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Academic Performance of Grade 7 Students in Biology Through Close Reading Strategies

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***Abstract*—** The study, "Academic Performance of Grade 7 Students in Biology through Close Reading Strategies," aimed to evaluate the effectiveness of close reading strategies in improving the academic performance of Grade 7 students in Biology. The study utilized the one-group pretest-posttest and descriptive methods and involved twenty-two (22) Grade 7 students from a private non-sectarian school in Sorsogon City, Philippines. It used pre-and post-tests and modules on selected Biology topics as instruments. The study indicated that close reading strategies significantly impacted students' academic performance. Following the application of close reading strategies, the students' performance in Biology improved, with t-values of 3.95, 5.92, 12.31, 8.30, and 16.78, all exceeding the critical value of 2.080. Additionally, these strategies enhanced their reading comprehension skills, which are essential for understanding scientific concepts. The findings suggest integrating close reading strategies into Biology instruction can benefit students' academic performance. Teachers and educators can utilize these strategies to enhance critical thinking skills, comprehension, and academic performance in science education. Furthermore, this research provides evidence that close reading strategies can effectively improve students' academic performance and be an instructional tool in Biology education.

***Keywords*—** Academic performance, biology, C-E-R tables, close reading strategies, reading comprehension

I. INTRODUCTION

Science and technology are pivotal in modern education, offering students valuable opportunities to develop scientific knowledge and skills. The rapid advancements in this field, driven by groundbreaking scientific discoveries and innovations, pose a significant challenge for educational institutions to meet the growing demand for scientific exploration (Imam et al., 2014). This study proposed close reading strategies to enhance the academic performance of Grade 7 students in Biology. These strategies, which are perfectly aligned with the rapid technological advancements and changes brought by the twenty-first (21st) century in science education, can effectively address these challenges.

Science Education in the Philippines

In the Philippines, the Department of Education emphasizes the importance of science education, aiming to develop scientific literacy and the ability to apply scientific knowledge to address community problems (De La Cruz R. D., 2022). However, the country scored lower than most participating nations in reading, math, and science, according to the 2022 Programme for International Student Assessment (PISA), highlighting the need for immediate action to address educational challenges (Manlapig, 2020; De La Cruz R. D., 2022; Craig R., 2023).

The low reading comprehension among Filipino high school students underscores the educational gap with their international peers, emphasizing the need for interventions to improve academic performance, especially in critical subjects like science (Manlapig, 2020; De La Cruz R. D., 2022; Craig R., 2023). Additionally, the study by Racca and Lasaten (2016) emphasizes the significant correlation between English language proficiency and academic achievements in subjects like Science, Mathematics, and English, highlighting the need for language support. Imam's research (2016) also emphasizes the critical link between reading skills and performance in Mathematics and Science, highlighting the potential impact of intervention strategies like close reading in enhancing comprehension skills and science performance.

Challenges in Science Education during the COVID-19 Pandemic

Educational disparities have worsened during the COVID-19 pandemic, leading to challenges in science education. Educators needed to adapt to online learning to improve students' academic performance in science.

This study aimed to enhance Grade 7 students' performance in Biology by evaluating the effectiveness of close reading strategies in overcoming pandemic-related challenges. The study aspired to inspire hope for the future of science education in the Philippines (Toquero, 2020; Imam et al., 2014).

Reading Comprehension and Academic Performance in Science

The Department of Science and Technology (DOST) and the Science Education Institute (SEI) have found that insufficient reading comprehension skills significantly contribute to students' lackluster performance on the National Achievement Test. Moreover, a study by Espejon and Janer (2022) highlighted that scientific literacy and academic performance are declining amid the pandemic. San Juan Bag-O High School researchers introduced Learning Activity Sheets (LAS) focusing on metacognitive skills in Biology to address this. Additionally, a study by Forque and Janer (2024) found that students demonstrated better comprehension and confidence when using their mother tongue, while Briones and Janer (2023) indicated that reading comprehension skills are related to students' performance in chemistry. The research conducted by Caraig and Quimbo (2022) emphasizes the critical role of reading comprehension as a foundational skill, shedding light on the challenges students face, particularly in science education. Therefore, enhancing reading comprehension is crucial to improving students' academic performance (Imam et al., 2014).

Close Reading Strategies to Enhance Academic Performance in Biology

Lapp, Moss, Grant, and Johnson (2015) suggest that close reading can help students tackle complex science texts. This strategy involves annotated assignments, discussing with a partner, asking text-based questions, and reflecting through writing. Students can improve their reading, writing, listening, and speaking skills with informational texts. Close reading is traditionally associated with analyzing literary texts, but its application in science education is relatively unexplored. Numerous research studies have shown a strong connection between reading comprehension and science achievement. Specifically, good readers tend to perform better in science, highlighting the critical role of reading comprehension as a prerequisite for science achievement. Reading skills are crucial for comprehension and academic success, and close reading strategies can help enhance academic performance in Biology. Close reading is an instructional practice that entails a meticulous and focused approach to reading to uncover the deeper meanings concealed within a text. It encourages skills such as making inferences and identifying the main idea, which has been shown to predict performance in mathematics. While close reading has shown promise as an instructional practice, its universal applicability to all texts and reading purposes remains to be determined. Scholars have questioned whether detailed text analysis is necessary for readers seeking quick information extraction. Close reading is best suited for contexts where readers are motivated to understand a text's interpretation or construct an argument. This debate underscores the need to investigate the effectiveness of close reading in the specific context of Grade 7 biology students.

Close reading in biology classes can benefit students, teachers, school administrators, the Department of Education, parents, and researchers. The research may help improve students' reading comprehension and academic performance, inform teachers about instructional choices, guide school administrators in integrating effective strategies into the curriculum, provide the Department of Education with data to revise the curriculum, involve parents in the teaching-learning process, and support the educational theory. The study focused on Grade 7 students in a non-sectarian private school in Sorsogon City for the school year 2023-2024, aligning with the K to 12 Science Curriculum Guide of the Department of Education for Grade 7 students in Quarter 2 (Department of Education, 2016).

The Present Study

The literature and studies reviewed emphasize the challenge of low reading comprehension among Filipino high school students, especially in Science and Mathematics. The 2022 Programme for International Student Assessment (PISA) reported that Filipino students lag behind global peers in these subjects. The COVID-19 pandemic has further highlighted the urgency of addressing this issue. Close reading is a promising solution to improve reading comprehension skills, particularly in science. The research underscores the crucial link between reading skills and scholastic aptitude, emphasizing the need for targeted interventions to enhance reading comprehension. Integrating close reading into educational settings can bridge the gap between students' diverse reading levels and improve overall academic achievement, fostering better comprehension and critical thinking. Studies have shown that incorporating annotation and immediate written responses enhances students' engagement and deepens their understanding of complex scientific materials. Close reading practices can serve as a bridge between close and distant reading, aligning with the idea of using close reading to comprehend scientific concepts

in science education comprehensively. The study assessed the effectiveness of close reading strategies among Grade 7 Biology students in a non-sectarian private school in Sorsosogn City during the school year 2023-2024 to bridge the gap between reading skills and actual performance in science subjects. Existing literature highlights close reading's potential to enhance reading comprehension in science education and its practical application through annotated reading, partner discussions, and text-based questioning. The study sought to explore whether close reading can improve academic performance in Grade 7 Biology and addresses the need for close reading to bolster reading comprehension within the Philippine educational setting.

This study determined the academic performance in Biology through the Close Reading Strategies of Grade 7 students of a non-sectarian priviate school in Sorsogon City for the school year 2023-2024. Specifically, it aimed to 1) determine students' academic performance in the pre-test along the select topics in biology, such as Microscopy, Levels of Biological Organization, Animal and Plant Cells, Sexual and Asexual Reproduction, and Ecosystem; 2) determine students' academic performance in the post-test along the select topics in Biology and; 3) discuss the difference between the student's academic performance in the pre-test and post-test.

II. METHODOLOGY

Research Design

This study aimed to determine the academic performance of Grade 7 Biology students at a non-sectarian private school in Sorsosogn City for the school year 2023-2024 using Close Reading Strategies. It utilized the one-group pretest-posttest and descriptive methods. The study design involved collecting quantitative data through the Pre-test, Intervention, and Post-test.

The target learning competencies are aligned with the K to 12 Science Curriculum Guide of the Department of Education (DepEd) for Grade 7 students in Quarter 2 (Department of Education, 2016). The content standards emphasized learners' demonstration of understanding of the parts and functions of the compound microscope, different levels of biological organization, the difference between animal and plant cells, reproduction between asexual or sexual, and organisms interacting with each other and with their environment to survive.

The study used pre-and post-tests and modules. The main instrument is the pre-and post-test, which gathers data on the respondents' reading comprehension skills and academic performance.

The data on the respondents' academic performance in Grade 7 Biology pre- and post-intervention are collected, tallied, and collated using the appropriate statistical tools. The results are then examined, analyzed, and interpreted.

The Respondents

The respondents of the study are the Grade 7 class of a non-sectarian private school in Sorsosogn City during the school year 2023-2024. The researcher intentionally selected twenty-two (22) students from this class as respondents. These students were the only ones in the Grade 7 class, making them the most suitable candidates for the research. The selection process followed purposive sampling, ensuring the chosen participants were aligned with the research objectives. Among the respondents, twelve (12), or fifty-five percent (55%) were male and ten (10) or forty-five percent (45%) were female. They participated in pre-tests, close reading intervention through modules, and post-tests.

Research Ethics

All respondents' data was maintained with utmost privacy and confidentiality. The respondents' right is to withhold their personal information from public disclosure. Before participating in the research, respondents were thoroughly informed about their data usage, storage, and protection. The collected data is strictly used for the purposes outlined in the research proposal. Any deviation from the stated use of data necessitates additional consent from the respondents. This ensures the ethical handling of data and respects the rights of the respondents.

Research Instruments

The instruments used to gather data are pre-test, post-test, and modules. Specifically, the pre-test and post-test were used to determine the student's academic performance on select topics in biology. The tests consisted of 36 multiple-choice questions, organized according to a table of specifications that includes the corresponding learning competencies, required number of hours, and placement of the items in the test. The

specification table also shows the necessary level of comprehension for each question.

These questions were randomly selected from two reputable sources: the Science Links 7 Revised Edition 2020 and 2023, published by Rex Book Store. These sources have undergone rigorous validation processes such as peer review, fact-checking, and legal review, which adhere to the educational standards of DepEd and governing bodies. The Science Links 7, which covered various science topics for Grade 7 students, is particularly noteworthy for its alignment with educational standards, making it highly suitable for classroom use. Both editions are widely used and reviewed by educators and experts, and they are available and used in the school as reference books. Moreover, the questions target to determine the baseline comprehension skills and academic performances of the respondents in their expected learning competencies in Biology for Quarter 2, which are (1) identifying the parts and microscope and their functions, (2)focus specimens using the compound microscope, (3) describing the different levels of biological organization from cell to biosphere, (4) differentiating plant and animal cells according to the presence or absence of specific organelles, (5) explaining why the cell is considered the basic structural and functional unit of all organisms, (6) differentiating asexual from sexual reproduction in terms of a number of individuals involved and similarities of offspring to parents, (7) differentiate biotic from abiotic components of an ecosystem, (8) describing the different ecological relationships found in an ecosystem and (9) predicting the effect of changes in abiotic factors on the Ecosystem. As the questions were specified based on the learning competencies, these test items were also grouped according to the literal, inference, and evaluative comprehension levels. Specifically, literal questions primarily focus on information explicitly stated in the text, requiring a straightforward recall of facts, details, or events directly presented in the passage. Answers to these questions can often be found verbatim within the text, and they assess basic comprehension and memory. Inferential questions, on the other hand, go beyond the surface level and require readers to make logical connections based on implicit information. These questions involve drawing conclusions, making predictions, or inferring meaning from context. Answers are not explicitly stated but can be inferred from clues within the text, and they assess deeper understanding and critical thinking. Evaluative questions assess readers' judgment, opinions, and text analysis. They ask for personal interpretation, assessment, or critique, encouraging reflection and higher-order thinking. Answers to evaluative questions involve expressing an opinion, evaluating the author's choices, or considering the text's impact. Additionally, each competency had a corresponding passage with a literal, inference, or evaluative question to check the students' reading skills.

The students' modules are used as an intervention tool to assess the students' close reading strategies in learning biology. Each module includes the following key components: 1) the title of the module, 2) the objectives or learning competencies, 3) the lessons, and 4) the assessment. The objectives or learning competencies section outlines specific outcomes that the module aims to achieve. The lesson, which is the main content of the module, consists of a discussion of the topic, which serves as the reading material for the students to practice close reading. This content is sourced from the e-resource PowerPoint presentation of Rex Book Store, which has undergone a thorough review and quality assurance before publication. After studying the material, students are expected to answer questions to demonstrate their understanding of the module's topic. The questions are categorized based on the students' reading comprehension levels - literal, inferential, and evaluative.

Data Collection

In conducting the study, the researcher obtained approval from the school's principal and consent from the class adviser and respondents—data gathered from November 13, 2023, to January 15, 2024. The pre-test assessed students' baseline academic performance in Biology and reading comprehension. Close reading strategies were implemented from November 14, 2023, to January 12, 2024. The process involved guiding students through text-dependent questions, making claims, marking text evidence, explaining reasoning, and receiving feedback. The post-test was administered on January 15, 2024, and the results were compared to the pre-test.

Data Analysis

The data from the pre-test and post-test are summarized using descriptive statistics, specifically the mean ($\bar{x}$) for the performance level of the student's results, which represent the student's academic performance before the close reading strategies and are interpreted using the adopted scale from DepEd Order No. 8, s. 2015.

Scale in Determining Students' Academic Performance

x̄ for Performance Level	Description
96-100%	Mastered
85-95%	Closely Approximating Mastery
66-85%	Moving Towards Mastery
36-65%	Average
15-34%	Low
5-14%	Very Low
0-4%	Absolutely No Mastery

This scale indicates whether the students achieved the learning competencies corresponding to their grade level standards as indicated in the K to 12 Curriculum Guide for Science subjects (Department of Education, 2016) and Most Essential Learning Competencies (Department of Education, 2020).

The difference between students' academic performance in pre-test and post-test is rigorously analyzed through the highly reliable and valid method of a paired sample t-test before and after intervention. This tool is particularly appropriate as the researcher measured the same subjects at two points, ensuring a fair and accurate performance comparison.

III. RESULTS

1) Academic performance of the students in the pre-test

This section reveals students' academic performance on select topics in Biology, such as Microscopy, Levels of Biological Organization, Animal and Plant Cells, sexual and Asexual Reproduction, and Ecosystems.

Students' academic performance refers to their ability to comprehend and apply the concepts taught on these topics. The pre-test evaluates students' understanding and baseline knowledge of the topics. Data is presented below.

Table I. *Level of Performance of the Students in Biology Pre-test*

Topics	MPL (%)	Description
a. Microscopy	71.02	Did not meet the expectation
b. Level of Biological Organization	51.14	Did not meet the expectation
c. Animal and Plant Cells	36.93	Did not meet the expectation
d. Sexual and Asexual Reproduction	28.41	Did not meet the expectation
e. Ecosystem	35.23	Did not meet the expectation
Overall MPL	44.55	Did not meet the expectation

Legend: MPL = Mean Performance Level

Table 1 shows students' academic performance in a Biology pre-test on Microscopy, the Level of Biological Organization, Animal and Plant Cells, sexual and Asexual Reproduction, and Ecosystems. The mean performance levels for these topics were 71.02%, 36.93%, 28.41%, 28.41%, and 35.23%, respectively, below the expected performance levels. The overall mean performance level for all topics was 44.55%, indicating the student's performance did not meet expectations. This suggests that the students may require additional support, resources, or strategies to improve their understanding of these biology topics. The data also reveals that the topics with the lowest mean scores are sexual and Asexual Reproduction and Ecosystem. These topics contain questions that require inferential and evaluative skills.

2) Academic performance of students in the post-test

After the intervention, this portion reveals the students' academic performance in post-tests on the select topics in Biology for the 2nd Quarter. The data are presented in Table 2.

Table II. *Level of Performance of the Students in Biology Post-test*

Topics	MPL (%)	Description
a. Microscopy	88.07	Very Satisfactory

b. Level of Biological Organization	89.77	Outstanding
c. Animal and Plant Cells	83.52	Satisfactory
d. Sexual and Asexual Reproduction	81.82	Satisfactory
e. Ecosystem	81.82	Satisfactory
Overall Mean	85.00	Very Satisfactory

Legend: MPL = Mean Performance Level

Table 2 showcases the academic performance of students in a post-test on Biology. Microscopy and Level of Biological Organization achieved mean performance levels of 88.07% and 89.77%, respectively, characterized as "Very Satisfactory" and "Outstanding."

Meanwhile, the topics of Animal and Plant Cells, sexual and Asexual Reproduction, and Ecosystem each garnered a mean score of 83.52%, 81.82%, and 81.82%, respectively, all classified as "Satisfactory." The overall mean performance level across all topics was 85.00%, indicating the students' "Very Satisfactory" performance.

3) Difference between the student's academic performances in the pre-test and post-test along the select topics in Biology

This portion shows the difference between the academic performances of Grade 7 students in Biology before and after the close reading strategies intervention. Table 3 shows the difference in the students' academic performance in Biology before and after the intervention of the close reading strategies. Table 3 shows the statistical comparison of pre-test and post-test results for students across the select topics in Biology before and after the close reading intervention. The study's null hypothesis (H0) states no statistical difference between the means of the pre-and post-test data, indicating that the intervention had no significant effect.

Table III. *Difference between the pre-and post-test results of the students along the select topics*

Statistical Bases	**Microscopy**	**Level of Biological Organization**	**Animal and Plant Cells**	**Sexual and Asexual Reproduction**	**Ecosystem**
Computed t-value	3.95	5.92	12.31	8.30	16.78
Decision on Ho	Significant	Significant	Significant	Significant	Significant
Conclusion	Reject	Reject	Reject	Reject	Reject

Legend: α=0.05 df= 21 Critical Value = 2.080

In Microscopy, the computed t-value is 3.95, which exceeds the critical value 2.080. Hence, the null hypothesis is rejected. In Biological Organization, with a t-value of 5.92, the difference in pre-test and post-test scores lead to the rejection of the null hypothesis. In Animal and Plant Cells, the t-value is 12.31, indicating a substantial improvement and rejection of the null hypothesis. The t-value of 8.30 for Sexual and Asexual Reproduction shows a significant difference, rejecting the null hypothesis, and the topic ecosystems' highest t-value of 16.78 suggests a substantial change in scores, rejecting the null hypothesis.

The results show that students' understanding of all select topics in Biology improved after the intervention. The critical value for significance was set at 2.080, with an alpha level of 0.05 and 21 degrees of freedom (df). Therefore, the null hypothesis was rejected, stating that there is a significant difference between the pre-and post-test.

IV. DISCUSSION

The results revealed a significant difference between the pretest and post-test of students, indicating that the close reading strategies positively affect students' comprehension levels, leading to improved academic performances. The results support the findings of previous studies conducted by Janus (2017) and Buraga (2021). These studies have demonstrated a significant difference between students' reading comprehension levels and academic performance.

Students Prior Knowledge of Select Topics in Biology

In the second quarter of Grade 7, students are introduced to Biology, focusing on Living Things and Their Environment. The curriculum aimed for students to use microscopes to observe tiny organisms and structures, building a foundation for further studies in Biology. Further, it teaches students about the different levels of

organization in living things, including cells, tissues, organs, organ systems, and organisms. Additionally, students learned how living things interact with non-living things in ecosystems and how populations and communities play a role in this interaction (Department of Education, 2016). Students' engagement in reading is essential to grasp the concepts behind these topics. Reading allowed students to learn independently according to their phase. Through this, they can reread, answer and make text-dependent questions, and annotate. Moreover, it must be noted that reading comes with comprehension. Poor comprehension skills lead to poor academic performance.

A recent study by Smith et al. (2021) reinforces the idea that poor comprehension skills are linked to lower academic performance. The study highlights the impact of inadequate reading skills on understanding science texts, which can contribute to learning challenges; this aligns with the findings of Imam et al. (2014), which suggest that insufficient reading skills can lead to a lack of understanding when reading science texts, resulting in learning difficulties. Therefore, it is recommended that students focus on developing vocabulary and engaging in reading activities to achieve science learning goals. This statement has been confirmed for this study as, based on the pretest results, students struggle with select topics in Biology, such as Microscopy, Levels of Biological Organization, Animal and Plant Cells, Sexual and Asexual Reproduction, and Ecosystems. Pretest results with an overall mean performance level of 44.55% indicate that there is still a need to meet the expectations set by DepEd, as outlined in DepEd Order No. 160, s. 2012. According to the PISA 2018 report, this finding also favors the Philippines' need to perform better in the science literacy assessment (Bernardo et al., 2023).

Students' Academic Performance After Close Reading Intervention

After the close reading intervention, the post-test results indicated a significant improvement in the students' understanding of select Biology topics and their reading comprehension skills. The student's academic performance showed substantial progress in all tested Biological topics. Specifically, comparing the results of the pretest to the post-test, improvement in score means from the pretest and post-test are evident. In Microscopy, the mean score improved from 71.02% to 88.07%, interpreted as "Did not meet the expectation" to "Very satisfactory." This data only indicates that students "very satisfactorily" achieved the learning competencies under this topic, where students can identify the parts of the microscope and their function and focus specimens using the compound microscope. In the Level of Biological Organization, the mean score increased from 51.14%, described as "Did not meet the expectation," to 89.77%, described as Outstanding. This only implies that students can describe the different levels of biological organization from cells to the biosphere. In animal and plant cells, the mean score of 36.93% in the pretest increased to 83.52% in the post-test, from "Did not meet the expectation" to "Satisfactory." This data shows that students can satisfactorily differentiate animal and plant cells according to the presence or absence of specific organelles and explain why the cell is considered the basic structural and functional unit of all organisms.

In Sexual and Asexual Reproduction, the mean score on the pretest to the post-test improved from 28.41% to 81.82%, described as "Did not meet the expectation" to "Satisfactory." This data infers that students, after the close reading intervention, were able to differentiate sexual and asexual reproduction in terms of the number of individuals involved and similarities of offspring to parents. Meanwhile, in the Ecosystem, mean scores from the pretest and post-test increased from 35.23% to 81.82%, described as "Did not meet the expectation" to "Satisfactory." The increase in mean score indicates that students can differentiate biotic from abiotic components of the Ecosystem, describe different ecological relationships found in the Ecosystem, and predict the effects of changes in abiotic factors on the Ecosystem.

Overall, the mean score of students from the pretest to the post-test increased from 44.55% to 85.00%, which can be interpreted as "Did not meet expectation" to "Very Satisfactory." This data indicates a significant improvement in students' academic performance in biology. Hence, this suggests that the close reading strategies were crucial to this positive change. In the study of Catterson et al. (2017), the importance of close reading as a strategy for enhancing comprehension was discussed. Close reading can help students better understand complex texts by focusing on the analysis and interpretation of the texts. This also aligns with the findings of Abejuela et al., 2023, which acknowledge the effectiveness of close reading in science education. The study recognizes that close reading has shown promise in enabling students to delve deeply into

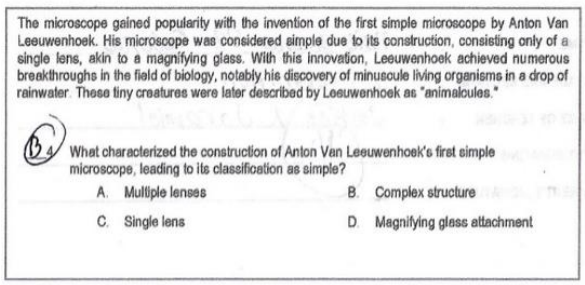
intricate scientific materials, thereby enhancing their comprehension and, subsequently, their academic performance.

The study's findings align with the significant improvement in students' understanding of identified biology topics after the close reading intervention. Catterson et al. (2017) emphasized the importance of rereading a text with different objectives as a crucial part of the close reading strategies. This aligns with the method used in the present study, where students were encouraged to reread texts to gain clarity and confirm their answers to the provided questions

Close Reading Strategies as an Intervention in Teaching Select Topics in Biology

The pre-test and post-test comparison results in various Biology topics indicate a significant improvement in students' academic performance after the close reading intervention. This improvement is evident across all topics, including Microscopy, the Level of Biological Organization, Animal and Plant Cells, sexual and Asexual Reproduction, and Ecosystems. The computed t-values for all these topics were well above the critical value of 2.080, suggesting a statistically significant enhancement in students' academic performance in these Biology topics.

Student 1 Pretest:


The microscope gained popularity with the invention of the first simple microscope by Anton Van Leeuwenhoek. His microscope was considered simple due to its construction, consisting only of a single lens, akin to a magnifying glass. With this innovation, Leeuwenhoek achieved numerous breakthroughs in the field of biology, notably his discovery of minuscule living organisms in a drop of rainwater. These tiny creatures were later described by Leeuwenhoek as "animalcules."

B 4 What characterized the construction of Anton Van Leeuwenhoek's first simple microscope, leading to its classification as simple?

A. Multiple lenses B. Complex structure
C. Single lens D. Magnifying glass attachment

Student 1 Post-test:

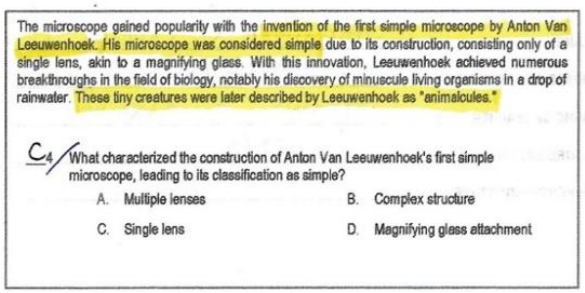

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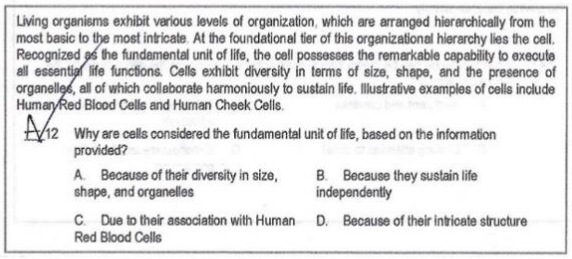
Fig I. *Sample Pre-test and Post-test Response on Microscopy*

Figure 1 below reveals a sample student's response in the pre-test and post-test on Microscopy. In the pre-test on Microscopy, the students' responses indicated a mix of understanding, lack of knowledge, and misconception. However, in the post-test, Student 1 can correctly answer the questions incorrectly answered during the pre-test, maybe due to a lack of knowledge or understanding about the topic. It is also evident in the item, as per the response by Student 1, that the close reading process through highlighting was applied.

The student's academic performance in Microscopy significantly improved compared to the pre-test and post-test, with a t-value of 3.95. This finding suggests that the intervention was particularly effective in enhancing students' grasp of complex concepts. Figure 2 shows a sample student's response in the pre-test and post-test on the topic Levels of Biological Organization.

Student 2's response to the question about the hierarchical organization in living organisms is correct in pre-and post-test. Further, the student's academic performance significantly improved in Biological Organization.

Student 2 Pre-test:


Living organisms exhibit various levels of organization, which are arranged hierarchically from the most basic to the most intricate. At the foundational tier of this organizational hierarchy lies the cell. Recognized as the fundamental unit of life, the cell possesses the remarkable capability to execute all essential life functions. Cells exhibit diversity in terms of size, shape, and the presence of organelles, all of which collaborate harmoniously to sustain life. Illustrative examples of cells include Human Red Blood Cells and Human Cheek Cells.

A 12 Why are cells considered the fundamental unit of life, based on the information provided?

A. Because of their diversity in size, shape, and organelles B. Because they sustain life independently
C. Due to their association with Human Red Blood Cells D. Because of their intricate structure

Student 2 Post-test:

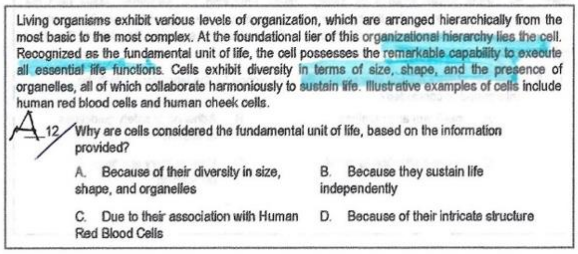

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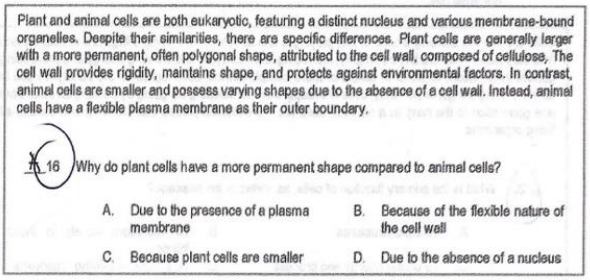
Fig II. *Sample Pre-test and Post-test Response on Levels of Biological Organization*

The increase in academic performance was more substantial in Biological Organization (t-value = 5.92) compared to Microscopy (t-value = 3.95). This finding suggests that the intervention was particularly effective in helping students understand complex concepts, such as the different levels of biological organization.

In addition, data shows that topics such as Animal and Plant cells and sexual and Asexual Reproduction, which deal with fundamental biological processes, have different significance levels in the student's academic performance. Animal and Plant cells resulted in a t-value of 12.31, which was more significant than that of sexual and Asexual Reproduction (t-value= 8.30). This may indicate that the intervention was especially beneficial in improving animal and plant cell understanding, which leads to better academic performance.

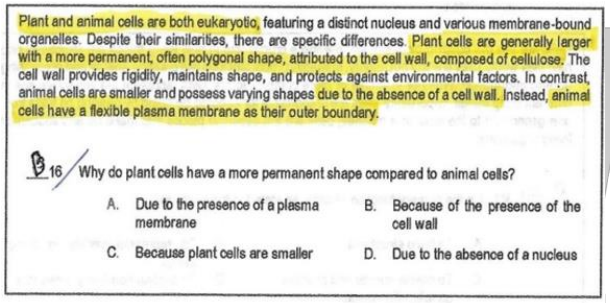
Student 3 Pre-test:


Plant and animal cells are both eukaryotic, featuring a distinct nucleus and various membrane-bound organelles. Despite their similarities, there are specific differences. Plant cells are generally larger with a more permanent, often polygonal shape, attributed to the cell wall, composed of cellulose. The cell wall provides rigidity, maintains shape, and protects against environmental factors. In contrast, animal cells are smaller and possess varying shapes due to the absence of a cell wall. Instead, animal cells have a flexible plasma membrane as their outer boundary.

16 Why do plant cells have a more permanent shape compared to animal cells?

A. Due to the presence of a plasma membrane
B. Because of the flexible nature of the cell wall
C. Because plant cells are smaller
D. Due to the absence of a nucleus

Student 3 Post-test:


Plant and animal cells are both eukaryotic, featuring a distinct nucleus and various membrane-bound organelles. Despite their similarities, there are specific differences. Plant cells are generally larger with a more permanent, often polygonal shape, attributed to the cell wall, composed of cellulose. The cell wall provides rigidity, maintains shape, and protects against environmental factors. In contrast, animal cells are smaller and possess varying shapes due to the absence of a cell wall. Instead, animal cells have a flexible plasma membrane as their outer boundary.

16 Why do plant cells have a more permanent shape compared to animal cells?

A. Due to the presence of a plasma membrane
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Fig III. *Sample Pre-test and Post-test Response on Animal and Plant Cells*

Figure 3 shows the sample students' pre- and post-test responses on Animal and Plant Cells. Student 3 incorrectly answered why plant cells have a more permanent shape than animal cells in the pre-test but correctly attributed it to a cell wall in the post-test. On the other hand, responses in Sexual and Asexual Reproduction also improved.

The intervention led to significant improvements across all topics in biology, with the highest improvement seen in the Ecosystem. The variations in improvement could be due to the complexity of the topic, students' prior knowledge, interest and engagement, teaching methods, and individual learning styles. Understanding these variations could help refine the intervention for greater effectiveness. Continuous monitoring and evaluation are crucial to ensure the intervention's effectiveness.

V. CONCLUSIONS AND RECOMMENDATIONS

In light of the findings, the following conclusions were drawn: The academic performances of Grade 7 Biology students in the pretest did not meet the expectations. After the close reading intervention, the student's academic performance in the post-test is "Very satisfactory." Lastly, the pretest and post-test results of the identified topics in Biology indicate a significant improvement in students' academic performance after the close reading intervention.

Based on the conclusions, the recommendations are made, such as science teachers may support the school's reading program and work hand in hand with English teachers. Close reading should be part of the weekly lesson plan. Moreover, they should only allow students to work independently on the task if they scaffold them with practical strategies in close reading mentioned in the study. Teachers may also consider implementing activities like collaborative discussion during and after close reading. As the direct recipients of this study, students may realize the importance of a higher level of comprehension skills in understanding biology concepts. They must recognize that close reading demands academic tasks that will improve their academic performance. Hence, students must be consistently exposed to daily close reading through learning materials like modules and books. The school administrator may have a concrete plan for implementing close reading in science classes that leads to integrating this strategy into the school's curriculum, potentially raising overall academic performances. School administrators may also allocate resources to the plan, including purchasing biology reading materials. Other researchers may conduct a similar study on different factors. The study may involve further research and exploration into the effectiveness of close reading in various subjects and grade levels, considering the potential factors that may contribute to the observed variation in the improvement of the student's academic performance in biology. Further, it could include other strategies that match close reading to deepen the understanding and application of biology concepts or other subjects.

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