INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY: APPLIED BUSINESS AND EDUCATION RESEARCH
2024, Vol. 5, No. 3, 1044 – 1062
http://dx.doi.org/10.11594/ijmaber.05.03.27

Research Article

Integration of Literacy Strategies in Teaching Science among Grade IV Pupils of Zone II Zambales Division for The School Year 2019 – 2020

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Article history:
Submission March 2024
Revised March 2024
Accepted March 2024

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ABSTRACT

The study aimed to assess and determine the integration of literacy strategies in teaching Science among Grade IV elementary pupils of Zone II Division of Zambales during the School Year 2019-2020.

The researcher utilized the descriptive research design with questionnaire as the main instrument in gathering data and information from (50) Science teachers and determine their profile as to age, sex, highest educational attainment, position, and numbers of years in teaching Science. The study was limited to determine perception towards integrating literacy in teaching Science among elementary pupils as to Paraphrasing/Vocabulary Instruction, Summarizing Science, Interactive Read-Aloud, Interactive Reading Guides, and Writing A Scientific Explanation

The result of the study revealed that most of the respondents are from age-group of 30-39 with 19 or equivalent to 38.00% and with mean age of 38.1 years old; majority of the respondents are female teachers with 29 or equivalent to 58.00%; majority have attained Masteral units and with 27 or equivalent to 54.00%; mostly are occupying Teacher I and with 19 or equivalent to 38.00%; and 18 or equivalent to 36.00% are in the teaching service for 6-9 years with mean of 7.6% or 8 years in the service.

Based on the summary of the investigations conducted, the researcher has arrived to conclude that the respondent is a typical female in her middle adulthood, Teacher 1, with Masteral units and has served for almost a decade in the teaching service. The respondents Highly Practiced Paraphrasing/Vocabulary Instruction, Summarizing Science, Interactive Read-Aloud, Interactive Reading Guides, and Writing A Scientific Explanation. The students were assessed "Average Mastery" in their academic performance. Based on the summary of the investigations conducted and the conclusions arrived at the researcher has offered the following recommendations based on the salient findings obtained in the study. It

How to cite:
Sebastian, M. J. A. (2024). Integration of Literacy Strategies in Teaching Science among Grade IV Pupils of Zone II Zambales Division for The School Year 2019 – 2020. *International Journal of Multidisciplinary: Applied Business and Education Research*. *5*(3), 1044 – 1062. doi: 10.11594/ijmaber.05.03.27

is encouraged that the Science teachers have to finish their Masteral Degree for them to have higher academic rank.

The Science teachers have to sustain the teaching strategies in Paraphrasing, Summarizing in Science, Interactive Read Aloud, Interactive Reading Guides, and Writing Scientific Explanation must be sustained among science teachers. The teachers have to encourage pupils to develop study habits to improve the academic performance. Teachers are encouraged to be sensitive and vigilant to pupils who are passive in the subjects and make them highly involve in all activities by giving rewards and recognition. If budget warrants, provision of internet services in classroom environment is strongly recommendable for better appreciation and learning Science. The future researchers have to conduct a parallel or similar study with in-depth and wider in scope so as to validate and confirm the findings obtained in the study.

Keywords: *Grade IV pupils, Integration of literacy strategie, Zone II Zambales Division*

Introduction

Teaching Science has both many challenges and rewards. One of the biggest challenges teachers face as science facilitators and educators is creating lessons that will not only get students to learn or be informed about things around them but catch students' interest. Students find it easier to stay on learning task when they can relate to the topic they are studying. This motivates them to personally involve themselves directly in the activity. Teachers will be more successful in engaging students' interest when they themselves understand the material and are excited by it. Strategic teaching is important in teaching Science in a way in which pupils or students learn while enjoying what they do inside the classroom or laboratory.

According to Alton-Lee (2011) the teachers should align their professional experiences with their teaching practices and pedagogies in order to benefit their students. Agreeing to Alton-Lee, these days one of the major roles of the teachers is to ensure that the content delivered has achieved the learning objective, which can be considered a key challenge. Despite the years of teaching experience, there is always room for improvement and innovation for the teachers to adapt as per their requirement. Demands and needs change time to time so the teachers should also undergo professional and personal development to benefit both, the students and themselves as well, both are the learners.

Students and citizens who are scientifically literate are able to read, understand, and interpret Science in the popular media as well as to have the ability to communicate more coherently in their professional and personal lives. Science educators need to provide students with the experiences to develop these modes of communication through a variety of means so that students have the skills to apply their understanding to other situations. For instance, there is no one that has not been affected or know someone affected by cancer or some other debilitating disease. Being able to visit a physician and communicate one's symptoms effectively often allows for early detection and successful treatment (Barroso et al., 2023).

As suggested by the National (2015) Science students in a Science reading course will spend less time with rote memorization, listening to direct instruction, completing worksheets, and answering the end of the chapter questions. Instead, students will participate in science in ways that align more with the new vision of Science 7 education. Students will learn terminology as needed to explain and argue from evidence in multiple modes, develop systems models of their thinking, and engage in Science and Engineering practices while

learning to obtain, evaluate and communicate information from a variety of texts (National, 2015).

First of all, reading, writing, and oral communication are critical literacy practices for participation in a global society (Krajcik & Sutherland, 2010). By allowing students to develop and use literacy skills, this course becomes applicable to other disciplines and to students' personal lives. Secondly, Science Reading follows the "New Vision" for Science education in the nation by offering students the opportunity to practice many of the Science skills that scientists use such as arguing from evidence, communicating and evaluation information, and constructing explanations. Lastly, perhaps most importantly, incorporating literacy in Science improves students' metacognition and understanding of Science concepts. In fact, the skills of reading and writing can serve as dynamic vehicles for learning Science meaningfully (Glynn & Muth, 1994).

Basically, the New Vision encourages the development of scientific literacy, being able to communicate and evaluate Science. Comparatively, this is what scientists do on a daily basis, write, speak, debate, visualize, listen, and read about their specialties. By integrating reading and writing activities within Science Reading, students will be able to hone their literacy skills. Reading and discussion skills help students recognize the utility of Science in their lives. If students develop positive attitudes toward Science and become confident of their ability to understand it, students will continue to learn Science outside the classroom. They will be able to understand how Science interacts with social issues and will be able to apply those skills in their personal lives. Students will benefit from grappling with ideas, sharing their thoughts, and solving problems (Hicks & Ewing, 2003).

Integrating literacy activities into a Science classroom can play a vital role in achieving a minds-on or metacognitive approach to the learning of Science. Reading and writing activities can support active inquiry, and problem solving as well as help students to cover Science content in greater depth focusing on related content and cross cutting themes. Through reading and writing, students can build upon their prior learning and make real-world connections (Glynn & Muth, 1994). Making these connections allow students to move their knowledge into long term memory where they store memorable and applicable schema or representations of concepts until they need to retrieve it at a later date. The use of literacy skills while learning Science content also extends and expands students' scientific reasoning skills. In fact, a growing body of research and practice in science instruction indicates language is essential in science learning and improves achievement in literacy and Science (Romance, & Vitale, 1992). This is no surprise because language allows students to clarify their ideas, make claims, present evidence based arguments, and record and present findings (Winokur & Worth, 2006).

The researcher found it significant to assess and the level of integration of literacy strategies in teaching Science among Grade IV pupils in public elementary schools of Zone II under the Division of Zambales during the School Year 2019-2020.

Methods

The study aimed to assess and determine the level of integration of literacy strategies in teaching Science among Grade IV elementary pupils of Zone II Division of Zambales during the School Year 2019-2020.

Specifically, this study will seek to provide answers to the following questions:

1. What is the profile of the respondents in terms of :
   1.1. Age;
   1.2. Sex;
   1.3. Highest Educational Attainment; and
   1.4. Number of years in teaching the subject?
2. How do the respondents perception towards the level of integration of literacy strategies in teaching Science as to the following strategies be described:
   2.1. Paraphrasing/Vocabulary Instruction;
   2.2. Summarizing in Science;
   2.3. Interactive Read-Aloud;
   2.4. Interactive Reading Guides; and
   2.5. Writing a Scientific Explanation?
3. What is the academic performance of the Grade IV pupils?

4. Is there significant difference on integration of literacy strategies in teaching Science when grouped according to profile variables?
5. Is there significant difference on the level of integration of literacy strategies in teaching Science and the academic performance among Grade IV pupils?
6. Is there a significant relationship between the academic performance and level of literacy strategies in teaching Science?

Result and Discussion

This chapter presents the processed and gathered data using tabular form, analyzed and provides interpretation so as to give a better and clear understanding on the problems asked in Chapter 1.

1. Profile of the Respondents

1.1. Age

Table 4 shows the frequency and percentage distribution on the respondents' age profile variables.

Table 4. Frequency and Percentage Distribution on the Respondents' Age Profile Variables

N=50		
Age	**Frequency (f)**	**Percentage (%)**
50 - 59 years old	9	18.00
40 - 49 years old	11	22.00
30 - 39 years old	19	38.00
21 - 29 years old	11	22.00
Total	**50**	**100.00**
Mean of Age=38.1 years old		

Most of the respondents are from the age group of 30-39 years old with 19 or equivalent to 38.00%; 11 or 22.00%, are from 40-49 and 21-29 years old respectively. And 9 or 18.00% from 50-59 years old. The computed mean age of the respondents was 38.1 years old.

The data simply manifest that the respondents were classified in the middle adulthood. Middle adulthood, or middle age, is the time of life between ages 40 and 65.

The educationists are well familiar with the fact that all the learners have a different learning style, whereas the problem lies in catering to all of them with an effective teaching strategy. Students learn in different ways as per their capabilities. Some learn by seeing, hearing, reflecting, modelling, reasoning, and drawing etc. (Kohistani & Probst, 2016). With an agreement to Felder, similarly there are different teaching styles as well. Some give lectures, some discuss the topic, some make their students work in groups, some use technology, some use textbooks and many more. But, the main purpose behind these efforts is to help students grasp content knowledge and align them with the real world scenario (Tolero et al., 2021).

1.2. Sex

Table 5 shows the frequency and percentage distribution on the respondents' sex profile variables.

Table 5. Frequency and Percentage Distribution on the Respondents' Sex Profile Variables

N=50		
Sex	**Frequency (f)**	**Percentage (%)**
Male	21	42.00
Female	29	58.00
Total	**50**	**100.00**

Majority of the respondents are female with 29 or equivalent to 58.00% teacher while only 21 or 42.00% are male teachers.

The numerical predominance of women in teaching professions, especially those designed for the youngest children, is usually explained as an effect of the conviction that teaching should be regarded as an extension of adults' work with their own children, which is still performed more often by women than men. The importance assigned to the possibility for harmonization of professional and domestic work by the respondents in the survey is also related to the gender division of labor. Furthermore, it is precisely this characteristic of the occupation that is regarded as one of the most desirable characteristics of the students' future occupation, as well as one of the most important advantages of the teaching profession. Thus, the educational and professional choices made by the respondents are constituted in accordance with their habitus and the practices managed by it (Tolero et al., 2021). Asimaki and Verdigis conclude with regard to pedagogical studies that successful recruiting of a "suitable clientele" into pedagogical professions is taking place: "a clientele whose habitus harmoniously meet the gender character of the particular scientific field" (2013). The numerical predominance of women in education professions can partly be explained by social background, as well. The majority of the respondents came from comparatively small settlements or villages, their parents had mainly completed secondary or professional education, their fathers were mostly employed in the technical field in the private sector, while their mothers were active in the public sector. On this basis, one might conclude, as exposed by Key (2001) in Sallaz & Zavisca (2007) that middle-class women have moved into certain professional occupations such as law and medicine, whilst undergraduates from poorer backgrounds continue to pursue careers in traditionally female professions like teaching. It can be said that teaching offers the possibility of social mobility and security to male and, above all, female students originating from socially weaker surroundings. This conclusion is based on the fact that the teaching profession is a comparatively well-paid profession the occupation itself is relatively secure, given that the vast majority of (primary and secondary) schools are state schools.

1.3. Highest Educational Attainment

Table 6 shows the frequency and percentage distribution on the respondents' highest educational attainment profile variables.

Table 6. Frequency and Percentage Distribution on the Respondents' Highest Educational Attainment Profile Variables

N=50

Highest Educational Attainment	Frequency (f)	Percentage (%)
Doctorate Degree	2	4.00
Master's Degree	6	12.00
With Master's Units	27	54.00
College Graduate/Baccalaureate Degree	15	30.00
Total	**50**	**100.00**

Majority of the respondents have attained Masteral units with 27 or equivalent to 54.00%; 15 or 30.00% are college graduate; 6 or 12.00%, are Masteral degree holders and 2 or equivalent to 4.00% are doctorate degree holders.

Educational attainment refers to the level of education completed. It also refers to the highest *level* of *education* that an individual has completed. This is distinct from the *level* of schooling that an individual is attending. The attainment of earning Masteral units is

imperative for professional advancement, work status promotion and for future managerial functions.

1.4. Position

Table 7 shows the frequency and percentage distribution on the respondents' position profile variables.

Table 7. Frequency and Percentage Distribution on the Respondents' Position Profile Variables

N=50

Position	Frequency (f)	Percentage (%)
Master Teacher	4	8.00
Teacher III	13	26.00
Teacher II	14	28.00
Teacher I	19	38.00
Total	**50**	**100.00**

Most of the respondents are occupying Teacher I with 19 or equivalent to 38.00%; 14 or 28.00%, are Teacher II; 13 or 26.00%, are Teacher III and 4 or equivalent to 8.00% are Master Teacher.

For entry level in the Department of Education is Teacher-I. Promotion to the next level of academic rank is anchored on the years in service, attendance to seminars and workshops, research outputs, exemplary performances as winning coach or trainer, Science discovery projects and completing Masteral or Doctoral education.

1.5. Length of Years in the Service

Table 8 shows the frequency and percentage distribution on the respondents' length of years in the service profile variables.

Table 8. Frequency and Percentage Distribution on the Respondents' Length of Years in the Service Profile Variables

N=50

Length of Years in the Service	Frequency (f)	Percentage (%)
10 years & above	17	34.00
6 - 9 years	18	36.00
2 - 5 years	14	28.00
1 year & below	1	2.00
Total	**50**	**100.00**
Mean Length of Years in the Service=7.6 years		

Most of the respondents are in the teaching service for 6-9 years; with 18 or equivalent to 36.00%; 17 or 34.00%, 10 years and above; 14 or 28.00% with 2-5 years teaching experience and only 1 or equivalent to 2.00% with 1 year or less in the teaching service. The computed mean length of years in the service was 7.6 or 8 years.

2. Respondents' Perception Towards the Level of the Integration of Literacy Strategies in Teaching Science

2.1. Paraphrasing/Vocabulary Instruction

Table 9 shows the perception of the respondents' towards the level of the integration of literacy strategies in teaching Science as to Paraphrasing/Vocabulary Instruction.

The respondents highly practiced the simplified meaning of the complex Science term as manifested on the computed mean value of 3.88 with a qualitative interpretation of highly practiced and ranked 1st followed by unlocking the new word or key concepts of a new lesson

and encouraging the pupils make use of dictionary, encyclopedia, or the internet to find similar meaning of key concepts in the subject with equal mean of 3.84 and ranked 2.5th respectively while least on allowing pupils to take note or record definitions of terms with mean of 3.48 and ranked 10th. The computed overall weighted mean on the responses towards paraphrasing /vocabulary instruction as an integration of literacy strategies in teaching Science was 3.66 with qualitative interpretation of highly practiced.

Table 9. Perception of the Respondents Towards the Level of the Integration of Literacy Strategies in Teaching Science as to Paraphrasing/Vocabulary Instruction

N=50

	Practices	**WM**	**QI**	**Rank**
1	Unlocks the new word or key concepts of a new lesson.	3.84	Highly Practiced	**2.5**
2	Simplifies the meaning of the complex Science term	3.88	Highly Practiced	**1**
3	Encourages the pupils make use of dictionary, encyclopedia, or the internet to find similar meaning of key concepts in the subject.	3.84	Highly Practiced	**2.5**
4	Allows pupils express their ideas on the new Science words or concepts.	3.52	Highly Practiced	**9**
5	Uses localized term to clearly give meaning to new terms.	3.54	Highly Practiced	**7.5**
6	Provides reading materials or board display for unlocking difficult or new terms.	3.54	Highly Practiced	**7.5**
7	Allows pupils to take note or record definitions of terms	3.48	Highly Practiced	**10**
8	Allows feedback from the learners about vague meaning of science terms.	3.60	Highly Practiced	**6**
9	Encourages pupils to explore on meanings of difficult terms in Science to develop comprehension.	3.70	Highly Practiced	**4**
10	Allows pupils or the class restate the given meaning of words for retention purpose.	3.62	Highly Practiced	**5**
	Overall Weighted Mean	**3.66**	**Highly Practiced**	

Paraphrasing is a teaching strategies that gives pupils a tool for monitoring their own comprehension as they read Science text. Basically, the New Vision encourages the development of scientific literacy, being able to communicate and evaluate Science. Comparatively, this is what scientists do on a daily basis, write, speak, debate, visualize, listen, and read about their specialties. By integrating reading and writing activities within Science Reading, pupils will be able to hone their literacy skills. Reading and discussion skills help pupils recognize the utility of Science in their lives. If pupils develop positive attitudes toward Science and become confident of their ability to understand it, students will continue to learn Science outside the classroom. They will be able to understand how Science interacts with social issues and will be able to apply those skills in their personal lives. Students will benefit from grappling with ideas, sharing their thoughts, and solving problems (Hicks & Ewing, 2003).

2.2. Summarizing in Science

Table 10 shows the perception of the respondents towards the level of integration of literacy strategies in teaching Science as to Summarizing in Science.

Table 10. Perception of the Respondents Towards Level of the Integration of Literacy Strategies in Teaching Science as to Summarizing in Science

N=50

	Practices	WM	QI	Rank
1	Prepares lesson in bullet form with simple meanings and concepts.	3.54	Highly Practiced	**7.5**
2	Chooses important ideas as a springboard in creating a summary of a concept.	3.58	Highly Practiced	**3.5**
3	Deducts concepts in paragraph into simpler meanings in bullet form	3.48	Highly Practiced	**10**
4	Provides reading device for the audience in summarized form.	3.64	Highly Practiced	**1**
5	Allows pupils to express ideas by way of summarizing a concept/concepts using their own language.	3.54	Highly Practiced	**7.5**
6	Appreciates pupils who summarize concepts in their own way	3.62	Highly Practiced	**2**
7	Simplifies the lesson using localized terms or language.	3.54	Highly Practiced	**7.5**
8	Requires pupils record/obtain the summary of the lesson	3.56	Highly Practiced	**5**
9	Allows pupils to write their own summary of the lesson at the end of the class or by way of a take home task.	3.54	Highly Practiced	**7.5**
10	Provides prepared or predetermined summary of lessons	3.58	Highly Practiced	**3.5**
	Overall Weighted Mean	**3.56**	**Highly Practiced**	

The respondents provided reading device for the pupils in summarized form as manifested on the computed mean value of 3.64 with a qualitative interpretation of highly practiced and ranked 1st followed by giving appreciation to pupils who summarize concepts in their own way with the mean of 3.62 and ranked 2nd and least on the competence of deducting concepts in paragraph into simpler meanings in bullet form with the mean of 3.48 and ranked 10th. The computed overall weighted mean on the responses towards Summarizing in Science as an integration of literacy strategies in teaching Science was 3.56 with qualitative interpretation of highly practiced. Summarizing in Science helps readers make meaning of complex Science material.

2.3. Interactive Read-Aloud

Table 11 shows the perception of the respondents towards the level of the integration of literacy strategies in teaching Science as to Interactive Read-Aloud.

Table 11. Perception of the Respondents Towards the Level of the Integration of Literacy Strategies in Teaching Science as to Interactive Read-Aloud

N=50

	Practices	WM	QI	Rank
1	Facilitates peer-to-peer talk through "Think Pair Shares" where the teacher pauses at some time to allow students talk and share thoughts and ideas.	3.70	Highly Practiced	**2.5**
2	Uses the internet for meaning of words	3.70	Highly Practiced	**2.5**

	Practices	WM	QI	Rank
3	Uses other references aside from the standard textbook provided by the DepEd	3.60	Highly Practiced	**8**
4	Allows pupils to practice reading aloud of text altogether.	3.62	Highly Practiced	**7**
5	Applies buzz session or brainstorming among pupils through group activities in deriving meaning of text and allows them to make a class report.	3.68	Highly Practiced	**4**
6	Provides available references or resources such as dictionaries, encyclopedia, online search, magazines, etc. to help pupils find meaning of words in science	3.72	Highly Practiced	**1**
7	Explores and shares the etymology of science terms and difficult words through advance online resources to pupils	3.54	Highly Practiced	**9**
8	Allows pupils to record or take note of learned new words in the subject for future review.	3.66	Highly Practiced	**5.5**
9	Selects the text based on relevant content and the quality of the writing.	3.52	Highly Practiced	**10**
10	Uses the interactive read-aloud where teacher shows the illustrations and/or text to students for them to view the text through a document camera, smart board, or projector.	3.66	Highly Practiced	**5.5**
	Overall Weighted Mean	**3.64**	**Highly Practiced**	

The respondents provided available references or resources such as dictionaries, encyclopedia, online search, magazines, etc. to help pupils find meaning of words in Science as manifested on the computed mean value of 3.72 with a qualitative interpretation of highly practiced and ranked 1st followed by facilitating peer-to-peer talk through "Think Pair Shares" where the teacher pauses at some time to allow students talk and share thoughts and ideas and the use of the internet for meaning of words with equal mean of 3.70 and ranked 2.5th respectively while least practiced on selecting the text based on relevant content and the quality of the writing with mean of 3.52. The computed overall weighted mean on the responses towards Interactive Read-Aloud as an integration of literacy strategies in teaching Science was 3.64 with qualitative interpretation of highly practiced.

One of the teaching techniques which can be used in classroom vocabulary development activity is Reading Aloud. It is one kind of teaching techniques in which the teacher and the pupils pronounce the word loudly. This technique can help pupils focus on the content of the text because the words are pronounced loudly and it will be saved in pupils' memories. Therefore, this technique also make the pupils directly involve in classroom activity. By reading and pronouncing the text, pupils can remember the text. This technique is effective to be applied in the classroom as Muller (2015) mentioned that reading aloud makes active movement: sets sounds, thought, and feeling in motion. As addition, Lane and Bright (2011) mentioned that teachers must maximize the effectiveness of their read-aloud activities to make read aloud as effective as possible.

2.4. Interactive Reading Guides

Table 12 shows the perception of the respondents towards the level of the integration of literacy strategies in teaching Science as to Interactive Reading Guides

Table 12. Perception of the Respondents Towards the Level of the Integration of Literacy Strategies in Teaching Science as to Interactive Reading Guides

N=50

	Practices	**WM**	**QI**	**Rank**
1	Allows pupils to read a text independently but with coaching that does not require to read alongside the pupil.	3.46	Highly Practiced	**9.5**
2	Finds a better performing pupil as a partner in learning for an inferior one.	3.68	Highly Practiced	**2**
3	Gives opportunity to slow learners to cope up with the lesson by joining them to work with a partner or group.	3.48	Highly Practiced	**8**
4	Encourages slow academically pupils to read with a team or a partner aloud.	3.72	Highly Practiced	**1**
5	Reinforce proper pronunciation of words through personal knowledge.	3.52	Highly Practiced	**5.5**
6	Reviews proper pronunciation of words and meanings using the internet or you-tube.	3.54	Highly Practiced	**4**
7	Provides several tasks for pupils to perform or accomplish to cover the lesson objectives	3.50	Highly Practiced	**7**
8	Walks around the room while pupils are working with their team to offer guidance.	3.52	Highly Practiced	**5.5**
9	Provides clear instruction for every reading task given to a team or group.	3.46	Highly Practiced	**9.5**
10	Facilitates peer interaction among pupils to work with a others in reading with certain guidelines to follow such as underlining the most important sentence, or impressions as they compare them with their peer.	3.64	Highly Practiced	**3**
	Overall Weighted Mean	**3.55**	**Highly Practiced**	

The respondents encourage to slow pupils to read with a team or a partner aloud as manifested on the computed mean value of 3.72 with a qualitative interpretation of highly practiced and ranked 1st followed by finding a better performing pupil as a partner in learning for an inferior one with mean of 3.68 and least practiced on allowing pupils to read a text independently but with coaching that does not require to read alongside the pupil and providing clear instruction for every reading task given to a team or group with equal mean of 3.46 and ranked 9.5th respectively. The computed overall weighted mean on the responses towards Interactive Reading-Guide as an integration of literacy strategies in teaching Science was 3.55 with qualitative interpretation of highly practiced.

The teacher had considered and tested effective on encouraging slow pupils to read with a team or a partner aloud. Reading aloud in a group or collaborative learning provides slow learners to enhance their capability of reading competence. In cooperative learning individuals work together to achieve shared goals; they collaborate to maximize their own and each other's learning (Riddell et al., 2006). According to Tolero & Echaure (2021) five elements must be present in cooperative/collaborative learning:1) positive interdependence, 2) individual accountability, 3) face-to-face promotive interaction, 4) social and interpersonal skills, and 5) group processing. However, in the current project, the focus is on the purposive cooperative/collaborative activities which enhance students' achievement. Collaboration is

understood as interaction between and/or among student-student (Borokhovski et al., 2016) teacher-students and student-content (Borokhovski et al., 2016) which enhance student learning outcomes, excluding collaboration meant for non-academic intentions.

2.5. Writing A Scientific Explanation

Table 13 shows the perception of the respondents towards the level of integration of literacy strategies in Teaching Science as to Writing Scientific Explanation .

Table 13. Perception of the Respondents Towards the Level of the Integration of Literacy Strategies in Teaching Science as to Writing A Scientific Explanation

N=50

	Practices	WM	QI	Rank
1	Provides outline for activities and explains each part such as investigation question, background information, and initial thoughts/hypothesis they may have.	3.60	Highly Practiced	**5**
2	Encourages pupils to scaffold their investigation by following the outline provided strictly	3.58	Highly Practiced	**8**
3	Gives specific question to be answered or investigated by the pupils	3.66	Highly Practiced	**2.5**
4	Gives ample time for pupils to gather information or data needed to be used as evidence and support in formulating scientific explanation	3.70	Highly Practiced	**1**
5	Allows pupils to write down their formal scientific explanation in their activity notebooks	3.60	Highly Practiced	**5**
6	Requires pupils to work individually	3.50	Highly Practiced	**10**
7	Accepts pupils' output positively.	3.66	Highly Practiced	**2.5**
8	Provides positive feedback on pupils' output	3.56	Highly Practiced	**9**
9	Provides discriminate feedback on pupils' output for better performance.	3.60	Highly Practiced	**5**
	Overall Weighted Mean	**3.61**	**Highly Practiced**	

The respondents give an ample time to gather information or data needed to be used as evidence and support in formulating scientific explanation manifested on the computed mean value of 3.70 with a qualitative interpretation of highly practiced and ranked 1st followed by giving specific question to be answered or investigated by the pupils and accepting pupils' output positively with equal mean of 3.66 and ranked 2.5th respectively while least practiced on requiring pupils to work individually with mean of 3.50 and ranked 10th. The computed overall weighted mean on the responses towards Writing a Scientific Explanation as an integration of literacy strategies in teaching Science was 3.61 with qualitative interpretation of highly practiced.

Requiring pupils to give explanation on the result of the data processed needs an in-depth and mental ability. The pupils are needed to give an ample time to gather information or data needed to be used as evidence and support in formulating scientific explanation. Writing an abstract, research publishable articles and formulating of hypothesis are forms of scientific explanation. (https://esajournals.onlinelibrary.wiley.com/doi/full/10.1002/bes2.1258)

Table 14. Summary Table on the Perception towards the Level of the Integration of Literacy Strategies in Teaching Science

Practices	Overall Weighted Mean	Descriptive Equivalent	Rank
Paraphrasing/Vocabulary Instruction	3.66	Highly Practiced	1
Summarizing Science	3.56	Highly Practiced	4
Interactive Read-Aloud	3.64	Highly Practiced	2
Interactive Reading Guides	3.55	Highly Practiced	5
Writing A Scientific Explanation	3.61	Highly Practiced	3
Grand Mean	**3.60**	**Highly Practiced**	

Table 14 shows the Summary Table on the perception towards level of the integration of literacy strategies in Science.

For Paraphrasing/Vocabulary Instruction obtained an overall weighted mean of 3.66 and ranked 1st; interactive read-aloud, 3.64 and ranked 2nd; writing a scientific explanation, 3.61 and ranked 3rd; summarizing in Science, 3.56 and ranked 4th and interactive reading guides with mean of 3.55 and ranked 5th. The overall the grand mean for the practices towards integration of literacy Strategies in teaching Science was 3.60 with qualitative interpretation of highly practiced.

3. Academic Performance in Science

The frequency, mean and percentage distribution on the Academic Performance of the pupils is shown in Table 15.

Table 15. Distribution on the Academic Performance of the Pupils

Academic Performance	Frequency (f)	Percentage (%)
Mastered (96-100%)	0	0.00
Closely Approximating Mastery (86-95%)	0	0.00
Moving Towards Mastery (MPS of 66-85%)	0	0.00
Average Mastery (MPS of 35-65%)	18	36.00
Low Mastery (MPS of 15-34%)	32	64.00
Very Low Mastery (5-14%)	0	0.00
Absolutely No Mastery (0-4%)	0	0.00
Total	50	100.00
Mean of Academic Performance = 33.68 (Average)		

For the academic performance of pupils Mean Percentile Score of 35-65 some obtained which was interpreted as "Average", there were 18 or equivalent of 36.00%; 32 or equivalent of 64.00% with 15-34 MPS interpreted as "Low Mastery" and nobody among pupils obtained a MPS of 66-85. The computed Mean of Academic Performance based on MPS was 33.68 which is interpreted as "Average Mastery".

4. Test of Differences on the Level of the Integration of Literacy Strategies in Teaching Science when Grouped According to Profile Variables

4.1. Paraphrasing/Vocabulary Instruction

Table 16 shows the Analysis of Variance to test differences on the level of the integration of literacy strategies in teaching Science as to paraphrasing/vocabulary instruction when grouped according to profile variables.

Table 16. Analysis of Variance to Test Differences on the Level of the Integration of Literacy Strategies in Teaching Science as to Paraphrasing/Vocabulary Instruction when Grouped According to Profile Variables

Sources of Variations		SS	df	MS	F	Sig.	Decision
Age	Between Groups	0.353	3	0.118	2.121	0.111	Accept Ho Not Significant
	Within Groups	2.550	46	0.055			
	Total	2.903	49				
Sex	Between Groups	.001	1	0.001	0.021	0.886	Accept Ho Not Significant
	Within Groups	2.902	48	0.060			
	Total	2.903	49				
Highest Educational Attainment	Between Groups	0.140	3	0.047	0.778	0.513	Accept Ho Not Significant
	Within Groups	2.763	46	0.060			
	Total	2.903	49				
Position	Between Groups	.009	3	0.003	0.045	0.987	Accept Ho Not Significant
	Within Groups	2.895	46	0.063			
	Total	2.903	49				
Length of Years in Service	Between Groups	0.222	3	0.074	1.267	0.297	Accept Ho Not Significant
	Within Groups	2.682	46	0.058			
	Total	2.903	49				

There is no significant difference on the perception towards the level of the integration of literacy strategies in teaching Science as to paraphrasing/vocabulary instruction when grouped according to age, sex, highest educational attainment and length of years in service profile variables respectively manifested on the computed Significant P-values of 0.111, 0.886, 0.513, 0.987 and 0.297 which all are higher than (>) 0.05 Alpha Level of Significance, therefore the Null Hypothesis is Accepted.

As suggested by the National (2015), Science pupils in a Science reading course will spend less time with rote memorization, listening to direct instruction, completing worksheets, and answering the end of the chapter questions. Instead, pupils will participate in Science in ways that align more with the new vision of Science 7 education. Pupils will learn terminology as needed to explain and argue from evidence in multiple modes, develop systems models of their thinking, and engage in Science and Engineering practices while learning to obtain, evaluate and communicate information from a variety of texts (National, 2015).

4.2. Summarizing in Science

Table 17 shows the Analysis of Variance to test differences on the level of the integration of literacy strategies in teaching Science as to summarizing when grouped according to profile variables.

There is no significant difference on the perception towards the level of the integration of literacy strategies in teaching Science as to summarizing in Science when grouped according to age, sex, highest educational attainment and length of years in service profile variables respectively as manifested on the computed Significant P-values of 0.531, 0.308, 0.164, 0.764 and 0.666 which all are higher than (>) 0.05 Alpha Level of Significance, therefore the Null Hypothesis is Accepted.

For students, it is essential that all must be involved in performing group work related to Science such as surveying, peer interaction, performing experiments or activities, discussion in classroom, showing the role of Science in solving different problems which are faced by the students of remote areas. Use of local resources in teaching and developing Science concepts around the experiences gained by the students of particular class, creed, race, gender, rural-urban or poor-rich. Works of scientists from different social, economic and cultural backgrounds should be highlighted in classroom.

Table 17. Analysis of Variance to Test Differences on the Level of the Integration of Literacy Strategies in Teaching Science as to Summarizing when Grouped According to Profile Variables

Sources of Variations		SS	df	MS	F	Sig.	Decision
Age	Between Groups	0.112	3	0.037	0.745	0.531	Accept Ho Not Significant
	Within Groups	2.306	46	0.050			
	Total	2.418	49				
Sex	Between Groups	.052	1	0.052	1.061	0.308	Accept Ho Not Significant
	Within Groups	2.366	48	0.049			
	Total	2.418	49				
Highest Educational Attainment	Between Groups	0.252	3	0.084	1.781	0.164	Accept Ho Not Significant
	Within Groups	2.166	46	0.047			
	Total	2.418	49				
Position	Between Groups	.059	3	0.020	0.386	0.764	Accept Ho Not Significant
	Within Groups	2.358	46	0.051			
	Total	2.418	49				
Length of Years in Service	Between Groups	0.080	3	0.027	0.527	0.666	Accept Ho Not Significant
	Within Groups	2.337	46	0.051			
	Total	2.418	49				

4.3. Interactive Read-Aloud

Table 18 shows the Analysis of Variance to test differences of the level of the integration of literacy strategies in teaching Science as to Interactive Read-Aloud when grouped according to profile variables.

Table 18. Analysis of Variance to Test Differences on the Level of the Integration of Literacy Strategies in Teaching Science as to Interactive Read-Aloud when Grouped According to Profile Variables

Sources of Variations		SS	df	MS	F	Sig.	Decision
Age	Between Groups	0.131	3	0.044	1.186	0.325	Accept Ho Not Significant
	Within Groups	1.689	46	0.037			
	Total	1.820	49				
Sex	Between Groups	.034	1	0.034	0.904	0.347	Accept Ho Not Significant
	Within Groups	1.786	48	0.037			
	Total	1.820	49				
Highest Educational Attainment	Between Groups	0.055	3	0.018	0.478	0.699	Accept Ho Not Significant
	Within Groups	1.765	46	0.038			
	Total	1.820	49				
Position	Between Groups	0.021	3	0.007	0.183	0.908	Accept Ho Not Significant
	Within Groups	1.799	46	0.039			
	Total	1.820	49				
Length of Years in Service	Between Groups	0.103	3	0.034	0.918	0.440	Accept Ho Not Significant
	Within Groups	1.717	46	0.037			
	Total	1.820	49				

There is no significant difference on the perception towards the level of the integration of literacy strategies in teaching Science as to interactive reading aloud when grouped according to age, sex, highest educational attainment and length of years in service profile variables respectively manifested on the computed Significant P-values of 0.325, 0.347, 0.699, 0.908 and 0.440 which all are

higher than (>) 0.05 Alpha Level of Significance, therefore the Null Hypothesis is Accepted.

4.4. Interactive Reading Guides

Table 19 shows the Analysis of Variance to test differences on the level of the integration of literacy strategies in teaching Science as to Interactive Reading Guides when grouped according to profile variables.

There is no significant difference on the perception towards level of the integration of literacy strategies in teaching Science as to interactive reading guides when grouped according to age, sex, highest educational attainment and length of years in service profile variables respectively manifested on the computed Significant P-values of 0.720, 0.403, 0.629, 0.947 and 0.440 which all are higher than (>) 0.05 Alpha Level of Significance, therefore the Null Hypothesis is Accepted.

Table 19. Analysis of Variance to Test Differences on the Level of the Integration of Literacy Strategies in Teaching Science as to Interactive Reading Guides when Grouped According to Profile Variables

Sources of Variations		SS	df	MS	F	Sig.	Decision
Age	Between Groups	0.056	3	0.019	0.448	0.720	Accept Ho Not Significant
	Within Groups	1.909	46	0.041			
	Total	1.965	49				
Sex	Between Groups	0.029	1	0.029	0.713	0.403	Accept Ho Not Significant
	Within Groups	1.936	48	0.040			
	Total	1.965	49				
Highest Educational Attainment	Between Groups	0.072	3	0.024	0.583	0.629	Accept Ho Not Significant
	Within Groups	1.893	46	0.041			
	Total	1.965	49				
Position	Between Groups	0.015	3	0.005	0.122	0.947	Accept Ho Not Significant
	Within Groups	1.949	46	0.042			
	Total	1.965	49				
Length of Years in Service	Between Groups	0.239	3	0.080	2.125	0.110	Accept Ho Not Significant
	Within Groups	1.726	46	0.038			
	Total	1.965	49				

4.5. Writing A Scientific Explanation

Table 20 shows the Analysis of Variance to test differences on the level of the integration of literacy strategies in teaching Science as to writing a scientific explanation when grouped according to profile variables.

Table 20. Analysis of Variance to Test Differences on the Level of the Integration of Literacy Strategies in Teaching Science as to Interactive Reading Guides when Grouped According to Profile Variables

Sources of Variations		SS	df	MS	F	Sig.	Decision
Age	Between Groups	0.053	3	0.018	0.425	0.736	Accept Ho Not Significant
	Within Groups	1.911	46	0.042			
	Total	1.964	49				
Sex	Between Groups	0.062	1	0.062	1.553	0.219	Accept Ho Not Significant
	Within Groups	1.903	48	0.040			
	Total	1.964	49				
Highest Educational Attainment	Between Groups	.045	3	0.015	0.361	0.781	Accept Ho Not Significant
	Within Groups	1.919	46	0.042			
	Total	1.964	49				

Sources of Variations		SS	df	MS	F	Sig.	Decision
Position	Between Groups	0.032	3	0.011	0.250	0.861	Accept Ho Not Significant
	Within Groups	1.933	46	0.042			
	Total	1.964	49				
Length of Years in Service	Between Groups	.097	3	0.032	0.795	0.503	Accept Ho Not Significant
	Within Groups	1.867	46	0.041			
	Total	1.964	49				

There is no significant difference on the perception towards level of the integration of literacy strategies in teaching in Science as to writing a scientific explanation when grouped according to age, sex, highest educational attainment and length of years in service profile variables respectively manifested on the computed Significant P-values of 0.736, 0.219, 0.781, 0.861 and 0.503 which all are higher than (>) 0.05 Alpha Level of Significance, therefore the Null Hypothesis is Accepted.

The data provides clear manifestation on the similarity and congruency of opinion towards level of the integration of literacy strategies in teaching Science as to writing a scientific explanation.

5. Test of Differences on the Level of the Integration of Literacy Strategies in Teaching Science

Table 21 shows the Analysis of Variance to test on the level of the integration of literacy strategies in teaching Science

Table 21. Analysis of variance to Test on the Level of the Integration of Literacy Strategies in Teaching Science

Groups	*Count*	*Sum*	*Average*	*Variance*
Paraphrasing	10	36.56	3.656	0.022293
Summarizing	10	35.62	3.562	0.002084
Interactive Read Aloud	10	36.4	3.64	0.004711
Interactive Reading Guides	10	35.52	3.552	0.008818
Writing Scientific Explanation	9	32.46	3.606	0.0036

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	0.08471	4	0.021179	2.5189	0.0546	2.5836
Within Groups	0.36996	44	0.008408			
Total	0.45467	48				

Decision: Accept Null Hypothesis (Not Significant)

There is no significant difference on the perception towards the level of the integration of literacy strategies in teaching Science as to Paraphrasing, Summarizing in Science, Interactive Read Aloud, Interactive Reading Guides, Writing Scientific Explanation manifested on the computed F-value of 2.5189 which is less than (<) F-critical value of 2.5836, therefore the Null Hypothesis is Accepted.

The data provide clear understanding on the similarity of respondents' perception towards Paraphrasing, Summarizing in Science, Interactive Read Aloud, Interactive Reading Guides, Writing Scientific Explanation. The respondents treated the three dimensions equally important that could influence or affect their competence in learning Science. Reading, writing, and oral communication are critical literacy practices for participation in a global society. By allowing students to develop and use literacy skills, this course becomes applicable to other disciplines and to students' personal lives. Secondly, Science Reading follows the "New Vision" for Science education in the nation by offering students the opportunity to

practice many of the Science skills that scientists use such as arguing from evidence, communicating and evaluation information, and constructing explanations. Lastly, and perhaps most importantly, incorporating literacy in Science improves students' metacognition and understanding of Science concepts. In fact, the skills of reading and writing can serve as dynamic vehicles for learning Science meaningfully (Riddell et al., 2006).

6. Test of Relationship between the Academic Performance and the Dimensions Towards Level of the Integration of Literacy Strategies in Teaching Science

Table 22 shows the Pearson Product Moment Coefficient of Correlation to test relationship between the Academic Performance and the dimensions towards level of the integration of literacy strategies in teaching Science.

Table 22. Pearson Product Moment Coefficient of Correlation to Test Relationship between the Academic Performance and the Dimensions Towards Level of the Integration of Literacy Strategies in Teaching Science

Sources of Correlations		Academic Performance	Integration of literacy Strategies in teaching Science
Academic Performance	Pearson Correlation	1	0.423**
	Sig. (2-tailed)		0.002
	N	50	50
Integration of literacy Strategies in teaching Science	Pearson Correlation	0.423**	1
	Sig. (2-tailed)	0.002	
	N	50	50

**. Correlation is significant at the 0.01 level (2-tailed).

There is a positive moderate relationship between the Academic Performance and the dimensions towards level of the integration of literacy strategies in teaching Science manifested on the computed Pearson r value of 0.423**. The computed Significant (2-tailed) value of 0.002 which is lower than (<) 0.05 Alpha Level of Significance, therefore the Null Hypothesis is Rejected, hence there is significant relationship.

Integrating literacy activities into a Science classroom can play a vital role in achieving a minds-on or metacognitive approach to the learning of Science. Reading and writing activities can support active inquiry, and problem solving as well as help students to cover Science content in greater depth, focusing on related content and cross cutting themes. Through reading and writing, students can build upon their prior learning and make real-world connections (Riddell et al., 2006). Making these connections allow students to move their knowledge into long term memory where they store memorable and applicable schema or representations of concepts until they need to retrieve it at a later date. The use of literacy skills while learning Science content also extends and expands students' Scientific reasoning skills. In fact, a growing body of research and practice in Science instruction indicates Language is essential in Science learning and improves achievement in literacy and Science (Romance, & Vitale, 1992). This is no surprise because language allows students to clarify their ideas, make claims, present evidence based arguments, and record and present findings (Riddell et al., 2006).

Acknowledgement

The researcher wishes to extend her heartfelt thanks and felicitations to the following who have made this research study possible.

Dr. Domingo C. Edano, Graduate School Director for his undying encouragement and moral support.

Dr. Lilian F. Uy, the Dean of the College of Teacher Education and thesis adviser, for the inspirational guidance that strengthens the researcher to pursue the undertakings over the course of research study, most importantly, for always taking the time out of her busy schedule whenever the researcher needed her most.

Dr. Edna Marie D. Punzalan, chairperson of the committee of the oral examiners, for the untiring assistance to make consistent progress on the study when times could be hard for the researcher to keep motivated.

Dr. Jessie S. Echaure and **Dr. Marilyn Gutierrez,** members of the committee of oral examiners, the researcher is highly fortunate for being supportive panelists and for their valuable suggestions to improve the study.

To her friends; OTW- Ate **Alice Espinosa**, **Cecil Andal**, **Ann Edodollon**, her co-teacher - **Blanche Orianza**, **Marina Morillos**, **Arlyn Co**, her supportive principal **Marciana B. Fenollar** her best friend **Annelyn E. Dulay**, and her children-to **Mary Delle Zelene**, and **Medardo Austin**,–for allowing her to research and write. (You deserve a trip to Disney!) Thanks to her parents as well, **Mr. and Mrs. Claudio Andajao**, Nanay **Julie** and Tatay **Heart**, for their countless times they kept the children during the hectic schedules.

Finally, for the care, love, and supportive husband, **Medardo**: deepest gratitude. Their encouragement when the times got rough are much appreciated and duly noted. It was a great comfort and relief to know that they were willing to provide management of their household activities while she completed her work. Her heartfelt thanks.

And above all, she thanks the Almighty God with all her heart His blessings, which give her strength and courage and guide her in doing this research study.

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