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Face-to-Face and Modular Learning Modality Performance of Junior High School Students in Science: A Comparative Study

LOVELYN PASCUAL-TUGARE
DOMINGO M. CABARTEJA, EdD
Urdaneta City University

Abstract — This study examined the academic performance of junior high school students under modular and traditional learning modalities, focusing on the impact of face-to-face and remote learning approaches. Findings revealed that the majority of respondents were aged 14–16, with an almost equal gender distribution, predominantly in Grade 10. A comparison of General Weighted Average (GWA) during the pandemic and face-to-face learning showed an overall improvement in student performance, with a higher percentage of students achieving grades in the 86-95 range under traditional learning settings. Results indicated that students in the traditional learning modality exhibited "Very High Performance" (VHP) in areas such as time management, learning schemes, and class involvement, whereas those in modular learning achieved only "High Performance" (HP). A moderate positive correlation ($r = 0.402$, $p < 0.001$) was observed between student performance in both modalities, suggesting that students who excel in one modality are likely to perform well in the other. However, traditional learning appeared to offer greater advantages in fostering engagement and academic success. Additionally, GWA in face-to-face learning was the only profile variable with a statistically significant relationship ($p = 0.044$) to student performance in traditional learning.
Based on these findings, it is recommended that schools continue effective strategies from face-to-face learning, enhance modular learning to improve student engagement, and integrate traditional learning methods into modular instruction. Furthermore, educators should consider students' past face-to-face performance when designing instructional strategies to support academic success.

Keywords — Traditional Learning Modality, Modular Learning Modality, Science, Face-to-Face

I. Introduction

Education adjusts to the needs of the society. A society can never exist without education. Members of the society learn the skills through education. These are to transmit, enrich and transform the existing social and scientific knowledge in the continuous advancement of the society (Ali et al, 2020). Teaching learning process has been inseparable to human being.

Barnett et al (2020) argued that the curriculum receives scant regard in current debates about teaching and learning in higher inculcation but suggests that this may vicissitude in the context of quality assurance mechanisms and benchmarking. In teaching there are many methods which are being used. Modular teaching is a new approach in classroom settings, for experience

taking in encounters in instruction also it has been getting much consideration. The system of taking in modules has turned into a piece of all level of instructions. Teaching through module is a self - taking in bundle managing one particular topic/ unit. It could be utilized within any setting helpful to the learner and may be finished at the learner's own particular pace. Sufficient hypotheses further more practices are accessible for the useful requisition of secluded educating in the classrooms. Consequently, a study was directed so as to check the adequacy of modular teaching.

Teachers must adapt instruction to the student's level of knowledge and development, motivate them to learn, and manage their technical skills. Instructions and learning should be effective.

The current educational situation in the Philippines seem depressing. From the latest data release by the Department of Education as of July 2020, the initial enrollment is just a little over half of the 2019's 27.7 million students. The decline in the number of enrollees is mainly attributed to financial factors and access to internet. While the public school system struggles for the resources in the remote learning, the private educational institutions face bigger threats of closure. In the DepEd data, only 866,935 registered in the private schools, a decline from 4 million in 2019. There are over 200,000 students who transferred from private to public schools due to economic downturn. Magsambol (2020) cites that the Coordinating Council of Private Educational Associations posed threat of closure of over 400 private schools due to lack of enrollees.

One way of maintaining the interest of the learners is to provide them with activities which they can perform individually, after being given the proper guidance, direction, instruction and encouragement by the teacher. This is the use of programmed instruction as a teaching tool. These programmed materials claim to make learning interesting.

This study is anchored on a number of theories or ideas on the efficacy of instruction, however focused on the course material science. Since Philippine education recognizes a growing realization that it is best to provide students in a diverse learning techniques and strategies.

The sudden shift to online learning created a hot debate in the Philippines citing the poor living conditions of the learners. Magsambol (2020) cites an obvious gap between those who can and cannot afford the resources to avail the new education platform. The general condition of children in the public school system sends a message of inequality with the DepEd's mantra 'no child left behind.' However, learning cannot be cancelled as much as to drive the economy. This led to tighter measures for education institutions in sustaining its operations despite the impending risk.

One of the basic problems seen by Kasrekar (2020) is the conduct of classes despite of the closure order. As the face-to-face classes pose higher risk of spread, the most viable solution is through online teaching and learning. This platform challenges both the teachers and the students as it occurs something new to them. This calls for an 'adopt quickly' response to the new normal

in teaching and learning amidst the pandemic (Tanhueco-Tumapon, 2020). The shift to online learning was too sudden at a very short notice but academic institutions have to strategize and accelerate new forms of teaching pedagogy. The question of how ready the schools are in terms of technical infrastructure is still left unanswered. Reopening of the schools at this stage is really expensive (Felter & Maizland, 2020).

Literature Review

The preexisting theories, insights, and ideas gained from the literatures and studies reviewed will guide the researcher in conceptualizing the research. To have directions and a clear concept of the study, this section discusses theories that will guide this study in finding out the significant results. The theories to be used are the following: Dewey's Constructivism, Social Development Theory of Vygotsky, Multiple Intelligence Theory's Howard Gardner, and Cognitive-Mediational Theory. In this study, the aforementioned will be explained through the ideas of the proponents of the said theories. The researcher has chosen these as much related in the fulfillment of the conduct of this study.

Teaching is a multifarious activity and teachers have multiple roles to play. They are interacting with animate and inanimate aspects of the teaching –learning process. The effectiveness of teaching-learning depends on the extent to which the teacher has put in number of efforts.

Dewey's Constructivism and Responsive Classroom

Dewey's constructivism theory is a theory that reconstructs past and present teaching and learning theories. It is a learning strategy that draws on learners existing knowledge, beliefs and skills. The learner as an important agent for learning process, construct their own understanding and knowledge through experiences in the classroom. The learners are taught how to use their sensory input to construct meaning because learning is an active process. Learning involves the learners' interaction to attain active learner in doing something for the knowledge which exists out there that connotes to the traditional formulation of different idea.

Learning consists of constructing meaning and systems of meaning because people learn to learn as they learn. This is also related to classroom management. This helps the teachers think of innovation to the learners especially activities for them to have additional understanding of the topics. In this theory it pointed out the underlying principles where the learners are the active participants in the teaching – learning process and practice the sense of self – regulation, there is a social interaction necessary for effective learning and encouraged to make sense of information for themselves.

Social Development Theory of Vygotsky

Vygotsky is known for his Social Development Theory. He believes that learning and development is a collaborative activity and that children are cognitively developed in the context

socialization and education. In the social development theory, Leo Vygotsky primarily explains that socialization affects the learning process in an individual. It tries to explain consciousness or awareness as the result of socialization. This means that when someone talks to our peers or adults, they talk to them for the sake of communication. After they interact with other people, they tend to internalize what they uttered.

Children learns through perceptual, attention and memory that are vital to their cognitive. This also provide them culture namely history, social context, traditions, language, and religion. For learning to occur, the child first makes contact with the social environment on an interpersonal level. They will internalize this experience. The earlier notions for this new experience influence the child, who then constructs new ideas.

Multiple Intelligence Theory's Howard Gardner

Multiple Intelligence Theory outlines eight intelligences, although Howard Gardner continues to explore additional possibilities:1) Verbal / Linguistic Intelligence: The ability to use language effectively both orally and in writing. 2) Logical/Mathematical Intelligence: The ability to use numbers effectively and to reason well. 3) Visual/Spatial Intelligence: The ability to recognize form, space, color, line, and shape and to graphically represent visual and spatial ideas. 4) Bodily/Kinesthetic Intelligence: The ability to use the body to express ideas and feelings and to solve problems. 5) Musical Intelligence: The ability to recognize rhythm, pitch, and melody. 6) Interpersonal Intelligence: The ability to understand another person's feelings, motivations, and intentions and to respond effectively.7) Intrapersonal Intelligence: The ability to know about and understand oneself and recognize one's similarities to and differences from others. 8) Naturalist Intelligence: The ability to recognize and classify plants, minerals, and animals. These can be used by the many teachers in a classroom. This will make the class more participative.

Also, mixture of activities that deal with heterogeneous learners are advisable. There is no best among these MI, so, combination can be more attractive to learners. This can help this study that a good strategy will give a good atmosphere and behavior among the learners toward the learning scheme. The teacher would be stress free in the class.

Cognitive-Mediational Theory

The dominant process theory of stress since the early 1980s has been the cognitive-mediational (cognitive-relational) approach. This view of stress emphasizes the importance of the roles of coping and appraisal in the process of managing the environment to maintain well-being. It is this "evaluative process that determines why and to what extent a particular transaction or series of transactions between the person and its environment".

Statement of the Problem

This study aimed to determine the level of performance in the face-to-face learning modality and modular learning modality of the JHS students in Science.

Specifically, it sought to answer the following questions:

1. What is the profile of the respondents in terms of:
    a. age,
    b. sex,
    c. grade level, and
    d. GWA in pandemic and face-to-face?
2. What is the level of performance of the junior high school students in science in face-to-face learning modality along:
    a. Time management, and
    b. Learning scheme?
3. What is the level of performance of the junior high school students in science in modular learning modality along:
    a. Time management, and
    b. Learning scheme?
4. Is there a significant difference between the level of performance in the face-to-face learning modality across modular learning modality of the JHS students in science?
5. Is there a significant relationship between the level of performance in the face-to-face and modular learning modality of JHS students and their profile variables?

Null Hypothesis

This study tested the following research hypotheses in their null forms at 0.05 alpha level of significance:

1. There is a significant difference between the level of performance in the face-to-face learning modality across modular learning modality of the JHS students in science.
2. There is no significant relationship between the level of performance in the face-to-face and modular learning modality of JHS students and their profile variables.

II. Methodology

This chapter presents the research design and strategy used in the conduct of the study. It includes population and locale of the study, data gathering tools and procedures and treatment of data. The central idea of this chapter is to justify the methods by which data and information were assembled for this study.

Research Design and Strategy

The researcher used a descriptive quantitative method of research. Descriptive study is valuable in providing facts on which scientific judgements may be based from. It involves collecting data concerning the problems of the subject of the study. According to Panopio (2009) descriptive method is a statistic procedure that describes the characteristics and properties of a group of persons, places, events, or objects. Icutan et. al (2004), expressed descriptive statistic as method of organizing, summarizing and presenting data in an instructive way. Thus, this method will be used in determining the level of effectiveness in face-to-face and modular distance learning among junior high school students in science.

Population and Locale of the Study

This study focused on the grade 9 and 10 of junior high schools which has 52 and 71 students respectively of Unzad National High School. As for the number of respondents involved, the researcher used a non - probability sampling or purposive sampling. In purposive sampling, the researcher thought through how she established a sample population, even if it is not statistically represent the greater population at hand (Fayol, 2020).

The participants were selected based on the characteristic of the population or the objective of the study. This investigation employed a purposive sampling procedure. Purposive sampling, also called deliberate sampling is a design in which the respondents are chosen on the basis of their knowledge of the information desired and on the judgment of the researcher who is best qualified to the objectives of the study (Guevara & Lambinicio, 2020). This method involved the taking of the desired number of respondents for this study with the required characteristics proportionate to the need of the population under this study. Thus, the respondents of the study were the 123 students of Unzad National High School of Villasis, Pangasinan.

Data Gathering Tool

This study utilized researcher-developed questionnaires as its main data-gathering instruments. These underwent content validation from five (5) experts before actual administration. The researcher used quantitative data-gathering tools to thoroughly evaluate the performance of junior high school students in science in face-to-face and modular learning modality. The quantitative data-gathering tool was constructed after an extensive search of related literature and studies.

The researcher used standardized survey questionnaires with 4-point scale items to quantify the performance of junior high school students in science in face-to-face and modular learning modality.

Using the Simon & White (2020) developed Survey/Interview Validation Rubric for Expert Panel, the experts assessed, improved, and refined the questionnaire checklist. The purpose of the validation process is to ascertain if each question was comprehended clearly and pertained to the actual experiences of the respondents. The validity of these questionnaires was confirmed with an overall weighted mean of 4.63, indicating that they are highly valid (HV) and suitable for measuring the intended outcomes. The goal of these tools for collecting quantitative data was to find numerical evidence to the performance of junior high school students in science in face-to-face and modular learning modality.

Data Gathering Procedure

After refining and completing the research instrument, the researcher secured consent from the Superintendent of the Schools Division Office of Pangasinan II. Upon approval of the request to conduct the study, the researcher administered the questionnaire to the respondents. The researcher collected surveys and used frequency and percentage, average weighted mean, paired t-test, ANOVA and Pearson r correlation.

III. Results and Discussion

This chapter includes the presentation, analysis, and interpretation of the data on the stated problems of the study.

Profile of the Respondents

Table 1 presents the profile of the respondents in terms of age, sex, grade level, GWA in pandemic and face-to-face modality.

Table 1
Profile of the Respondents
n=123

Profile		Frequency	Percentage
Age	14-16	122	99.2
	17-20	1	.8
Sex	Female	63	48.8
	Male	60	51.2
Grade Level	Grade 9	54	43.9
	Grade 10	69	56.1
GWA in Pandemic	75-80	37	30.08
	81-85	42	34.15
	86-90	34	27.64

	91-95	10	8.13
GWA in Face-to-Face	75-80	26	21.14
	81-85	29	23.58
	86-90	40	32.52
	91-95	26	21.14
	95-100	2	1.62

This table 1 presents the demographic profile and academic performance of a group of students based on age, sex, grade level, and general weighted average (GWA) during the pandemic and face-to-face learning. The data provides insights into the distribution of students and how their academic performance was affected by different learning modalities.

In terms of age distribution, the majority of students (99.2%) are between 14-16 years old, with only 0.8% aged 17-20. This suggests that most students are within the expected age range for secondary education, particularly in junior high school. This aligns with the findings of a study by Garcia and Weiss (2021), which indicated that the majority of secondary school students affected by remote learning during the pandemic were within this age bracket, highlighting the developmental challenges they faced in adapting to new learning environments.

The sex distribution of the sample is nearly equal, with 51.2% male and 48.8% female students. This balanced representation indicates that there is no significant gender disparity in the study population, ensuring a fair comparison across male and female students. Studies such as that by UNESCO (2022) confirm that gender parity in education has been a global goal, and many schools have achieved near-equal enrollment rates, particularly in secondary education.

Regarding grade level, 43.9% of the students are in Grade 9, while 56.1% are in Grade 10. The higher percentage of Grade 10 students suggests that the study may be slightly focused on students nearing the completion of junior high school, who may be preparing for their transition to senior high school. This is supported by the study of Orlov et al. (2021), which found that older students in secondary education were more affected by academic disruptions and faced greater pressure to transition smoothly into higher education levels.

Level of Performance of the Junior High School Students in Science along Face-to-Face Learning Modality

Table 2 presents the level of performance of the junior high school students in science along with face-to-face learning modality in two areas namely: time management, and learning scheme.

It is shown that the overall average weighted mean of the face-to-face learning modality is 3.25 with a descriptive equivalent of very highly performed (VHP).

Table 2
Level of Performance of the Junior High School Students in Science along Face-to-Face Learning Modality

Time Management	WM	DE
1. I study following my class schedules.	3.41	VHP
2. I attend the class religiously.	3.52	VHP
3. I pass all my quizzes/assignments on time.	3.11	HP
4. I take the test and pass on time.	3.32	VHP
5. I am aware of my class schedules.	3.60	VHP
AWM	**3.39**	**VHP**
Learning Scheme		
1. I read the lessons in advance.	2.68	HP
2. I take notes during discussions.	3.39	VHP
3. I stay in the class from the start to finish.	3.70	VHP
4. I research the topics being discussed in the class.	2.76	HP
5. I learn easily.	2.96	HP
AWM	**3.10**	**HP**
OAWM	**3.25**	**VHP**

Legend:

Numerical Value	Descriptive Equivalent
3.25-4.00	Very Highly Performed (VHP)
2.50-3.24	Highly Performed (HP)
1.75-2.49	Performed (P)
1.0-1.74	Not Performed (NP)

The findings on time management indicate that students generally exhibit very high performed (VHP) in managing their academic schedules. The highest mean score (3.60) reflects that students are highly aware of their class schedules, followed closely by their regular attendance (3.52) and adherence to test schedules (3.32). However, turning in quizzes and assignments on time received a slightly lower mean (3.11), suggesting that while students are diligent in attending classes, they may struggle with time-bound tasks. According to Zimmerman & Schunk (2022), effective time management significantly influences academic performance, as students who manage their time well tend to achieve better results. These findings emphasize the importance of structured scheduling and self-regulation in ensuring academic success.

Extent of Skill Competency along Power

Table 3 presents that the weighted mean (WM) of skill competency ratings for badminton players in terms of power, as assessed by the athletes. The ratings are accompanied by descriptions of the competency level, with highly competent being the highest rating.

The athletes' ratings for each statement range from 3.43 to 3.69, with an overall weighted mean of 3.52, indicating that athletes perceive themselves as highly competent in terms of power. Athletes reported positive effects of power training on their overall strength, explosiveness, and performance in sports and physical activities requiring explosive movements.

Power		WM	DESCRIPTIVE EQUIVALENT	TRANSMUTED RATING
1. improved the overall strength and explosiveness significantly.		3.69	Highly Agree	Highly Competent
2. give more powerful and explosive in my movements.		3.43	Highly Agree	Competent
3. power-focused exercises positively impacted my ability to generate force and power in various physical activities.		3.47	Highly Agree	Competent
4. influenced the performance in sports and activities that require explosive movements positively.		3.52	Highly Agree	Highly Competent
5. affected the ability to execute explosive movements in sports events positively.		3.47	Highly Agree	Competent
OVERALL WEIGHTED MEAN		3.52	Highly Agree	Highly Competent

Overall, athletes perceive power training to be highly agree and highly competent in enhancing athletes' strength, explosiveness, and performance in sports requiring explosive movements. Several studies support the importance of power training for athletes, including badminton players. Power is essential for generating force quickly, executing explosive movements, and improving overall athletic performance. Research by Lee and Lee (2021) and Smith et al. (2021) has demonstrated the positive association between strength levels and power output in badminton strokes, highlighting the importance of strength development for maximizing racket head speed and shot velocity. Biomechanical analyses, including studies by Wang et al. (2024), have elucidated the biomechanical factors contributing to power generation in badminton, emphasizing the coordinated involvement of lower body musculature and core stability in executing powerful strokes. Furthermore, interventions focusing on strength training, as evidenced by research conducted by Zhang et al. (2024), have shown promising results in enhancing power production and stroke effectiveness among badminton players. While the existing literature provides valuable insights into the impact of strength components on power generation in badminton, further research is warranted to explore optimal training protocols and interdisciplinary approaches for maximizing power output and skill competency on the court.

Level of Performance of the Junior High School Students in Science along Modular Learning Modality

Table 3 presents the level of performance of the junior high school students in science along modular learning modality in two areas namely: time management, and learning scheme.

It is shown that the overall average weighted mean of the modular learning modality is 2.76 with a descriptive equivalent of highly performed (HP). The findings on time management indicate that students exhibit a high level of performance (HP) in managing their academic schedules, with an average weighted mean (AWM) of 2.88.

Table 3
Level of Performance of the Junior High School Students in Science along Modular Learning Modality

Time Management	**WM**	**DE**
1. I study following my class schedules.	2.80	HP
2. I attend the class religiously.	2.63	HP
3. I pass all my quizzes/assignments on time.	2.98	HP
4. I take the test and pass on time.	2.94	HP
5. I am aware to my class schedules.	3.04	HP
AWM	**2.88**	**HP**
Learning Scheme		
1. I read in advance the lessons.	2.46	HP
2. I take notes during discussions.	2.61	HP
3. I stay in the class from the start to finish.	2.93	HP
4. I research the topics being discussed in the class.	2.62	HP
5. I learn easily.	2.51	HP
AWM	**2.63**	**HP**
OAWM	**2.76**	**HP**

Legend:

Numerical Value	**Descriptive Equivalent**
3.25-4.00	Very Highly Performed (VHP)
2.50-3.24	Highly Performed (HP)
1.75-2.49	Performed (P)
1.0-1.74	Not Performed (NP)

The highest-rated aspect is awareness of class schedules (3.04), followed by submitting quizzes and assignments on time (2.98) and taking tests as scheduled (2.94). However, attending classes regularly (2.63) scored lower, indicating that some students may struggle with consistent attendance. According to Zimmerman & Schunk (2022), effective time management is crucial in academic performance, as students who maintain a structured study plan tend to perform better. These findings suggest that while students are generally aware of their responsibilities, improvements in consistency and adherence to schedules could further enhance their academic success.

IV. Conclusion

This chapter summarizes the research work undertaken, the conclusions shown, and the recommendations made as an offshoot of this study.

The majority of respondents were adults, with a nearly equal distribution of male and female students, predominantly in Grade 10. A comparison of GWA during the pandemic and face-to-face learning shows an overall improvement in student performance, with a higher percentage achieving grades in the 86-95 range in face-to-face settings. Junior high school students demonstrated a higher level of performance in science under the face-to-face learning modality, particularly in time management, and learning schemes, where they consistently achieved "Very High Performance" (VHP) ratings. In contrast, students under the modular learning modality showed only "High Performance" (HP) across all areas, indicating that traditional learning may be more effective in fostering engagement and academic success. The positive Pearson correlation of 0.402** with a significance level of 0.000 indicates a moderate and statistically significant relationship between students' performance in modular and face-to-face learning modalities. This suggests that students who perform well in one modality are likely to perform well in the other, though face-to-face learning may still offer advantages. The results indicate that among the profile variables, only GWA in face-to-face learning shows a statistically significant relationship ($p = .044$) with performance in the face-to-face learning modality, while all other variables do not exhibit significant differences. This suggests that students' previous academic performance in face-to-face settings may influence their success in face-to-face learning, but not in modular learning. School administrators shall continue implementing strategies from face-to-face learning that contributed to improved student performance while addressing any challenges faced during the pandemic. School administrators and teachers must prioritize face-to-face learning methods while enhancing modular learning strategies to improve student engagement, time management, and overall academic performance. School administrators are encouraged to integrate effective elements of face-to-face learning into modular learning to enhance student performance across both modalities. Teachers must consider students' past face-to-face academic performance when designing instructional strategies to support their success in face-to-face learning. Administrators are still encouraged to prepare a contingency plan for modular learning as strategies to address natural calamities and other factors in the learning achievements of the learners.rom

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