(RESEARCH ARTICLE)

Academic performance of Grade 8 learners in science during face-to-face class at General Emilio Aguinaldo National High School

Marinel Ramilo Gara [1, 2, *] and Florence Mae Facelo Dela Cruz [1, 2]

[1] Department of Education Philippines, Science Junior High School Teacher, General Emilio Aguinaldo National High School – Imus City, Province of Cavite.
[2] National Teacher Colleges, Intramuros City, Manila, Philippines.

Abstract

This study aimed to investigate the academic performance of Grade 8 Science learning during face-to-face classes in General Emilio Aguinaldo National High School – Imus City for the School Year 2022-2023. The research involved analyzing data gathered from 238 learners to draw conclusions. The study explored various aspects related to attendance, engagement, quality of teaching, cla2rity of explanations and examples, access to learning resources, study habits, motivation and interest in science subjects, the impact of face-to-face classes on motivation, parental involvement in inquiring about progress, learning engagement during face-to-face classes, and the correlation between grades in science and hours spent studying.

The findings revealed that most learners actively engaged in face-to-face classes, with high attendance rates and positive perceptions of teaching quality. Most respondents reported having access to necessary textbooks and learning materials, although some reported lack of access. Study habits showed that many learners regularly reviewed science material outside class, indicating active engagement. Regarding motivation and interest, most respondents expressed some interest in science subjects, and face-to-face classes were reported to enhance their motivation to learn and excel in the subject.

Parental involvement varied, with some parents or guardians rarely inquiring about their child's progress in science while others inquired occasionally or frequently. Overall, learners had positive perceptions of face-to-face learning engagement, with a strong agreement regarding the helpfulness of face-to-face interactions and provided resources.

The study found no significant correlation between grades in science and the total number of hours spent studying, suggesting that other factors may influence academic performance. Areas for improvement were identified, including ensuring equitable access to learning resources and addressing lower levels of engagement and clarity for some learners.

These findings provide valuable insights into the learning and engagement patterns of Grade 8 Science learners and can inform strategies to enhance their educational experiences.

Keywords: Academic Performance; Adequacy; Engagement; Interest; Parental Involvement

* Corresponding author: Marinel Ramilo Gara

1. Introduction

Science education fosters the learners to be a part of worldwide education that focuses on honing learners' various science skills, such as problem-solving, research-oriented, and scientific literacy among students. Learners' academic performance can be measured in various ways, such as motivation, student engagement, study habits, learning environment, and learning resources. The history of science education has changed due to Coronavirus 2019; this has changed the educational landscape worldwide. Learners, parents, teachers, and school administrators laid the various learning delivery, such as modular, digitized, asynchronous, and online classes. Everybody has adapted to the new educational landscape for two years. Teachers innovate the teaching delivery to become more meaningful and engaging to learners to aid the learning gaps. Promoting the effectiveness of face-to-face classes among grade 8 learners remains a vital investigation.

Grade 8 learners are on the critical stage of their learning journey; this is the transition years of science education to more specialized subjects; their reasoning skills, scientific reasoning skills, and inquiry skills are the foundation of scientific knowledge. The face-to-face class has a particular advantage; it is an interactive, immersive, and practical educational approach to form a solid foundation for learners to understand the lessons.

Based on the study of Kalani, Doral, and Post et al. Wakelin (2021), face-to-face classes monitor the learner's progress in linear series of individual assessments measured. Nevertheless, there is a difference in face-to-face classes wherein learners can understand the lesson based on the explanation, discussion, group activity, collaborative work, and other observable outputs.

Meanwhile, learners enjoy face-to-face they gain self–confidence in communication skills and expressing their ideas about science subjects. Multiple questions arise during the discussion, leading to a broader learning of the subject. Based on Inside Higher Ed published 2022 research article, during the pandemic, students missed an opportunity for the fundamental vital concepts such as peer collaboration and relationships; science learners missed the opportunity to engage in practices such as asking developing questions based on observations, planning, and carrying out investigations and analyzing data.

Science and Technology is one of the significant subjects that focus on honing various skills of learners to be equipped in educational globalization. Science skills are essential in developing learners to engage in robotics, the digital world, research, Science, and engineering, and the development of new studies when it comes to improving new Technology. Learners' engagement is essential to develop their skills and understand lessons. This pandemic changed learning settings; it has been a challenge to develop their skills through distance learning exposure to using laboratories and performing experiments was affected by this pandemic. Digital learning is different from experiential learning. The impact of various learning modalities received considerable attention in decades of research. Face-to-face is one of the most effective ways to learn skills and knowledge; it includes reading, writing, discussion, experimentation, researching, performing an artwork, demonstration, dialogue, dramatization, practice, and craft journals. (Dorabi & Nelson, 2020)

Gabriel, J. & Rhonda, D. (2020) stated that face-to-face is a teaching and learning method that enhances the learning process through interpersonal contact. It creates interactions and networks among teachers and learners, in which they may feel more comfortable learning, an easy way to learn subject matter in a traditional classroom setting. They find it easier to access information and acquire a broader understanding of the lessons. It develops camaraderie between teachers and other learners rather than using online learning delivery. However, a positive attitude has been found to determine immediate attitude and will be continued performance (Hatane et al., 2020; Khoo & Foong, 2015).

However, face-to-face class is more interactive, wherein teachers interact with their learners through various teaching strategies such as practical lessons, constructivism, reflective, inquiry-based lesson, and collaborative; in this teaching delivery, learners and teachers could explore lessons in interactive ways. As a part of science teaching skills, their exposure to performing an activity to understand the subject matter further is one way of their engagement in the learning process; their connections to their natural environment are another skill that they had to develop; however, due to two years of learning gaps in using, when they return to school for face to face classes, learners have a new adjustment to learning settings. Performing their performance task is gradually on track to make the learning environment meaningful and challenging; guided performance task makes them inclined to the new learning settings, and their scientific skills need more time to enhance. The recalibration of their skills needs to be focused and given highlights. Alongside the positive impacts of face-to-face, this is more effective than distance learning for some categories, such as developing a positive attitude toward learning, gaining self-confidence, developing communication skills, and soft and hard skills.

To further investigate and prove the study, the researcher will determine the demographic profile of learners, what is the significant relationship between student's academic performance in terms of 1) attendance and engagement,(2) teacher quality, (3) learning resources, (4) study habits (5) academic performance (6)class environment (7) motivation and interests and what is the significant relationship of academic performance of grade 8 learners in a face-to-face class.

Objectives and Goals of the Study

The main goal of this study is to determine the impact of face-to-face classes in science subjects. This study will underscore to validate the positive impact and negative impact of learners to gradual changes in learning delivery during the post-pandemic. Is there a relationship between the academic performance of grade 8 learners in science and face-to-face classes? The *Null Hypothesis (Ho)* is that "there is no relationship between academic performance in the Science of Grade 8 learners and face-to-face class", and the *Alternative Hypothesis (Ha)* is "there is a significant relationship between academic performance in the Science of Grade 8 learners and face-to-face class."

This research is mainly to validate the science academic performance of grade 8 learners to improve and develop learning delivery and teaching modality. It empowers the teacher to develop teaching delivery and empowers teachers and learners to become more flexible in various learning modes. More specifically, this paper aims to (1) determine the academic performance in Science between face-to-face classes and (2) recommend science enhancement programs for learning delivery and teaching styles in Science and the significant relationship between the academic performance of grade 8 learners in Science during face-to-face classes.

2. Methodology

The study used a descriptive survey method of research, using a researcher – constructed questionnaire to investigate the academic performance of grade 8 students in science during face-to-face classes. The study's respondents are grade 8 science students in General Emilio Aguinaldo National High School –Imus City, with a total population of 2002 learners. Stratified sampling was used to assess the academic performance of grade 8 learners.

The data gathering tool used by the crafted a survey questionnaire of the researchers which facilitated collecting the respondent's demographic profile, academic performance in science, and the impact of face-to-face classes on their studies. The survey questionnaire is divided into three parts; the first part is to collect the respondent's data. The second part is to provide a survey question and intake interview for their academic performance in science. The last part is the impact of face-to-face classes.

2.1. Data Gathering Procedure

The researcher provided and distributed the survey questionnaire to selected grade 8 students during their science time. The participants are provided explicit instructions and ensure the confidentiality and anonymity of their responses. The respondents' answers were collected and subject to data interpretation through Thematic Statistical Analysis and Correlation Analysis.

2.2. Statistical Treatment Used

2.2.1. Percentage

It was used to create descriptive statistics determined by a significant amount of data that was used to analyze and interpret the demographic profile of the respondents.

2.2.2. Mean

Each data point in a set is multiplied by a value based on some attribute of whatever generated the data point to arrive at the weighted mean. The researchers used this algorithm to determine each participant's average response to each question.

2.2.3. Thematic Statistical Analysis

An approach that combines qualitative thematic analysis with quantitative statistical analysis to gain a comprehensive understanding of the data set. This research uses thematic statistical analysis to measure the student's performance factors such as attendance and engagement, learning resources, study habits, academic performance, class environment motivation, interest, and parental involvement. To further understand the thematic analysis, (1) *familiarization of responses, frequency, and percentage*, (2) *initial coding*, the data is coded by assessing labels or codes that capture the

main themes present in the responses. (3) *theme development*, examine the codes and group them into a broader theme. (4) *review and refine themes*, review the themes to ensure they accurately capture the content and meaning of the responses and refine or revise them as needed to reflect underlying patterns in the data. (5) For data charting, creating a table or chart to summarize the data.

2.2.4. Pearson Correlation Coefficient (r)

To measure the significant relationship between the academic performance of grade 8 learners during face-to-face classes, the researcher will utilize Pearson's correlation coefficient.

In this study, the researchers used Pearson's R to measure the correlation between the two variables:

$$\mathbf{r} = \frac{\sum(x_i - \bar{\mathbf{x}})(y_i - \bar{y})}{\sqrt{\sum(x_i - \bar{\mathbf{x}})^2 \sum(y_i - \bar{y})^2}}$$

Whereas:

r = correlation coefficient
x_i = values of the x-variable in a sample
$\bar{\mathbf{x}}$ = mean of the values of the x-variable
y_i = values of the y-variable in a sample
$\bar{y}$ = mean of the values of the x-variable

Researchers used a 0.05 or 5% level of significance.

To determine that there is a correlation between the two variables under consideration, the interpretation is as follows:

Table 1 Correlation Table

Correlation Coefficient	Interpretation
0.80 – 1.00 (-0.80 – -1.00)	Very Significant Correlation
0.50 – 0.80 (-0.50 – -0.80)	Significant Correlation
0.30 – 0.50 (-0.30 – -0.50)	Fairly Significant Correlation
0.00 – 0.30 (0.00 – -0.30)	Insignificant Correlation

The following rating description scale was utilized for the engagement during face-to-face class.

Table 2 Likert Five–Point Scale

Statistical Limits	Numerical Rating	Qualitative Description
4.51– 5.0	5	Strongly Agree
3.51- 4.50	4	Agree
2.51 – 3.50	3	Neutral
1.51 – 2.50	2	Disagree
1.0 – 1.50	1	Strongly Disagree

3. Results

Research involved thorough research analysis analyzing the problems to find workable solutions. The gathered data were tabled and analyzed to draw the results and conclusions, represented using frequency and weighted mean. The study's main objective is to determine the Academic Performance of Grade 8 Science Learners during Face-to-Face Classes in General Emilio Aguinaldo National High School for the School Year 2022-2023.

3.1. Part 1: Demographic Profile of Learners

Table 3 Demographic Profile of Learners in Terms of Gender

GENDER		Percentage (%)	SD	Mean
Male	111	46.64	11.13	119
Female	127	53.40		
Total	238	100		

Based on *Table 3*, the data shown that out of 238 learners were male with a frequency of 111 and a percentage of 46.64% of the total respondents, 127 were female, with 53.40% of the total population of the respondents. The mean is 119, and the standard deviation is 11.13; the data shows that most respondents shown were female.

One study found that male students outperformed female students at the senior high school level in terms of academic performance. The academic performance of students varies during their time in junior high school. It influences teaching methods, motivation styles, and support from teachers, parents, and peers. Males are often considered to have intellectual superiority and tend to overlook the obstacles and stereotypes that hinder the academic abilities of females, particularly in the field of sciences (Wringley-Asante et al.,2021).

Table 4 Demographic Profile of Learners in Terms of Age

AGE	Respondents	Percentage (%)
13 years old	63	26.47
14 years old	138	57.98
15 years old	29	12.18
16 years old	3	1.26
17 years old	2	0.84
18 years old	1	0.42
19 years old	2	0.84
20 years old and above	0	0.0
GRAND TOTAL	238	100

The table above reflected the distribution of the demographic profile in terms of age. Out of 238 respondents, the highest percentage fall on the age of 14 years with 57.98. On the other hand, the least percentage with frequency of 0, falls in the age of 20 years old and above. This value manifested that most learners are 14 years, which means they have a driving force to their studies and seek for the influence of demographic factors on academic performance suggested that learners possess unique learning abilities, skills, and experiences. Age positively affects academic performance as it relates to adopting effective teaching methods, approaches, and the availability of necessary learning materials. As learners aged, they mature and acquire additional skills and experiences within the educational environment. Motion that leads them to think out of the box. (El Refae et al., 2021).

3.2. Learning and Engagement

Table 5 Attendance and Engagement of Selected Grade 8 Learners

How many times did you attend science face-to-face class?	Never	Often	Daily	Once a week	Once a month	Grand Total
Frequency	0	18	197	10	13	238
Percentage (%)	0.00	7.56	82.77	4.20	5.46	100
Weighted Mean	0.00	54	591	30	5.46	714

3.3. Thematic Data Analysis Results

Based on the data set, the thematic data analysis revealed the following insights regarding attendance in face-to-face science classes. No one surveyed ever attended, with 0.00% of individuals reporting never attending science face-to-face class. However, out of 238 respondents, 197 students with 82.77%, reported attending science face-to-face classes *daily*. The results provide insights into the attendance patterns in science face-to-face classes. Most respondents reported attending classes daily, indicating high engagement and regular participation.

Lucey and Grydaki (2022) suggested that attendance is crucial in accessing information within daily learning environments. It plays a significant role in a student's academic performance as it forms the foundation for the learning process. Students can be motivated to attend classes consistently by incentivizing regular class attendance. Positive encouragement has been found to contribute to improved attendance among students.

Table 6 Average per week spent studying Science during Face-to-Face Class

Hours	Frequency	Percentage (%)	Weighted Mean
0-5	85	35.71	283.33
6-10	63	26.7	210.00
11-15	48	20.17	160.00
16-20	17	7.14	56.67
21-25	13	5.56	43.33
26-30	12	5.05	40.00
35 and above	0	0.00	0.00
Grand Total	238	100%	793.33

The table shows that the majority of participants, with 35.71%, spent 0 – 5 hours on the subject of the study, and it also has the highest range of individuals with 85 respondents while 35 hours and above got nothing frequency. The thematic analysis of the study suggested that a significant proportion of participants spent fewer hours on the subject, with diminishing frequencies and percentages as the hours increased. The highest weighted mean was observed in the 0-5 range, indicating that more participants spent fewer hours on average compared to other ranges.

Adams and Blair (2019) believed that students who achieved better performance and experience lower levels of anxiety can strike a balance in their daily lives as students. Effective time management for studying can help reduce stress and anxiety, particularly among junior high school students. Many students struggle to find a harmonious integration between their academic commitments and personal lives, resulting in difficulties with time management, disrupted sleep patterns, and heightened stress levels. It is important to note that students' achievement cannot be solely determined by how much time they spend studying their lessons. The study also revealed that personal behaviors, such as a student's approach to time management and perspective, are significant predictors of academic outcomes.

Table 7 Level of Engagement during Face-to-Face Class

Level of engagement during face-to-face class	Very Low Engagement	Low Engagement	Moderate Engagement	High Engagement	Very High Engagement	Grand Total
Frequency	15	30	90	45	58	238
Percentage (%)	6.30	12.61	37.82	18.91	24.37	100
Mean	3.75	7.5	22.5	11.25	14.5	59.5

Illustrated in table above that most respondents with 37.82% reported having a *"Moderate Level"* of engagement during face-to-face class with the mean of 22.5. Otherwise, relatively fewer respondents of 15 under *"Very Low Engagement"* with 6.30% with mean of 3.75. Based on these findings, many respondents reported moderate engagement during face-

to-face classes, and some respondents still reported low engagement levels. These results suggested room for improvement in engaging all students effectively during face-to-face classes.

Soian et al., (2022) concluded that teachers and students desired electronic learning materials for face-to-face education. Teachers utilize these resources and incorporate online tools to enhance interactivity in the learning process. Meeting these requirements enhances interactive learning engagement and facilitates continuous communication, allowing for adaptable learning approaches and diverse teaching methods, ultimately leading to effective learning outcomes.

Table 8 Quality of Teaching in Face-to-Face Science Class

	Poor	Below	Average	Good	Excellent	Grand Total
Frequency	4	20	45	78	91	238
Percentage (%)	1.68	8.40	18.91	32.77	38.24	100
Mean	0.8	4	9	15.6	18.2	47.6

Based on the data set, using thematic statistical analysis, the majority of the respondents, 38.24%, rated the quality of teaching during face-to-face classes as *"Excellent"* with a mean of 18.2. While only a few respondents, with 1.68%, indicated *"Poor"* quality of teaching during face–to–face classes with mean of 0.8. The mean provides an overall measure of the quality of teaching. Based on thematic interpretation, most respondents perceived the quality of teaching during face-to-face classes as *"Excellent"*. The results indicated room for improvement in enhancing the quality of teaching for those who rated it as *"Poor"*. It is essential to address these concerns and work towards improving the quality of teaching to ensure a positive learning experience for all students.

A significant number of students express a preference for engaging in classroom activities. They believe such activities foster social interactions and a sense of connectedness among peers, highlighting the importance of face-to-face classes in building a strong community. In these settings, students can explore various perspectives and benefit from a broader range of learning experiences. The teaching and learning process, characterized by interpersonal contact, creates a supportive network among students and teachers (Julien & Dookwah, 2020).

Table 9 The Teacher Provides Clear Explanations and Examples during Face-to-Face Class

Responses	Frequency	Percentage (%)
Yes	235	98.74
No	3	0.84
Grand Total	238	100

Seen on the *table 9* above, most respondents, with 98.74% reported that their teacher provided clear explanations and examples during face-to-face classes, indicating high satisfaction with the teaching approach. A small percentage of respondents with 1.26% indicated that their teacher needed clear explanations and examples during face-to-face classes.

Thematic interpretation suggested that most respondents found their teacher effective in providing clear explanations and examples during face-to-face classes. It indicated a positive perception of teaching quality and instructional delivery. The small number of respondents who needed to find the explanations and examples clear may represent an opportunity for improvement in the teacher's instructional approach or the need for additional support to ensure clarity for all students. Overall, the results demonstrate a strong level of satisfaction with the clarity of explanations and examples provided during face-to-face classes.

According to Anderson et al. (2018) the cognitive processes underlying the effectiveness of clear explanations during face-to-face instruction. The research indicated that clear explanations stimulate students' attention, activate prior knowledge, and facilitate new information organization. This process promotes meaningful learning and retention of knowledge.

3.4. Learning Resources

Table 10 Access to Necessary Textbooks and Learning Materials during Face-to-Face Science Classes?

Responses	Frequency	Percentage (%)
Yes	169	71.00
No	69	28.99
Grand Total	238	100

The table above indicated that the most respondents with the percentage of 71 reported having access to necessary textbooks and learning materials during face-to-face science classes, indicating a relatively high level of availability and accessibility while a significant proportion of respondents with 28.99% indicated they needed some access to the necessary textbooks and learning materials during face-to-face science classes, suggesting a potential limitation or lack of resources in providing the required materials.

Thematic interpretation suggested that while most respondents reported having access to necessary textbooks and learning materials, a notable proportion indicated a lack of access. It indicated a potential issue that needs to be addressed to ensure equitable access to educational resources for all students. Providing adequate textbooks and learning materials is crucial for students' learning and comprehension during face-to-face science classes. It is essential to address the needs of students who reported needing more access to ensure they have the necessary resources to support their learning experiences effectively. Overall, the results highlight the importance of ensuring equitable access to textbooks and learning materials for all students during face-to-face science classes.

Garcia et al. (2018) investigated the influence of access to supplementary materials, such as laboratory kits and manipulatives, in science education. The research demonstrated that students accessing hands-on materials experienced deeper engagement, improved conceptual understanding, and enhanced critical thinking skills. The study highlighted the importance of providing diverse and tangible learning resources during face-to-face science classes to promote active learning and exploration.

Table 11 Adequacy of Learning Resources Provided During Face-to-Face Class

	Inadequate	Below Average	Average	Good	Excellent	Grand Total
Frequency	2	10	74	104	48	238
Percentage (%)	0.84	4.20	31.09	43.70	20.17	100
Weighted Mean	4.4	22	162.8	228.8	43.70	523.6

The data above displayed that most respondents, with 43.70% rated the adequacy of learning resources during face-to-face classes as "*Good*" indicating a satisfactory level of resource provision with a weighted mean of 228.8 while a few respondents with 0.84% indicated that the learning resources provided were *"Inadequate"* with the weighted mean of 4.4. The weighted mean provides an overall measure of the adequacy of learning resources, considering both the frequency and the reported ratings. The data set results manifested that most respondents found the learning resources provided during face-to-face classes "adequate" or "suitable". However, some respondents still rated adequacy as "Inadequate", and a small percentage found that the resources needed to be improved. These results indicated room for improvement in providing learning resources. It is vital to address these concerns and ensure students can access sufficient and appropriate learning resources to support their education effectively.

Moreover, a study by Garcia and Hernandez (2019) explored the influence of hands-on and manipulative learning resources in face-to-face classrooms. The research demonstrated that students with access to hands-on materials, such as laboratory equipment and manipulatives, experienced increased motivation, a deeper understanding of abstract concepts, and improved problem-solving skills. The study highlighted the importance of incorporating tangible learning resources to enhance the adequacy and effectiveness of face-to-face instruction.

3.5. Study Habits

Table 12 How Frequently did you Review Science Material Outside of the Class?

Level of engagement during face-to-face class.	Rarely (1)	Sometimes (2)	Often (3)	Always (4)	Grand Total
Frequency	15	24	136	63	238
Percentage (%)	6.30	10.08	54.14	26.47	100
Weighted Mean	41.25	66	374	173.25	654.5

3.6. Thematic Interpretation

The data above shown in the table shows that most respondents of 136, with 54.14% reported often being engaged during face-to-face classes with the weighted mean of 173.25, indicating an active level of participation and involvement. While few respondents reported "Rarely" being engaged with 6.30% with the weighted mean of 41.25.

The weighted mean provides an overall measure of the level of engagement, considering both the frequency and the reported ratings. Thematic interpretation suggested that most respondents reported a high level of engagement during face-to-face classes, with a significant proportion consistently being engaged. It indicates a positive level of involvement and active participation in the learning process. However, there were still respondents who rarely reported levels of engagement. These results suggested the need to address strategies to enhance engagement for those who reported lower levels and sustain and maintain high levels of engagement for those who consistently reported being engaged. The results highlight the importance of fostering and maintaining student engagement during face-to-face classes.

Table 13 Did you Seek Extra Help or Clarification from your Science Teacher during Face-to-Face Classes

`	Frequency	Percentage (%)
Yes	175	73.53
No	83	26.47
Grand Total	238	100

Based on the data set above, the percentage of respondents with 73.53% reported seeking extra help or clarification from their science teacher during face-to-face classes, indicating a proactive approach to their learning and a willingness to seek assistance when needed. A significant proportion of respondents, 26.47%, indicated they did not seek extra help or clarification from their science teacher during face-to-face classes.

The data results suggested that most students proactively sought extra help or clarification from their science teacher during face-to-face classes. Indicates a positive attitude toward seeking support and assistance to enhance their understanding and learning. However, some students still needed help or clarification, indicating areas where additional support and encouragement could be provided to promote a more inclusive and supportive learning environment. Creating an open and supportive atmosphere where students feel comfortable seeking extra help or clarification from their teachers is vital to facilitate their academic progress. Overall, the results highlighted the significance of fostering a culture of seeking assistance and support among students during face-to-face classes.

Furthermore, Garcia and Hernandez (2018) investigated the influence of review frequency on the retention of scientific knowledge over time. The research demonstrated that students who frequently reviewed science material outside of class were more likely to retain the knowledge and recall it accurately in subsequent assessments. The study emphasized the benefits of regular review in strengthening memory and promoting long-term retention of scientific information.

Table 14 Level of Self-discipline and Organization in studying Science

Level of self-discipline and organization in studying Science	Low	Below Average	Average	High	Very High	Grand Total
Frequency	20	24	102	70	22	238
Percentage (%)	8.40	10.08	42.86	29.41	9.24	100
Weighted Mean	50	60	255	175	55	595

The results show that most respondents of 102 with 42.86% rated their level of self-discipline and organization in studying Science as "*Average*," indicating a moderate level of discipline and organization with the weighted mean of 255. And the lowest rated, with 20 respondents fall as "*Low*" level with 8.40% with the weighted mean of 50.

The weighted average mean provides an overall measure of self-discipline and organization, considering the frequency and the reported ratings. The results of the set of data suggested that a significant proportion of respondents reported an "*Average*" of self-discipline and organization in studying Science. It indicated a positive approach to their academic work and suggested they can effectively manage their study habits and routines. However, some respondents rated "*Low*", indicating potential areas where additional support and guidance may enhance their self-discipline and organizational skills. It is crucial to provide resources and strategies to help students develop effective study habits and foster self-discipline in their scientific studies. Overall, the results highlighted the significance of promoting self-discipline and organization in studying Science to facilitate academic success.

Furthermore, a study by Park et al. (2018) investigated the influence of self-discipline and organization on science learning engagement. The research demonstrated that students with higher levels of self-discipline and effective organizational strategies exhibited greater motivation, active participation, and persistence in science classes. The study underscored the importance of self-discipline and organization in promoting a positive learning environment and enhancing student engagement in science education.

Table 15 Average Grades in Science for Academic Year 2022 – 2023

	70-75	76-80	81-85	86-90	91-95	96-100	Grand Total
Frequency	9	50	63	54	40	22	238
Percentage (%)	3.78	21.01	26.47	22.69	16.81	0.84	100
Weighted Mean	34.71	192.86	243.00	208.29	154.29	84.86	918.00
Standard Deviation	20.53						
Confidence Level	21.55						

Based on the data of average grades in Science for the Academic year 2022-2023, many of the students with 25.47% received grades in the range of 8-95, followed by the 86-90 range with 22.69% and 21.01% in the range 76-80 range. The weighted mean Average is 918.0; this value considers the frequency of students in each grade range and the midpoint of each grade range. The standard deviation of grades is 20.23; this measures the spread or variability of the grades around the weighted mean. A higher standard deviation indicates greater grade variation, while a lower standard deviation suggests less variability. The confidence level is 21.55, which represents the margin of error associated with estimating the population means based on the sample data; with a 95% confidence level, it suggested that the true population mean falls within the range of weighed average mean plus or minus confidence level.

According to a study conducted by Smith and Johnson (2020), an examination of grade distribution patterns in diverse academic fields, including Science, demonstrated considerable variations across subjects and courses. The research also identified specific factors influencing grade distributions in science education, such as assessment techniques, class size, and teaching effectiveness.

3.7. Class Environment

Table 16 Classroom Discipline during Face-to-Face Class

Interest in Science subject	Not interested	Somewhat Interested	Moderately Interested	Very Interested	Grand Total
Frequency	20	49	129	49	238
Percentage (%)	8.40	20.59	54.20	20.59	100
Mean	50	122.5	322.5	122.5	809.2

The data shows that the highest number of responses falling into each category of "*Average*" level, 94 out of 238 with the percentage of 39.50 with the weighted mean of 81.6. On the other hand, the reported least got 11 respondents under "*Low*" level of classroom discipline with 4.62% and the weighted mean of 37.4. Based on the data analysis, most respondents perceived classroom discipline during face-to-face classes to be "*Average*". Classroom discipline is one factor to consider: inside the classroom. According to Wang et al., (2018) various classroom management approaches and their impact on student behavior and academic outcomes, it revealed that effective classroom disciplines strategies, such as proactive management, clear expectations, and consistent consequences, were associated with reduced disruptive behavior and improved student engagement and achievement. The study underscored the importance of implementing evidence-based practices in classroom discipline to create a positive learning environment. It shows academic manifestation if the learners have high discipline.

Table 17 Asking Questions about Participating in a Discussion during Face-to-Face Class

Response	Frequency	Percentage (%)
Yes (Encouraging Environment)	128	53.78
No (Discouraging Environment)	110	46.22
Grand Total	238	100

3.8. Thematic Analysis

(a) *The familiarization data* set with the response, frequency/ percentage of "Yes" and "No" responses regarding asking questions and participating in discussions during face-to-face classes. (b) *Initial Coding*: Code the data by assigning labels or codes that capture the main themes present in the responses. In this case, the themes could be Encouraging Environment for "Yes" responses and Discouraging Environment for "No" responses. *(c) Theme Development – (c.1)* An *encouraging environment* is a class environment where students feel encouraged and supported to ask questions and actively participate in discussions during face-to-face classes. It includes a "Yes" response. *(c.2) Discouraging environment:* This class environment discourages or hinders students from asking questions or actively participating in discussions during face-to-face classes. It includes the "No" responses.

Based on the data set interpretation, the insights of the thematic analysis regarding the class environment and students' participation are as follows:

(a.) Encouraging Environment: 128 of 238 with 53.78% of respondents reported that the class environment is encouraging, which leads to their active participation in asking questions and engaging in discussions during face-to-face classes. (b) *Discouraging Environment:* The remaining 110 or 46.22% of respondents indicated that the class environment is discouraging or does not promote active participation in asking questions or discussions during face-to-face classes. These results suggested that many participants perceive the class environment as encouraging, positively influencing their willingness to participate in discussions during face-to-face classes.

Also, according to Rowe (2018) investigated the impact of student – generated questions on classroom discussions. The research highlighted that when students actively ask questions during face-to-face classes, it promotes deeper engagement, enhances critical thinking skills, and fosters a collaborative learning environment. The study emphasized the importance of creating a supportive classroom culture that encourages and values student questions.

3.9. Motivation and Interest

Table 18 Interest in Science Subject

Classroom discipline during face-to-face class	Low	Below Average	Average	High	Very High	Grand Total
Frequency	11	24	94	81	28	238
Percentage (%)	4.62	10.08	39.50	34.03	11.76	100
Weighted Mean	37.4	81.6	319.6	275.4	95.2	809.2

The table above was analyzed using thematic statistical analysis "Interest" in science subject. It has been coded and interpreted using *(a) initial coding and familiarization of responses with the frequency/percentage* of different interest levels in a science subject. (b) *Initial coding*, the data codes that capture the main themes, such as "Not Interested" represent individuals who express no interest in the science subject, "Somewhat Interested", and to "Moderately Interested" is coded as Low to Moderate interest present individuals who show a certain level of interest in the science subject, ranging from "Somewhat Interested" to "Moderately Interested" and "Very Interested". Presents individuals who display a high level of interest and enthusiasm in the science subject. It includes the "Very Interested" responses coded as with High Interest in science subject.

Based on the data above, the thematic analysis reveals insights regarding motivation and interest in science subjects.

Interpreted as (b.1) *Not Interested:* Out of the 238 respondents, 20 or 8.40% individuals expressed no interest in the science subject. (b.2) *Low to Moderate Interest:* 178 or 74.79% of respondents showed a certain level of interest in science, ranging from somewhat interested to moderately interested. (b.3) *High Interest:* The remaining 49 or 20.59% of respondents exhibited high interest and enthusiasm in science.

These results suggest that while a significant portion of the respondents have a moderate to high interest in science, a small proportion indicated a lack of interest.

Table 19 Did Face-to-Face Science Class enhance your Motivation to learn and excel in the Subject?

	Frequency	Percentage (%)
Yes	204	85.71
No	34	14.29
Grand Total	238	100

3.10. Thematic Analysis

(a) Initial coding. Code the data by assigning labels or codes that capture the main themes present in the responses. In this case, the themes could be Enhanced Motivation for "Yes" responses and No Change in Motivation for "No" responses. (b) *Theme development.* Based on the initial coding, the themes that immerge are: *(b.1) Enhanced Motivation.* This theme represents individuals who reported that face-to-face science classes enhanced their motivation to learn and excel. It includes the "Yes" responses. *(b.2) No Change in Motivation.* This theme represents individuals who indicated that face-to-face science classes did not significantly change their motivation to learn and excel in the subject. It includes the "No" responses.

3.11. Thematic Analysis Results

(a)*Enhanced Motivation:* Out of the 238 respondents, 204 or 85.71% reported that face-to-face science classes enhanced their motivation to learn and excel in the subject. (b)*No Change in Motivation:* The remaining 34 or 14.29%, respondents indicated that face-to-face science classes did not significantly change their motivation to learn and excel in the subject.

These results suggest that most respondents felt face-to-face science classes positively impacted their motivation to learn and excel.

In addition, a study by Wigfield et al., (2018) investigated the factors contributing to student's interest in science. The research identified several key factors, including teacher enthusiasm and expertise, relevance of science content to students' lives, and opportunities for hands-on exploration and discovery. The study emphasized incorporating these factors into science instruction to enhance students' motivation and interest.

3.12. Parental Involvement

Table 20 How often did your Parents/Guardians inquire about your Progress in Science during the Academic Year?

	Rarely	Sometimes	Often	Always	Grand Total
Frequency	51	85	60	42	238
Percentage (%)	21.43	35.71	22.21	17.65	100
Mean	127.5	212.5	150	105	595

3.13. Thematic Analysis Coding

a. Initial Coding. (a.1) Rarely. This theme represents instances where parents/guardians rarely inquire about their child's progress in science. *(a.2) Sometimes.* This theme represents situations where parents/guardians occasionally inquire about their child's progress in science, but only sometimes. *(a.3) Often.* This theme represents scenarios where parents/guardians inquire about their child's progress in science frequently. *(a.4) Always.* This theme represents cases where parents/guardians inquire about their child's progress in science consistently and regularly.

b. *Thematic Statistical Analysis Results.* Based on the data set, thematic analysis reveals insights regarding parental involvement inquiring about students' progress in science. ***Rarely:*** There were 51 or 21.43% instances where parents/guardians rarely inquired about their child's progress in science during the academic year. ***Sometimes:*** In 85 or 35.71% of cases, parents/guardians occasionally inquired about their child's progress in science but only sometimes. Often: There were 60 or 22.21% instances where parents/guardians frequently inquired about their child's progress in science. ***Always:*** In 42 or 17.65% instances, parents/guardians consistently and regularly inquired about their child's progress in science.

These results provide both qualitative and quantitative insights into parental involvement in inquiring about students' progress in science. A significant proportion of parents/guardians demonstrate some level of involvement by inquiring about their child's progress in science, with varying frequencies.

Deslandes & Bertrand (2005) examined the relationship between parental involvement and students' science achievement. The research indicated that when parents/guardians show an active interest in their children's progress in science and maintain open lines of communication with teachers, it positively influences students' science achievement and motivation.

Table 21 Learning Engagement during Face-to-Face Class

Learning Engagement During Face-to-Face Class	WM	SD	DI	Rank
The face-to-face classes have enhanced my understanding of the subject.	4.22	0.58	A	5
I find the face-to-face interactions with the teacher and classmates helpful for my learning.	4.54	0.70	SA	2
The face-to-face classes have increased my motivation to engage in class activities.	4.12	0.77	A	7
The face-to-face classes have provided me with opportunities for hands-on learning.	4.40	0.71	A	3
I am comfortable asking questions and seeking clarification during face-to-face classes.	3.91	0.76	A	9
The pace of the face-to-face classes is appropriate for my learning needs.	4.08	0.80	A	8
The teacher effectively uses teaching strategies and techniques to facilitate learning during face-to-face classes.	4.08	0.77	A	8
The classroom environment during face-to-face classes is conducive to learning.	3.95	0.82	A	10

The face-to-face classes allow for collaborative learning and group activities.	4.08	0.79	A	8
The face-to-face classes provide timely and constructive feedback on my progress.	4.08	0.89	A	8
I enjoy attending the face-to-face classes and look forward to them.	4.14	0.83	A	6
The resources and materials provided during face-to-face classes are helpful for my learning.	4.61	3.80	SA	1
The teacher encourages active participation and engagement in the face-to-face classes.	4.30	0.73	A	4
The face-to-face classes have allowed for personalized attention and individualized support.	3.88	0.82	A	11
15. The face-to-face classes have exposed me to real-world applications and examples of the subject.	3.91	0.83	A	9
Grand Total	4.15	0.97	A	
Legend: 4.51 – 5 .0 = Strongly Agree (SA) 3.51 – 4.50 = Agree (A) 2.51 – 3.50 = Neutral (N) 1.51 – 2.50 = Disagree (D) 1.0 – 1.50 = Strongly Agree (SD)				

The above shows that the overall weighted mean is 4.15 and the standard deviation is 0.97 with the descriptive interpretation "agree". In Statement 2, I find the face-to-face interactions with the teacher and classmates helpful for my learning 1, which receives strong agreement with mean ratings of 4.61, respectively, and statement 12. The resources and materials provided during face-to-face classes are helpful for my learning 4.54 weighted mean. The remaining statements received agreement ratings ranging from 3.88 to 4.40. These statements included enhanced understanding, increased motivation, hands-on learning, collaborative learning, effective teaching strategies, and improving teaching innovation aligned to the PPST – RPMS standards of the Department of Education.

The results suggested that learners generally agree with the positive aspects of face-to-face classes, indicating that these classes enhance their understanding, engagement, and learning motivation.

Table 22 Academic Performance of Grade 8 Learners in Science During Face-to-Face Class Correlational Analysis

Grades in Science 2023	Frequency	Total Number of Hours Spent Studying	Frequency
70-75	9	0-5	85
76-80	50	6-10	63
81-85	63	11-15	48
86-90	54	16-20	17
91-95	40	21-25	13
96-100	22	26-30	12

The table above provides the frequency distribution of grades in science and the total number of hours spent studying.

The statistical analysis shows an Insignificant Correlation (IC) between grades and studying hours. It indicated by the Pearson correlation coefficient of -0.255 for grades and hours and the p-value of 0.626, which is greater than the significance level of 0.05. The null hypothesis (Ho), stating that there is no significant difference between grades and hours spent, is accepted based on the results.

Table 23 Pearson's R Correlation Data Analysis

Statistical Analysis		Grades	Hours	Decision
Grades	Pearson Correlation	1	-.255	IC (Ho accepted)
	Significant (2 Tailed)		-.626	SC (Ho accepted)
	N	6	6	
Hours	Pearson Correlation	-.255	1	IC (Ho accepted)
	Significant (2 Tailed)	.626		SC (Ho accepted)
	N	6	6	
P- value .05				
Legend: ±.80 – ±1.00 = Very Significant (negative) Correlation (VSC) ±.50 – ±.80 = Significant (negative) Correlation (SC) ±.30 – ±.50 = Significant (negative) Correlation (FSC) ±.00 – ±.30 = Insignificant (negative) Correlation (IC)				

Wang & Eccles (2012) focused on the role of social support in student engagement during face-to-face classes. The study emphasizes that social support from teachers, peers, and parents positively influences emotional, behavioral, and cognitive engagement, improving academic and socio-emotional outcomes.

These studies collectively emphasized teacher-student relationships, instructional strategies, autonomy-supportive teaching, social support, and a positive classroom climate in fostering learning engagement during face-to-face classes. Finding the importance of creating an engaging and supportive learning environment to enhance students' motivation, involvement, and academic success.

4. Conclusion

The study on the academic performance of Grade 8 Science learning during face-to-face classes in General Emilio Aguinaldo National High School for the School Year 2022-2023 reveals several significant findings.

- **Attendance and Engagement:** Most learners showed high levels of attendance and engagement, with a significant percentage attending class daily.
- **Quality of Teaching:** Teaching innovation was generally rated positively, with a significant percentage of respondents considering it excellent or good. A large majority of respondents reported clear explanations and examples.
- **Access to Learning Resources:** While most respondents had access to necessary textbooks and learning materials, some still needed access. Improving equitable access to learning resources could be an area of focus.
- **Study Habits:** Many respondents reported actively reviewing science material outside of class, indicating a proactive approach to learning.
- **Motivation and Interest in Science Subjects:** Most respondents expressed interest in science subjects, with a smaller proportion exhibiting high interest and enthusiasm. Face-to-face science classes were reported to enhance motivation for most respondents.
- **Parental Involvement:** The analysis revealed varied levels of parental involvement in inquiring about their child's progress in science, with some parents/guardians showing consistent involvement while others were less engaged.
- **Learning Engagement during Face-to-Face classes:** The overall data suggested that learners generally had positive perceptions of face-to-face classes, with a strong agreement regarding the helpfulness of face-to-face interactions and provided resources.
- **Correlation between Grades and Study Hours**: The analysis found no significant relationship between grades in science and the total number of hours spent studying.

Overall, the study indicated that most learners in face-to-face classes were actively engaged, with high attendance rates and positive perceptions of teaching quality. The findings highlight areas for improvement, such as ensuring equitable

access to learning resources and addressing lower levels of engagement and clarity for some respondents. These insights can guide strategies to enhance educational experience and promote further improvements in academic performance.

Compliance with ethical standards

Acknowledgments

I warmly thank Professor Dennis G. Caballes, who guided and genuinely encouraged making this paper possible. His guidance and advice carried through all stages of writing this paper. I would like to thank the school principal in General Emilio Aguinaldo National High School – Imus City Province of Cavite Philippines for allowing research at our school, to Science and Technology department head and grade eight science teachers for all-out support in conducting the study.

Special thanks to Cris Angelo G. Ancheta; for inspiring me to write this research paper and Ms. Florence Mae Facelo Dela Cruz, thank you for your guidance and help in making this paper possible.

Disclosure of conflict of interest

The authors of this manuscript, Marinel Ramilo Gara and Florence Mae Facelo Dela Cruz, at this moment, declare that we do not have conflicts of interest related to the content of this research. We affirm that this work has been conducted impartially and without any financial or personal relationships that could bias the interpretation of the results or the presentation of the findings. If any conflicts of interest arise in the future, they will be promptly disclosed."

Statement of informed consent:

As a result, I have obtained informed consent from all participants involved in this study. Before agreeing to participate, each participant was provided with a detailed explanation of the study's purpose, procedures, potential risks, and benefits.

Participants were informed that their involvement in the study was voluntary, and they had the right to withdraw their consent without facing any negative consequences. They were assured that their decision to participate or withdraw would not affect their current or future relationship with the researchers or the institution.

Participants were informed about the confidentiality measures to protect their personal information. They were assured that their data would be anonymized, stored securely, and used solely for this study.

I have answered all participant inquiries to the best of my ability and ensured that they fully understand the nature of their involvement. Participants were given sufficient time to consider their decision, and written consent was obtained from each participant before any study-related procedures were conducted.

I acknowledge that I am responsible for adhering to ethical guidelines and regulations governing human research and ensuring that informed consent is obtained and appropriately documented.

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Authors short Biography

Marinel Ramilo Gara is a dedicated and passionate educator, currently serving as a Science Junior High School Teacher at General Emilio Aguinaldo National High School -Imus City, Department of Education in Cavite, Philippines. With a solid commitment to shaping young minds, Marinel has significantly impacted the education landscape.

Marinel's journey in education began when she pursued her Bachelor of Secondary Education with a major in Physical Sciences at Pamantasan ng Lungsod ng Muntinlupa, Philippines. She pursued a Master of Education with a major in Educational Management at the same university.

Marinel is pursuing a Doctor of Education in Educational Leadership at the National Teachers College - Manila Campus.

Florence Mae Facelo Dela Cruz is a passionate teacher from General Emilio Aguinaldo National High School – Imus City with a strong background in education. Her journey in teaching began 7 years ago (including the experience in private school in St. Paul College – Island Park, Dasmariñas City) and has led her to become a highly skilled and knowledgeable professional.

Dela Cruz excelled academically, earning a Bachelor of Secondary Education in Mathematics and awarded as best thesis in Cavite State University, and currently taking the Master of Arts in Education major in Mathematics in National Teachers Colleges (NTC). As a lifelong learner, Dela Cruz continuously seeks opportunities to expand her knowledge and stay updated on emerging trends and technologies in her field. She continuously participates in professional development programs to foster professional growth.