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Unlocking Challenges: Teacher's Teaching Strategies and Pupil's Comprehension in Science

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Abstract: This study aims to determine the challenges and teaching strategies of Science Teachers on pupils' comprehension in Science. This was conducted at Zamboanga Central District, Zamboanga City. The respondents were all Science teachers from grades 4 to 6. It employed a descriptive quantitative with correlational design. The findings suggest that the teaching strategies employed are effective in promoting comprehension and understanding among the pupils. The study recommends to provide ongoing development opportunities for teachers to enhance their pedagogical skills and knowledge in science education.

Index Terms **- teaching strategies, reading comprehension, science teachers, concept, scientific vocabulary, inferential skills, text structure recognition,**

I. INTRODUCTION

In elementary education, developing a strong foundation in science is critical for fostering curiosity, critical thinking, and a lifelong interest in the natural world. However, young learners often find scientific concepts and texts challenging due to their complexity and specialized vocabulary. To overcome these obstacles and enhance pupils' comprehension in science, elementary teachers employ a range of effective instructional strategies. Research has shown that when these strategies are implemented effectively, they not only help students grasp scientific concepts more clearly but also improve their overall reading comprehension skills.

Reading comprehension in science at the elementary level is essential as it enables students to decode information, understand complex ideas, and connect new knowledge with their existing understanding. Teachers' instructional strategies, such as explicit teaching of text structures, inquiry-based learning, and the integration of literacy tasks within science lessons, play a pivotal role in enhancing pupils' comprehension. These strategies provide students with the tools they need to navigate scientific texts, ask meaningful questions, and engage actively with the content. By fostering these skills, teachers can help young learners build a robust understanding of science, setting the stage for future academic success and a deeper appreciation of the subject.

1.1 Statement of the Problem:

This study aims to determine the challenges and teaching strategies of Science Teachers of Zamboanga Central District on pupils' comprehension in Science for School Year 2023-2024.

Specifically, it seeks to answer the following:

1. What is the level of pupils reading comprehension in science in terms of:
   1.1 concept
   1.2 understanding scientific vocabulary
   1.3 inferential skills
   1.4 Text Structure Recognition
2. What are the teacher's teaching strategies in science?
3. Is there a significant relationship between the teacher's teaching strategy and pupil's level of reading comprehension in science?

1.2 Scope and Delimitation of the Study

This study assess the Teachers' teaching strategies and pupils' comprehension in science particularly the grade 4,5 & 6 science teachers.

The research was conducted at Zamboanga Central District school year 2023-2024, Zamboanga City Division.

II. RESEARCH METHODOLOGY

2.1 Research Design

The study employed a descriptive – correlational research design because this allows you to systematically observe and describe the teaching strategies employed by teachers in the science classroom and the corresponding levels of comprehension among pupils. In this case, the researcher aims to describe the characteristics of the variables such as teacher's teaching strategies and level of pupils reading comprehension in science in terms of concept, understanding scientific vocabulary, inferential skills and Text Structure Recognition. The researcher collects quantitative data from the science teachers. The researcher examines the relationship between the variables using correlational analysis techniques. This involves calculating correlation coefficients (e.g. Pearson's r) to determine the strength and direction of the relationship between teachers' teaching strategies and pupil's comprehension levels in science

2.2 Population and Respondents of the Study

The total population of teacher-respondents was 385 across Zamboanga Central District. The largest number of science teachers (20) is in Zamboanga Central School SPED Center, while the smallest numbers (6) were from Canelar Integrated School, Rio Hondo and Mariki.

2.3 Sampling Design

The sampling method that was used in the study was the stratified random sampling design and Teacher-Student Pairing. This design involved dividing the population into subgroups or strata based on relevant characteristics that are important to the study. While Teacher-Student Pairing, since the study focuses on the interaction between teachers strategies and student's comprehension, it may be beneficial to pair teachers and students within the same stratum. This can help analyze how specific teaching strategies impact individual student comprehension levels.

2.4 Research Instruments

The researcher will utilize a researcher-made survey questionnaire for science teachers. It comprised of two parts. Part 1 solicited the profile of the respondents such as sex, length of service, educational qualification and number of years in teaching science. Part 2 contains the Level of Pupil's Reading Comprehension in Science in terms of Concept, understanding scientific vocabulary, inferential skills and text structure recognition all with 5 statements each. Then, Part 3 includes 10 statements on the Teacher's Teaching Strategies in Science. It will utilize a Likert scale of (4) Strongly Agree; (3) Agree; (2) Disagree; and (1) Strongly Disagree.

2.5 Data Gathering Procedure

A letter of approval will be obtained from the Office of the Schools Division Superintendent in order to collect data from selected teachers in the selected districts of Zamboanga Schools Division. An arrangement of schedules in the distribution and retrieval of the survey questionnaires will be carried out. The researcher will personally administer the questionnaires to the abovementioned schools. After the retrieval of data, the answers of the respondents will be treated statistically using the Statistical Package for social Sciences (SPSS).

III. Results and Discussion

Problem Number 1: ***What is the level of pupils reading comprehension in science in terms of concept, understanding scientific vocabulary, inferential skills and Text Structure Recognition?***

Table 1: Level of Pupils' reading comprehension in Science in terms of Concept

The pupil…	Mean	Verbal Description	Interpretation
1. understands scientific concepts presented in reading materials.	3.06	Agree	High
2. distinguishes facts and opinions in science texts related to concepts.	3.14	Agree	High
3. applies their understanding of scientific concepts to the situations.	3.06	Agree	High
4. explains scientific concepts in their own words, demonstrating comprehension	3.08	Agree	High
5. summarizes the information they read in science texts.	3.08	Agree	High
Overall Mean	**3.084**	**Agree**	**High**

Legend: 1.0-1.75 – Very low 1.76-2.50-Low 2.51-3.25- High 3.26-4.0-Very High

The data in table 1 showed that the pupil had a very high level of comprehension in science concepts. This was based on five metrics which were all rated as "High" with a mean score of 3.084 out of a possible 4.0. This suggested that pupils have a strong grasp of

scientific concepts, can differentiate between facts and opinions, apply their knowledge, explain concepts clearly and summarization information effectively when reading science texts. A Literature Review" by Lynn D. Dierking and John H. Falk. Published in 2003, this literature review digged into research on how young children, including elementary pupils, develop their understanding of scientific concepts and the process of scientific inquiry.

Table 2: Level of Pupils' reading comprehension in Science in terms of Understanding Scientific Vocabulary

	The pupil…	Mean	Verbal Description	Interpretation
1.	defines scientific vocabulary terms encountered in reading materials.	2.98	Agree	High
2.	understands the meaning of scientific vocabulary in context.	3.16	Agree	High
3.	uses scientific vocabulary when explaining concepts.	2.94	Agree	High
4.	relies heavily on background knowledge to understand scientific vocabulary.	3.00	Agree	High
5.	identifies synonyms and antonyms for scientific vocabulary terms.	3.00	Agree	High
	Overall Mean	**3.016**	**Agree**	**High**

Based on the table shown, the pupils had a high level of comprehension in terms of understanding scientific vocabulary. This was reflected in the "Mean" score of 3.016, which fell under the "High" category (between 2.76 and 3.50 according to the legend. The table also showed that the pupils rely heavily on background knowledge (score 3.00) to understand scientific vocabulary. This implies that while they could understand scientific terms presented in the text, their comprehension might be strengthened by explicit vocabulary instruction strategies. To support this outcome, a study conducted on "The Role of Prior Knowledge in Learning from Educational Software: Implications for Conceptual Change" by David Klahr and Milena Nigam. This study, published in 2004, explores how prior knowledge influences children's ability to learn scientific concepts, particularly through educational software. Another literature on that supports the idea of explicit vocabulary instruction strategies strengthening the comprehension of elementary pupils is "Vocabulary Instruction in Elementary Classrooms: Where Do We Go From Here?" by Elfrieda H. Hiebert and Anne E. Farrar. This study, published in 2010, examines effective vocabulary instruction practices and their impact on students' comprehension, particularly in elementary classrooms.

Table 3: Level of Pupils' reading comprehension in Science in terms of Inferential Skills

	The pupil…	Mean	Verbal Description	Interpretation
1.	draws conclusions based on information presented in science texts.	3.10	Agree	High
2.	identifies the author's purpose or implied meaning in science reading materials.	2.94	Agree	High
3.	makes predictions about scientific phenomena based on their understanding of the text.	3.22	Agree	High
4.	identifies cause-and-effect relationships presented indirectly in science texts.	3.22	Agree	High
5.	makes connections between their prior knowledge and the information presented in science texts.	3.36	Strongly Agree	Very High
	Overall Mean	**3.168**	**Agree**	**High**

The data in table 3 showed that the pupils had a high level of inferential comprehension skills in science. For skill 1, the skill had a score of 3.10, categorized as "High". This showed the ability to make a well-supported judgement based on the information in the text. For skill 2, this skills had a score of 2.94, categorized as "High". This showed the ability to understand the underlying reasons why the text was written. For skill 3, this skill had a score of 3.22, categorized as "High". This showed that the ability to use their understanding of the text to make an educated guess about what might happen next. For skill 4, this skill had a score of 3.36, categorized as "Very High". This showed the ability to understand the relationship between events described in the text, even if they are not explicitly stated. Lastly, for kill 5, this skill had a score of 3.22, categorized as "High". This showed the ability to use what they already know to understand the new information they are reading. The overall score was 3.16, which was categorized as "Agree" according to the legend which means they perform well in all the listed inferential skills. DeRosa and Cunningham emphasize the importance of engaging students in active exploration and inquiry-based learning experiences to deepen their understanding of scientific concepts. They discuss how inferential skills, such as making predictions, drawing conclusions, and synthesizing information, play a crucial role in comprehending scientific texts and interpreting experimental results.

Table 4: Level of Pupils' reading comprehension in Science in terms of Text Structure Recognition

	The pupil…	Mean	Verbal Description	Interpretation
1.	identifies the main idea and supporting details in science texts.	3.20	Agree	High
2.	differentiates between chronological order, cause-and-effect, and problem-solution structures in science reading materials.	3.08	Agree	High
3.	follows the sequence of ideas presented in a science text.	3.30	Strongly Agree	Very High
4.	identifies transitions words and phrases that signals changes in the text structure of science materials.	3.22	Agree	High
5.	uses their understanding of text structure to locate specific information in science texts.	3.14	Agree	High
	Overall Mean	**3.188**	**Agree**	**High**

Table 4 on the Level of Pupil's reading comprehension in Science in terms of Text Structure Recognition, the table showed that pupils had a high level of comprehension in Science in terms of Text Structure Recognition. The overall mean score was 3.188, which falls under the category "High" according to the legend (between 2.76 and 3.50). These findings indicates that pupils are skilled at recognizing how science texts were organized and could use this knowledge to improve their comprehension. A research showed that explicit instruction in text structures led to higher levels of comprehension among fourth and fifth graders. Students who received instruction were better able to recall and understand key concepts in science texts compared to those who did not receive such instruction.

Problem Number 2. ***What are the teacher's teaching strategies in science?***

Table 5: TEACHER'S TEACHING STRATEGIES IN SCIENCE

	The teacher…	Mean	Verbal Description	Interpretation
1.	uses hands-on experiments in her science lessons.	3.48	Strongly Agree	Very High
2.	incorporates technology into her science teaching.	3.460	Strongly Agree	Very High
3.	uses real-world examples to explain scientific concepts.	3.50	Strongly Agree	Very High
4.	differentiates her science instructions to accommodate various learning styles.	3.46	Strongly Agree	Very High
5.	assesses student understanding during her science lessons	3.44	Strongly Agree	Very High
6.	encourages pupils to ask questions and explore their own scientific interests.	3.48	Strongly Agree	Very High
7.	connects science lessons to other subjects such as mathematics or language arts.	3.52	Strongly Agree	Very High
8.	uses group work and cooperative learning strategies in her science teaching.	3.56	Strongly Agree	Very High
9.	adapts her science lessons based on pupil's feedback and assessment results.	3.40	Strongly Agree	Very High
10.	instills love of science and curiosity about the natural world in my pupils.	3.60	Strongly Agree	Very High
	Overall Mean	**3.49**	**Strongly Agree**	**Very High**

Table 5 showed the teacher's teaching strategies in Science. The results of the data showed that: Science lesson frequently incorporated activities that allowed pupils to learn by doing; that science lessons frequently connected to real-world phenomena which made the content more relevant and more engaged for pupils; that teachers were using a variety of instructional methods to cater the different needs of their pupils; that teachers were frequently checking for pupils comprehension throughout the lessons; that science classrooms were environments where students felt comfortable asking questions and investigating their own scientific interests; that science lessons frequently integrated with other subjects to reinforced learning.; that science lessons frequently involved collaborative activities; that teachers were responsive to students' needs and adjust their instructions accordingly; lastly, that teachers created a positive learning environments that nurtured student's interest in science.

Overall, the data implies that science teachers were using a variety of effective strategies to promote student learning and engagement.

One study that outlines various strategies such as inquiry-based learning, hands-on experiments, and the use of technology to enhance student engagement in science. The authors found that students who participated in active learning experiences showed greater interest and understanding of scientific concepts.

Problem Number 3. ***Is there a significant relationship between the teacher's teaching strategy and pupil's level of reading comprehension in science?***

Table 6

Variable	Mean	r- value	p-value	Decision	Interpretation
Teacher's Teaching Strategies in Science	Level of Pupil's Reading Comprehension in Science	.436	.002	Reject	Significant

Table showed that the significant relationship between the teachers teaching strategy and pupil's level of reading comprehension in science does exist as shown in the obtained p-value of .002 less than the alpha of 0.05 level of significance. Therefore, the null hypothesis is rejected since there is statistical significance among variables tested. Thus, there is a significant relationship between the teacher's teaching strategies and pupil's reading comprehension in Science. This implies that if the teacher's teaching strategies in Science were properly used, then the pupils reading comprehension in Science will also improve or increase.

"Effectiveness of Reading and Writing Strategies in Enhancing Science Learning" by Fang, Z. (2006). Fang's study highlights the importance of integrating reading and writing strategies into science instruction. The research indicates that when teachers use strategies such as summarization, questioning, and graphic organizers, students' comprehension of science texts improves significantly.

IV. Conclusion & Recommendation

The study concludes that the application of varied and effective teaching strategies by elementary science teachers significantly enhances pupils' reading comprehension in science. The high levels of comprehension across different aspects—concept understanding, vocabulary knowledge, inferential skills, and text structure recognition—can be attributed to the strategic instructional methods employed by teachers. These strategies not only facilitate better understanding and retention of scientific knowledge but also foster a deeper engagement and love for science among pupils. Therefore, continuous professional development for teachers in implementing these effective strategies is crucial for maintaining and improving pupils' comprehension and overall academic success in science.

Based on the findings and conclusions, the following recommendations can be made to further enhance student learning outcomes and optimized teaching strategies in science education: Provide ongoing development opportunities for teachers to enhance their pedagogical skills and knowledge in science education. Offer training sessions on effective teaching strategies, differentiated instruction, and assessment practices to empower teachers to cater to diverse student needs and promote comprehensive understanding in science. Encourage the integration of technology tools and resources in science instruction to enhance student engagement and facilitate interactive learning experiences. Facilitate collaborative planning sessions among teachers to share best practices, discuss effective teaching strategies, and reflect on student learning outcomes. Implement differentiated instruction strategies to accommodate diverse learning styles and abilities among students in science classrooms.

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