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**EFFECTIVENESS OF 5E'S INSTRUCTIONAL MODEL TO IMPROVE  
THE TEST PERFORMANCE OF THE GRADE 5  
PUPILS IN SCIENCE**

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**ABSTRACT**

This study evaluated the effectiveness of the 5E's Instructional Model in improving the test performance of Grade 5 pupils in Science at Baybay 1 Central School in the Division of Baybay City. The findings of the study served as the basis for the proposed Improvement Plan. The study employed a quasi-experimental design, which was appropriate because it allowed the researcher to measure the effect of the 5E Instructional Model on learners' test performance within a natural classroom setting, where random assignment to groups was not feasible. Specifically, a pre-test-post-test non-equivalent control group design was used. The experimental group consisted of Grade 5 learners exposed to the 5E Instructional Model, which included the phases Engage, Explore, Explain, Elaborate, and Evaluate, while the control group was taught using traditional instructional methods. Both groups took a pretest before the intervention to determine their initial understanding and performance in Science. Following the instructional period, a posttest was administered to both groups to measure improvement in their comprehension and application of scientific concepts. This design enabled the

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researcher to compare the improvement in test performance between the experimental and control groups, control for pre-existing differences using pretest scores as a baseline, and determine the effectiveness of the 5E model in enhancing learners' understanding and application of science concepts. The quasi-experimental design was particularly practical in school settings, where random assignment could have disrupted normal class schedules, and it directly measured the impact of the instructional model on academic achievement, making it ideal for evaluating educational interventions. The use of both pre-test and post-test allowed the researcher to track learners' growth and attribute improvements to the 5E instructional approach. For data analysis, descriptive statistics were used to summarize learners' performance before and after the intervention, while inferential statistics, such as paired sample t-tests or ANCOVA, were utilized to determine whether differences in posttest scores were statistically significant, adjusting for pretest scores.

The Test of Difference Between Post-Test Scores of Experimental and Control Groups, specifically focusing on the comparison between the two groups after the implementation of the instructional intervention. The table provides information on the post-test performance of both groups, the statistical analysis, the decision on the null hypothesis, and the interpretation of the results. Its primary objective was to determine whether a significant difference existed between the performance of pupils exposed to the 5E Instructional Model and those taught using traditional methods. The results indicate a clear advantage for the experimental group over the control group. The statistical analysis led to the rejection of the null hypothesis, confirming that the observed difference in achievement between the two groups was

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significant and not due to chance. The comparison further demonstrates that learners who experienced the 5E Instructional Model performed better than those who received conventional instruction. The findings reflect a greater level of mastery, understanding, and application of Science concepts among pupils exposed to the intervention. This significant result supports the conclusion that the instructional model meaningfully contributed to improving learners' academic performance. The results imply that the 5E Instructional Model was more effective than traditional teaching methods in enhancing pupils' academic achievement. The structured, inquiry-based, and learner-centered approach improved conceptual understanding and the ability to apply scientific knowledge. These findings confirm that strategically sequenced instructional methods can promote better learning outcomes and foster deeper comprehension of Science content.

Keywords: Effectiveness, 5E's Instructional Model, Test Performance, Grade 5 Science

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## INTRODUCTION

Science has always been viewed as a challenging subject for many learners. Teachers often observe how pupils struggle to understand scientific concepts and how traditional teaching approaches sometimes make the subject less engaging. The 5E Instructional Model, which stands for Engage, Explore, Explain, Elaborate, and Evaluate, is an innovative framework designed to make learning more meaningful and student-centered. Each phase of the model provides opportunities for learners to construct their own understanding through active participation and guided inquiry. The Engage phase sparks curiosity and connects prior knowledge to new learning; Explore encourages hands-on activities and teamwork; Explain allows learners to articulate their understanding; Elaborate deepens comprehension through application; and Evaluate measures what students have learned and how they apply it.

In relation to test performance, the 5E model helps learners move beyond memorization and toward conceptual understanding. When students are actively engaged and given the chance to explore, they develop a clearer grasp of abstract scientific ideas. This deeper understanding enables them to perform better on assessments, as they are able to reason, analyze, and apply what they have learned rather than simply recalling information. Particularly for Grade 5 learners, who are beginning to transition from concrete to abstract thinking, this model provides structured and interactive learning experiences that foster both academic growth and enthusiasm for science.

According to Hayat and Hussain (2021) in their study "Building Conceptual Understanding of Primary School Students in Science through the 5E Instructional Model," the

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use of the 5E approach significantly improved students' achievement in science. The researchers used a quasi-experimental design involving primary school learners who were taught using either traditional methods or the 5E model. Results revealed that students who experienced 5E-based instruction performed better in post-tests, particularly in remembering, understanding, and applying scientific concepts. Hayat and Hussain (2021) emphasized that the model not only enhanced academic performance but also developed essential 21st-century skills such as critical thinking, collaboration, and communication. Their findings support the idea that interactive and inquiry-based strategies make science lessons more effective and engaging, leading to improved comprehension and sustained learner motivation. This study provides a strong basis for conducting similar research in the Grade 5 level to verify whether the same positive outcomes can be achieved among younger learners.

From the researcher's standpoint, improving learners' academic performance in science requires shifting from the traditional lecture-based method to more innovative, learner-centered strategies. Approaches such as the 5E model, cooperative learning, and inquiry-based instruction can help learners become more involved in the learning process. When lessons are interactive and connected to real-life experiences, learners develop a deeper understanding of scientific concepts and retain information longer. The researcher believes that effective teaching should not only focus on academic achievement but also on developing curiosity, problem-solving skills, and a lifelong love for learning. By integrating modern teaching strategies, teachers can nurture critical thinking and creativity—skills that are essential for success in the 21st century.

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Despite various teaching efforts, several problems continue to affect students' academic performance in science. Many Grade 5 learners find it difficult to understand lessons when presented through traditional, lecture-type methods. This often leads to misconceptions and the tendency to memorize information without true comprehension. Some pupils also lose interest in science because lessons are not presented in an engaging or hands-on manner. Furthermore, limited instructional materials, time constraints, and large class sizes make it challenging for teachers to implement interactive strategies effectively. These obstacles hinder students from achieving their full potential and emphasize the need for a more dynamic and structured learning model such as the 5E instructional approach.

The researcher intends to pursue this study to explore how the 5E instructional model can improve Grade 5 learners' understanding of scientific concepts and overall academic performance. Science learning should not only be about passing tests but about developing skills that will be useful beyond the classroom. The 5E model offers an opportunity to transform science instruction into an engaging, meaningful, and reflective process where students take ownership of their learning. Through this study, the researcher aims to provide evidence that innovative instructional strategies can address learners' difficulties, increase motivation, and promote deeper understanding. Ultimately, the goal is to make science not just a subject to study, but a tool for discovery and lifelong learning.

This study evaluated the effectiveness of the 5E's Instructional Model in improving the test performance of Grade 5 pupils in Science at Baybay 1 Central School in the Division of

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Baybay City. The findings of the study served as the basis for the proposed Improvement Plan.

Specifically, it sought to answer the following questions:

1. What is the pre-test performance of the Grade 5 pupils in Science based on the following groups:
  - 1.1 Experimental; and
  - 1.2 Control
2. What is the post-test performance of the Grade 5 pupils in Science based on the same groupings?
3. Is there any significant difference in the pre-test and post-test performances of the two groups?
4. Is there a significant difference in the post test performance between the control and experimental group?
5. What improvement plan can be proposed based on the findings of the study?

Null Hypothesis:

HO1: There is no significant difference in the pre-test and post-test performances between the control and experimental group.

HO2: There is no significant difference in the post test performance between the control and experimental group.

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## METHODOLOGY

**Design.** The study employed a quasi-experimental design, which was appropriate because it allowed the researcher to measure the effect of the 5E Instructional Model on learners' test performance within a natural classroom setting, where random assignment to groups was not feasible. Specifically, a pre-test–post-test non-equivalent control group design was used. The experimental group consisted of Grade 5 learners exposed to the 5E Instructional Model, which included the phases Engage, Explore, Explain, Elaborate, and Evaluate, while the control group was taught using traditional instructional methods. Both groups took a pretest before the intervention to determine their initial understanding and performance in Science. Following the instructional period, a posttest was administered to both groups to measure improvement in their comprehension and application of scientific concepts. This design enabled the researcher to compare the improvement in test performance between the experimental and control groups, control for pre-existing differences using pretest scores as a baseline, and determine the effectiveness of the 5E model in enhancing learners' understanding and application of science concepts.

The quasi-experimental design was particularly practical in school settings, where random assignment could have disrupted normal class schedules, and it directly measured the impact of the instructional model on academic achievement, making it ideal for evaluating educational interventions. The use of both pre-test and post-test allowed the researcher to track learners' growth and attribute improvements to the 5E instructional approach. For data analysis, descriptive statistics were used to summarize learners' performance before and after the

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intervention, while inferential statistics, such as paired sample t-tests or ANCOVA, were utilized to determine whether differences in posttest scores were statistically significant, adjusting for pretest scores.

The main local of the study was in Baybay I Central School in the Schools Division of Baybay. The respondents of the study were the Grade 5 Learners.

To gather the necessary data for the study, the researcher utilized a 50-item test questionnaire that was validated by the Education Program Supervisor in Science for the third grading period. The test items were aligned with the prescribed learning competencies and were designed primarily as formative assessment questions to measure learners' performance accurately and reliably.

In addition, the researcher developed and utilized teacher-initiated instructional materials aligned with the 5E Instructional Model. These materials were carefully crafted to support the implementation of the Engage, Explore, Explain, Elaborate, and Evaluate phases and to effectively address the targeted learning competencies in Science. The use of these structured and competency-based materials ensured that the instructional intervention was systematically delivered and aligned with curriculum standards.

**Sampling.** The respondents of the study were 80 Learners (Control and Experimental) that were being identified and the primary means of reach is during the actual conduct of the study as well as during the gathering of data in the school where the study was conducted. Another way of contacting them are through cell phones.

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**Research Procedure.** The researcher sought permission from the Schools Division Office headed by the School Division Superintendent, Dr. Manuel P. Albaño, Ph.D., CESO VI, through a formal Transmittal Letter. The same letter was furnished to the Public Schools District Supervisor, the School Principal, and the teachers under whose supervision the respondents were enrolled.

The research instrument used was a test questionnaire based on the Most Essential Learning Competencies in Science for the third grading period. The test was administered by the researcher to determine the performance level of the Grade 5 pupils, particularly in terms of comprehension and understanding of the lessons covered. After the integration of the specified intervention over a one-month period, a posttest was administered to determine whether there was an improvement in the pupils' test performance.

All collected data were collated, organized, and submitted for appropriate statistical treatment.

**Ethical Issues.** The right to conduct the study was strictly adhered through the approval of the principal. Orientation of the respondents both their subject teachers.

**Treatment of Data.** The following statistical formulas were used in the study. The quantitative responses were carefully tallied, organized, and tabulated to ensure accuracy and clarity of presentation. The data were then subjected to appropriate statistical treatment using relevant statistical tools.

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The weighted mean was utilized to determine and describe the performance level of the Grade 5 pupils in Science, both before and after the implementation of the intervention. This statistical measure provided a clear summary of the learners' overall achievement.

The t-test for mean difference was employed to determine whether there was a statistically significant difference between the pretest and posttest performances of the Grade 5 pupils. This inferential statistical tool enabled the researcher to assess the effectiveness of the 5E Instructional Model in improving the pupils' academic performance in Science.

## RESULTS AND DISCUSSION

TABLE I

PRE-TEST PERFORMANCE OF EXPERIMENTAL AND CONTROL GROUPS

Score Range	Likert Scale Description	Experimental Group Frequency	Experimental %	Control Group Frequency	Control %
41-50	Outstanding	6	15.00%	4	10.00%
31-40	Very Satisfactory	17	42.50%	11	27.50%
21-30	Satisfactory	16	40.00%	17	42.50%
11-20	Fairly Satisfactory	1	2.50%	8	20.00%
0-10	Poor	0	0.00%	0	0.00%
<b>Total</b>	—	40	100%	40	100%

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Score Range	Likert Scale Description	Experimental Group Frequency	Experimental %	Control Group Frequency	Control %
<b>Weighted Mean</b>	—	—	25.28 – Satisfactory	—	24.00 – Satisfactory

This table presents the Pre-Test Performance of Experimental and Control Groups, which shows the distribution of scores of Grade 5 pupils prior to the implementation of the instructional intervention. It reflects the frequency and percentage of learners in both the experimental and control groups across the different score ranges, along with their corresponding descriptive ratings and computed weighted means. The purpose of this table is to determine the baseline performance of both groups and to establish whether they were comparable before the application of the 5E Instructional Model.

The data reveal that in the experimental group, most pupils fell under the Very Satisfactory category, followed closely by those in the Satisfactory range, while a smaller proportion achieved Outstanding performance and only one pupil was classified as Fairly Satisfactory. None of the pupils were rated Poor. In the control group, the majority of learners were in the Satisfactory category, followed by Very Satisfactory, while a notable number fell under Fairly Satisfactory. Similar to the experimental group, no pupil in the control group was classified as Poor.

Comparing the two groups, both demonstrated generally comparable levels of performance before the intervention, with most learners clustered within the Satisfactory and

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Very Satisfactory ranges. The experimental group posted a weighted mean of 25.28 (Satisfactory), while the control group obtained a weighted mean of 24.00 (Satisfactory). Although the experimental group showed a slightly higher mean score, both groups were interpreted at the same descriptive level, indicating that they started at relatively similar levels of academic readiness in Science prior to the treatment.

The results imply that the experimental and control groups had nearly equivalent baseline performance, as both obtained Satisfactory overall ratings, with weighted means of 25.28 and 24.00, respectively. The distribution of scores further shows that the majority of learners in both groups were performing within the average to above-average range, with only a few falling under Fairly Satisfactory and none under Poor. This implies that any significant improvement observed in the posttest could be reasonably attributed to the instructional intervention rather than pre-existing disparities between the groups. Establishing comparable starting points strengthens the validity of the study and supports the credibility of subsequent findings regarding the effectiveness of the 5E Instructional Model.

**Table 2**

**POST-TEST PERFORMANCE OF EXPERIMENTAL AND CONTROL GROUPS**

Score Range	Likert Scale Description	Experimental Group Frequency	Experimental %	Control Group Frequency	Control %
41–50	Outstanding	21	52.50%	8	20.00%

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Score Range	Likert Scale Description	Experimental Group Frequency	Experimental %	Control Group Frequency	Control %
31-40	Very Satisfactory	16	40.00%	20	50.00%
21-30	Satisfactory	3	7.50%	11	27.50%
11-20	Fairly Satisfactory	0	0.00%	1	2.50%
0-10	Poor	0	0.00%	0	0.00%
<b>Total</b>	—	40	100%	40	100%
<b>Weighted Mean</b>	—	—	41.85 – Very Satisfactory	—	33.45 – Very Satisfactory

This table presents the Post-Test Performance of Experimental and Control Groups, which shows the distribution of learners' scores after the implementation of the instructional intervention. It reflects the frequency and percentage of pupils in both the experimental and control groups across the different score ranges, together with their descriptive ratings and computed weighted means. The table aims to determine the level of improvement in test performance after the application of the 5E Instructional Model and to compare the outcomes between the two groups.

The results reveal that in the experimental group, more than half of the pupils achieved scores within the Outstanding range, while a large proportion obtained Very Satisfactory ratings, and only a small number fell under the Satisfactory category. Notably, none of the

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learners in the experimental group were classified as Fairly Satisfactory or Poor. In contrast, the control group had the majority of pupils in the Very Satisfactory category, followed by those in the Satisfactory range, and a smaller proportion reaching the Outstanding level. Only one pupil in the control group was rated Fairly Satisfactory, and none were classified as Poor.

A comparison of the two groups shows a marked difference in performance levels after the intervention. The experimental group posted a weighted mean of 41.85 (Very Satisfactory), while the control group obtained a weighted mean of 33.45 (Very Satisfactory). Although both groups were interpreted within the same descriptive category, the experimental group demonstrated a substantially higher mean score and a greater concentration of learners in the Outstanding range. This indicates that the group exposed to the 5E Instructional Model exhibited stronger mastery and understanding of the Science concepts compared to those taught using traditional methods.

The results imply that the implementation of the 5E Instructional Model contributed to a notable improvement in learners' academic performance. Specifically, the experimental group had the highest number of pupils in the Outstanding and Very Satisfactory categories, with no learners falling under Fairly Satisfactory or Poor, and achieved an overall weighted mean of 41.85, compared to 33.45 for the control group. While both groups were rated Very Satisfactory, the higher concentration of top-level scores in the experimental group implies that the intervention enhanced comprehension, engagement, and application of scientific.

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**TABLE 3**

**TEST OF DIFFERENCE BETWEEN PRE-TEST AND POST-TEST SCORES OF  
EXPERIMENTAL AND CONTROL GROUPS**

Group	Test Scores (Mean)	Computed t	Critical t ( $\alpha = 0.05$ )	Decision	Interpretation
Experimental	Pre = 25.28 Post = 41.85	14.62	2.02	Reject Ho	Significant Improvement
Control	Pre = 24.00 Post = 33.45	7.38	2.02	Reject Ho	Significant Improvement

This table presents Test of Difference Between Pre-Test and Post-Test Scores of Experimental and Control Groups, which determines whether there was a significant difference between the learners' performance before and after the implementation of the instructional intervention. The table includes the mean scores for both pre-test and post-test, the computed t-values, the critical t-value at the given level of significance, the decision on the null hypothesis, and the interpretation of the results. Its purpose is to establish whether the 5E Instructional Model significantly improved the academic performance of the Grade 5 pupils compared to the conventional teaching approach.

The findings show that the experimental group obtained a pre-test mean of 25.28 and a post-test mean of 41.85, indicating a substantial increase in performance after exposure to

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the 5E Instructional Model. The computed t-value for the experimental group was 14.62, which exceeded the critical t-value of 2.02, leading to the rejection of the null hypothesis. This result was interpreted as a Significant Improvement, demonstrating that the intervention had a strong positive effect on learners' achievement in Science.

Similarly, the control group recorded a pre-test mean of 24.00 and a post-test mean of 33.45, showing an improvement in scores even under the traditional method of instruction. The computed t-value of 7.38 was also higher than the critical t-value of 2.02, resulting in the rejection of the null hypothesis. This indicates that there was also a Significant Improvement in the control group. However, when comparing the magnitude of improvement, the experimental group exhibited a much greater increase in mean scores than the control group, suggesting that the 5E Instructional Model was more effective in enhancing learners' academic performance.

The results imply that both instructional approaches contributed to improved learner performance, as evidenced by the increased mean scores from pre-test to post-test in both groups and the rejection of the null hypothesis in each case. However, the experimental group, with a higher post-test mean of 41.85 compared to 33.45 in the control group, demonstrated a more pronounced improvement. The overall findings imply that the 5E Instructional Model had a stronger impact on learners' mastery of Science concepts, confirming its effectiveness as an instructional strategy for improving academic achievement.

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**TABLE 4**

**TEST OF DIFFERENCE BETWEEN POST-TEST SCORES OF EXPERIMENTAL AND CONTROL GROUPS**

<b>Group</b>	<b>Test Scores (Mean)</b>	<b>Computed t</b>	<b>Critical t (<math>\alpha = 0.05</math>)</b>	<b>Decision</b>	<b>Interpretation</b>
Post-Test Comparison (Experimental vs Control)	Exp = 41.85 Ctrl = 33.45	6.38	2.02	Reject $H_0$	Significant Difference

This table presents the Test of Difference Between Post-Test Scores of Experimental and Control Groups, specifically focusing on the comparison between the two groups after the implementation of the instructional intervention. The table shows the mean post-test scores of both groups, the computed t-value, the critical t-value at the 0.05 level of significance, the decision on the null hypothesis, and the interpretation of the results. Its primary objective was to determine whether a significant difference existed between the performance of pupils exposed to the 5E Instructional Model and those taught using the traditional method.

The results indicate that the experimental group obtained a post-test mean of 41.85, while the control group achieved a mean of 33.45, showing a clear advantage for the experimental group. The computed t-value exceeded the critical t-value, leading to the rejection of the null hypothesis. This indicates a significant difference between the post-test

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performances of the two groups, confirming that the observed variation in achievement was not due to chance.

The comparison further demonstrates that learners who experienced the 5E Instructional Model performed better than those who received conventional instruction. The higher post-test mean of the experimental group reflects a greater level of mastery, understanding, and application of Science concepts. This significant statistical result strengthens the conclusion that the instructional intervention contributed meaningfully to the improved academic performance of the pupils.

The results imply that the 5E Instructional Model was more effective than traditional teaching methods in enhancing learners' academic performance. The structured, inquiry-based, and learner-centered approach significantly improved pupils' conceptual understanding and their ability to apply scientific concepts. These findings confirm that strategically sequenced instructional methods can yield better academic outcomes and foster deeper comprehension of Science content.

## CONCLUSION

Based on the results of this study, the 5E Instructional Model significantly enhanced the Science performance of Grade 5 pupils compared to traditional teaching methods. Learners who experienced the structured, inquiry-based, and learner-centered approach demonstrated greater mastery, understanding, and application of scientific concepts. The findings indicate that the intervention effectively promoted deeper comprehension, active

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engagement, and improved academic outcomes, confirming that strategically sequenced instructional methods can substantially support and elevate student learning in Science.

### RECOMMENDATION

The Learners should actively participate in science lessons using the 5E Instructional Model by engaging in all phases of learning, practicing critical thinking, and applying learned concepts to real-life situations to enhance understanding and performance.

The Teachers should integrate the 5E Instructional Model in their Science teaching, plan lessons that promote inquiry-based and learner-centered activities, and provide continuous guidance and feedback to improve pupils' comprehension and academic performance.

The School Heads should support teachers by providing necessary resources, professional development, and monitoring strategies to ensure effective implementation of the 5E Instructional Model across classrooms.

The Public Schools District Supervisor should encourage and facilitate training programs for teachers on inquiry-based instructional strategies, monitor implementation, and provide support to schools to improve teaching and learning outcomes.

The Parents should actively support their children's learning by engaging in discussions about science topics, assisting with activities and modules, and reinforcing the concepts learned in school to enhance understanding and performance.

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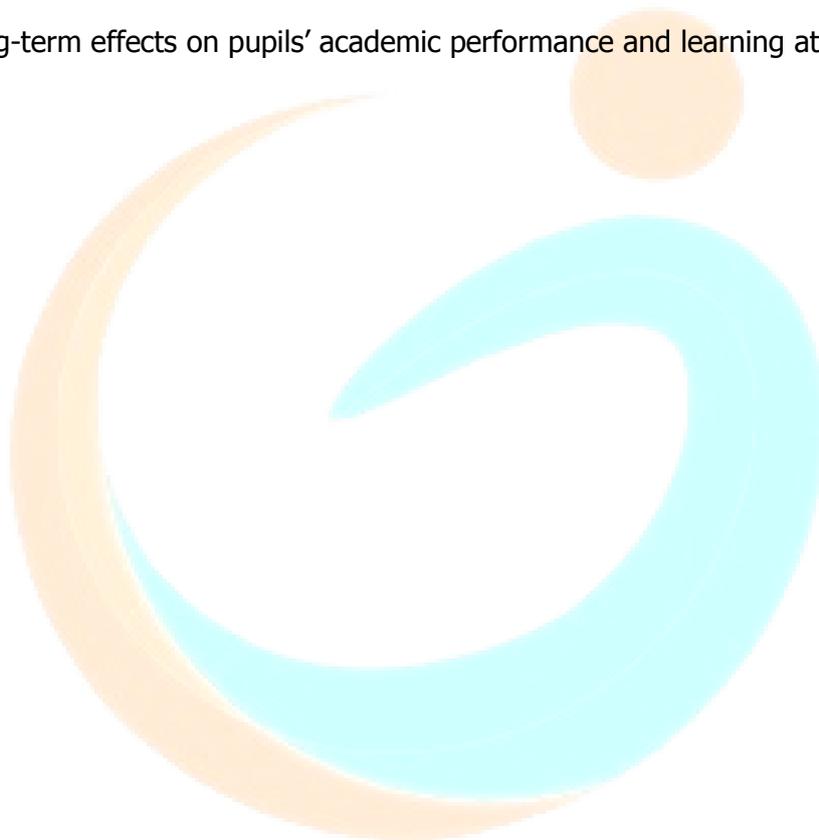
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The Researcher should continue to evaluate the effectiveness of the 5E Instructional Model across different grade levels and subjects to provide further evidence of its impact on learning outcomes.

Future Researchers should explore additional instructional strategies, compare the 5E model with other innovative teaching approaches, and conduct longitudinal studies to determine long-term effects on pupils' academic performance and learning attitudes.



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## AUTHOR'S PROFILE



### ESSIELYN NAYRE AREDIANO

Jessielyn N. Arediano was born on December 24, 1987 at Baybay City, Leyte, Philippines. She finished her Elementary Education in year 2000 at Baybay North Central School and her Secondary Education at Baybay National High School in 2004.

During her Tertiary Education, she graduated her Bachelor's Degree in Elementary Education at Visayas State University – Main Campus in 2008. She is currently finishing her Master's Degree of Arts in Education major in Elementary Education at Western Leyte College of Ormoc City.

She has been in the Department of Education for sixteen (16) years and is currently teaching at Baybay 1 Central School. She is a teacher who is deeply committed to helping her pupils understand lessons more clearly, especially in Science. Through years of classroom experience, she has observed the challenges learners face in grasping scientific concepts, which inspired her to explore more effective and engaging teaching strategies.

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Her experience as Science Teacher in Grade 5 inspired her to conduct this study, which focus on improving pupils' understanding through research-based instructional models. She hopes that the results of this study will contribute to better learning experiences for both teachers and pupils.



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