear and helplessness when faced with mathematical problems, which can result in disengagement and poor academic performance. This anxiety can stem from various sources, such as past negative experiences, fear of failure, lack of conceptual understanding, and traditional teaching methods that prioritize rote memorization over comprehension.

This study aims to explore the impact of structured interventions and interactive teaching strategies in alleviating mathematics anxiety and fostering confidence among students. Various methods such as gamification, visualization, relaxation techniques, and peer tutoring will be implemented to create an engaging and supportive learning environment. These strategies will encourage students to perceive mathematics not as an insurmountable obstacle but as a subject that can be mastered through practice, logical reasoning, and creative problem-solving.

Moreover, the research will investigate the psychological and emotional aspects of learning mathematics, identifying factors that contribute to fear and developing actionable steps to address them. Through a combination of pre-test and post-test evaluations, this study will assess the effectiveness of the implemented strategies in transforming students' attitudes towards mathematics. The ultimate goal is to help students transition from a state of fear to focus, enabling them to approach mathematical challenges with confidence and resilience.

NEED FOR THE STUDY

- Math is essential for careers in STEM fields but often causes anxiety in students.
- Fear of math lowers confidence, engagement, and performance in the subject.
- Early math anxiety, if unaddressed, can persist into adulthood.
- Fear of failure prevents students from actively participating in learning.
- Avoiding math due to anxiety limits academic and career opportunities.
- A growth mindset and encouragement can boost confidence in math.
- Rote learning methods may increase anxiety by neglecting conceptual understanding.

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- This study explores strategies to reduce anxiety and build confidence.
- Supportive interventions can create a more positive learning environment.
- Problem-solving, interactive learning, and stress management techniques help shift students from fear to focus

PROBABLE CAUSES OF THE PROBLEM

Negative Past Experiences: Many students develop a fear of mathematics due to past failures, harsh criticism, or discouraging remarks from teachers or parents.

Lack of Conceptual Understanding: If students do not grasp fundamental mathematical concepts early on, they struggle with advanced topics, leading to frustration and anxiety.

Pressure from Assessments and Grades: Standardized tests and frequent assessments create high expectations, leading to stress and a fear of failure.

Fixed Mindset: Some students believe that mathematical ability is an innate skill rather than one that can be improved through effort and practice.

Teaching Methods: Traditional rote learning methods may not engage all learners effectively, making math feel abstract and difficult to understand.

Parental and Societal Pressure: Expectations from parents and society to perform well in mathematics can add to the stress, increasing anxiety levels.

Comparison with Peers: Students who compare themselves to their peers and perceive themselves as weaker in math often experience self-doubt and diminished confidence

OBJECTIVE OF THE ACTION RESEARCH

- To implement and assess strategies for reducing mathematics anxiety..
- To develop long-term approaches for improving student attitudes toward mathematics.

HYPOTHESIS OF THE ACTION RESEARCH

There is a significant improvement in student confidence and mathematical performance when anxiety-reducing strategies are applied.

TOOL

i. Mathematics anxiety questionnaire.

ii. Pre-test and post-test assessments.

TATERGIES ADOPTED

- Growth Mindset Encouragement
- Visualization Techniques
- Step-by-Step Problem Solving
- Gamification
- Relaxation Techniques
- Peer Tutoring:

PLAN OF ACTION

A well-structured teaching plan was implemented over eight days, incorporating interactive methods

to enhance student engagement and understanding. Each day included specific objectives, content delivery, and relevant examples using blackboards, flashcards, group discussions, peer teaching, and hands-on exercises.

Day 1:

- ***Objective:*** Assess students' current levels of mathematics anxiety and identify problem areas.
- ***Content:*** Students completed a mathematics anxiety questionnaire and a diagnostic pre-test to evaluate their current understanding of mathematical concepts.
- ***Examples Used:*** Real-life scenarios were used to explain how anxiety affects learning. Students shared their past experiences with math.
- ***Assessment:*** Students were asked to reflect on their anxiety levels and identify specific math-related fears.

Day 2:

- ***Objective:*** Introduce students to the concept of a growth mindset in learning mathematics.
- ***Content:*** Students learned that mathematical abilities can be developed through effort and practice.
- ***Examples Used:*** Stories of famous mathematicians who overcame struggles with math were shared.
- ***Assessment:*** Students wrote affirmations about their ability to improve in math.

Day 3:

- ***Objective:*** Help students build a concrete understanding of abstract mathematical concepts.
- ***Content:*** Interactive activities using number lines, geometric models, and digital visualizations.
- ***Examples Used:*** Demonstrations with real-world objects
- ***Assessment:*** Students extended a base class to create their own derived class.

Day 4:

- ***Objective: Make learning mathematics engaging and reduce stress.***
- ***Content: Students participated in math-based games, competitions, and digital learning apps.***
- ***Examples Used: Puzzle-solving activities and interactive quizzes that encouraged logical thinking.***
- ***Assessment:*** Students competed in a math relay, applying learned concepts in a fun, low-pressure environment.

Day 5:

- ***Objective: Teach students systematic approaches to solving complex problems.***
- ***Content: Strategies such as breaking down problems into smaller steps, pattern recognition, and logical sequencing.***
- ***Examples Used: Word problems were deconstructed into smaller, manageable parts, emphasizing clear steps.***
- ***Assessment:*** Students demonstrated problem-solving skills by explaining each step of their solutions.

Day 6:

- ***Objective: Build confidence by encouraging peer interactions and group learning.***

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- ***Content: Students worked in pairs or small groups to solve math problems collaboratively.***
- ***Examples Used: Stronger students mentored peers, reinforcing their understanding while helping others.***
- ***Assessment:*** Students reflected on their group learning experiences and shared insights from their collaboration.

Day 7:

- ***Objective: Reduce stress and anxiety through relaxation exercises and confidence-building activities.***
- ***Content: Deep breathing exercises, mindfulness techniques, and positive affirmations were introduced before tackling math problems.***
- ***Examples Used: Students practiced visualization exercises, imagining themselves solving a difficult problem successfully.***
- ***Assessment: Students noted changes in their stress levels and confidence before and after relaxation techniqu***es.

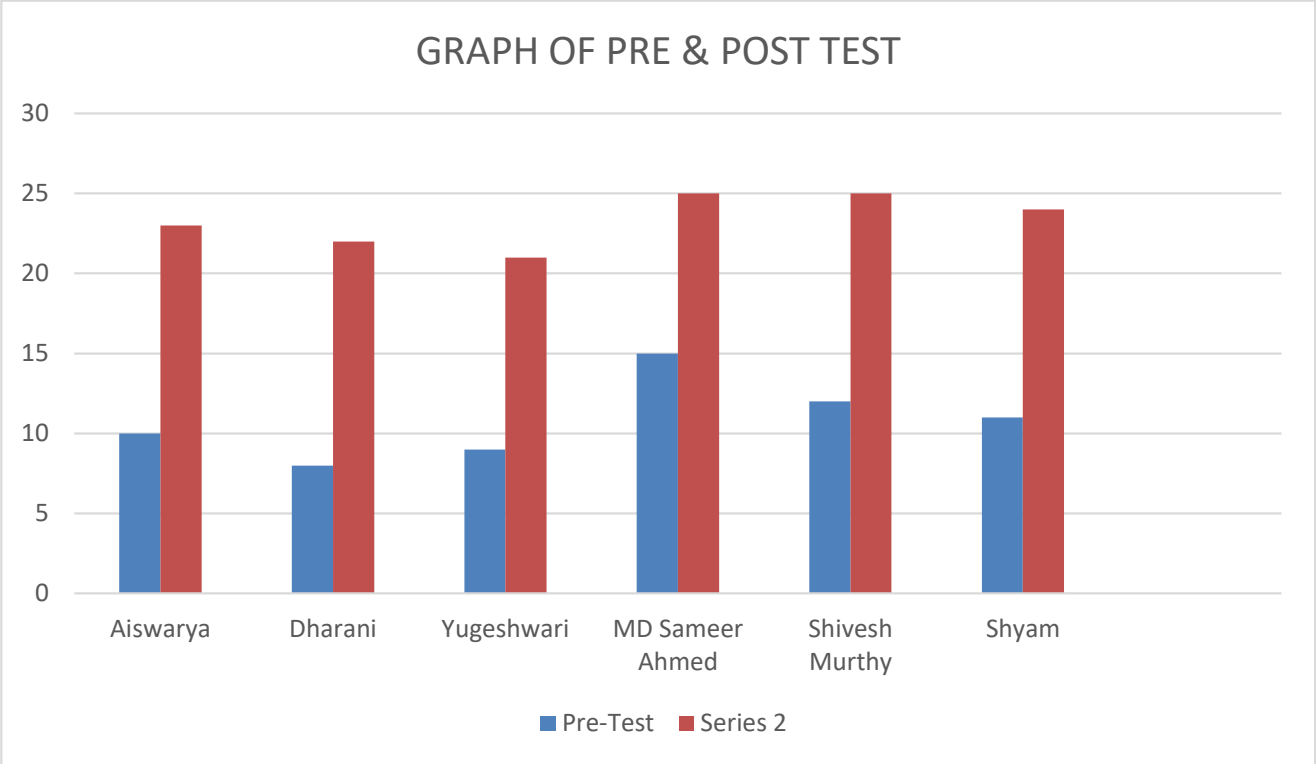
Day 8:

- ***Objective: Measure improvements in mathematical confidence and performance.***
- ***Content: A post-test was conducted to compare results with the pre-test. Students reflected on their journey*** and discussed the most effective strategies.

POST-TEST

Post test was conducted in the classroom to test the acquired knowledge of pupil.

STATISTICAL ANALYSIS



PRE – TEST AND POST- TEST SCORES:

S.No.	NAME OF THE STUDENT	Pre-Test Score (25)	Post-Test Score (25)	Difference (Post test- Pre-test)
1.	ASIHWARYA	10	23	13
2.	DHARANI	8	22	14
3.	YUGESHWARI	9	21	12
4.	MD SAMEER AHMED	15	25	10
5.	SHIVESH MURTHY	12	25	13
6.	SHYAM	11	24	13

LIMITATIONS OF THE STUDY

- The study was conducted over a short duration, limiting long-term observations.
- The sample size was small, restricting generalizability.
- Individual differences in learning styles may have affected outcomes.

CONCLUSION

Overcoming mathematics anxiety is crucial for improving student confidence and performance in the subject. This action research aimed to identify effective strategies to help students transition from fear to focus while tackling mathematical problems. The structured interventions implemented over eight days proved to be highly effective in reducing anxiety and fostering a positive learning environment.

The pre-test and anxiety assessment on the first day provided insights into the students' initial levels of discomfort with mathematics. It was evident that many students associated mathematics with fear, leading to avoidance and low performance. However, as the program progressed, students gradually shifted their mindset.

Students demonstrated increased confidence, improved test scores, and a more positive attitude toward mathematics. They reported feeling more equipped to handle mathematical challenges and expressed reduced levels of anxiety when approaching problems.

This study has demonstrated that targeted interventions, when implemented consistently, can significantly reduce mathematics anxiety and enhance student confidence. Encouraging interactive, engaging, and supportive strategies not only improves academic performance but also fosters a lifelong appreciation for mathematics. Moving forward, integrating these strategies into regular teaching practices can create a more positive and inclusive learning environment for all students.

SUGGESTIONS

- Integrating relaxation techniques into regular math sessions.

- Encouraging more student-led discussions and peer support networks.
- Developing long-term intervention programs for anxiety-prone students.
- Expanding the study to include students from diverse educational backgrounds.

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