
Perceived Effectiveness of Mathematics Teaching Strategies and Students' Academic Performance in Blended Learning Modality

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ABSTRACT

Using the quantitative-correlational research design, this study determined the perceived effectiveness of teaching strategies and academic performance of grade 7, 8 and 9 students in Mathematics in all public secondary schools in the municipality of Dumingag, Zamboanga del Sur. The participants were 270 students and 27 teachers. The questionnaire-checklist was the main instrument in data gathering. Tests of reliability using the Cronbach alpha coefficient and the normality test of the summative test items were done using the SPSS. Descriptive statistical analyses used the frequency and percentage distribution, weighted average mean and standard deviation; and tests of inference using the Kruskal-Wallis and Spearman rho correlation.

Students have diverse considerations on their mathematics teachers teaching effectiveness in the modular learning modality. They have different self-perceptions, beliefs and mindsets on mathematics subjects. The students have good attitudes toward the Mathematics as the subject helped in the development of students' ideas.

Teachers should adopt appropriate instructional techniques and strategies in Mathematics taking into account students' diversities or barriers to learning, provide support whenever necessary, and encourage students to enhance their time management giving top priority on practicing mathematical skills and internalizing mathematical concepts learned.

Keywords: *effectiveness, Mathematics, teaching strategies, academic performance, blended learning*

INTRODUCTION

Teaching at any level of education has the sole purpose of ensuring that all learners can acquire information and apply those skills. It is incumbent upon all educators to not only know their teaching style so that teaching has a two-fold purpose where teachers teach and students learn. Consequently, knowing how your students learn and what strategies best fit your classroom and school are fundamental in the process of learning. As a result, the question that arises in education is what are those effective teaching strategies (1).

(2) emphasized that effective teaching includes an engaging classroom presence, value in real-world learning, exchange of best practices and a lifelong love of learning. (3) promoted the ten powerful instructional principles that he believed excellent teachers apply which are: meaningfulness, prerequisites, open communication, organized essential ideas, learning aids,

novelty, modeling, active appropriate practice, pleasant conditions and consequences, and consistency.

Students come from a variety of backgrounds and have a wide variety of skills. Good teaching is based not only on teaching strategies and their effectiveness, but also on individual needs and the content's appropriateness.

When the subject matter is presented using a range of teaching strategies, it is assumed that students learn in different ways, at different speeds, with different levels of prior knowledge, and in diverse situations.

(4) further stated that "students react differently to different teaching methods, and that the selection of the proper method is critical to the learning style of those being served by the instruction".

As a result of the rapid shift in learning settings, math has once again become a challenge in the sense that a new approach of delivering learning is being deployed. The COVID-19 epidemic forced everyone to adapt new strategies in order to keep learning and growing. Modular remote learning is a new way of delivering learning for the benefit of young people's career potential. And the most important question is whether students can accomplish math using modular remote learning, like if the modality is efficient and are the students showing signs of progress on their learning. Too soon to draw any conclusions, however after over two years, certain improvements have been noted, while others stay on their last face-to-face learning due to some factors encountered along the way. Due to a variety of challenges and conditions, including family status, not all students are given the opportunity to benefit from government educational support.

In teaching mathematics in the secondary level, instructions are focused on the development of the knowledge and understanding, skills, application, attitudes and appreciation of mathematics competencies. Teachers need to facilitate acquisition of these competencies using diverse teaching strategies and methodologies. With modular distance learning modality, mathematics teachers have experienced even more challenging situations.

Distance learning's effectiveness is still being debated, particularly in terms of which techniques and learning strategies may be used to promote student learning. In order to pick and deploy the best alternatives, it is critical to assess the use and efficacy of distance education approaches and techniques. This study aims to assist math teachers in making their math classes enjoyable and fun despite the rapid shift in educational setting. This study recommended effective teaching strategies for students' attitudes, behavior, and performance

Statement of the Problem

This study was conducted to determine the perceived effectiveness of teaching strategies and academic performance of Grade 7, 8 and 9 students in Mathematics in all public secondary schools in the municipality of Dumingag, Zamboanga del Sur.

Specifically, this study answer to the following questions:

1. What is the level of perceived effectiveness of Mathematics teaching strategies employed during blended learning?
2. What is the level of students' attitudes toward Mathematics in the blended learning modality?

3. What is the level of academic performance of the students as revealed by their test scores in Mathematics?
4. Is there a significant difference among the self-perceived attitudes of the Grades 7, 8 and 9 students towards Mathematics in the blended learning modality?
5. Is there a significant relationship between the students' perceptions of the teachers' teaching effectiveness and their academic performance in Mathematics?
6. Is there a significant relationship between the students' self-perceived attitudes towards Mathematics in the blended learning modality and their academic performance in Mathematics?

METHODS

This study utilized quantitative-correlational research design in order to determine, describe and analyze the significant difference between variables of two respondents and its significant relationship between the effectiveness of teaching strategies, its attitudes and performance of the student-respondent. The quantitative design was applied in describing the effectiveness of teaching strategies in mathematics teaching, attitudes and academic performance of the students in mathematics. In addition, the correlational design was adhered to determining the significant relationship between the teaching strategies and academic performance of students; and attitudes and academic performance.

The study was conducted in all public secondary schools in the municipality of Dumingag, Zamboanga del Sur during the School Year 2021-2022. The municipality has a total of eight public secondary schools including extension campuses; Dumingag National High School, Dulop National High School, Dulop National High School – Bag.ong Valencia Extension, Dulop National High School – Labangon Extension, DNHS – Dapiwak Extension, DNHS – Saad Extension, DNHS – Sinonoc Extension, and Paquito S. Yu Memorial National High School in which schools can be reached by any kind of vehicles preferably a motorcycle.

The participants of the study were public secondary teachers teaching mathematics 7, 8 and 9 as to teacher-participants. As to student-participants, a randomly selected students from a specific teacher-participants were chosen.

The questionnaire-checklist was the main instrument in data gathering. The instrument was adapted with modification from the study of Behan, Greta (2019); and Martha's (1996). The questionnaires were subjected to both validity and consistency measures. The face validity was done to determine if the questionnaire items appear to measure the constructs investigated in the study. The face validity was done by the review of the panel members who were considered as experts in the field of business management and administration.

The consistency of the test items was done by measuring the Cronbach alpha coefficient using the SPSS. This was done by a sample of participants.

The descriptive questions were treated with the frequency, percentage distribution, weighted average mean and standard deviation. Tests of inference were done using the Kruskal-Wallis test and the Spearman-rho correlation and t-test of r were employed to test the significant relationship. Tests of inference were done using the online data analysis calculators and were

validated with SPSS. Test of normality was also done on the summative test results of the students as data for the academic performance.

RESULTS AND DISCUSSIONS

Level of Perceived Effectiveness of Mathematics Teaching Strategies Employed During Blended Learning

Teachers' Perceived Effectiveness. The use of movements in class to demonstrate could translate an abstract idea into a concrete one. In the blended instruction especially in virtual lessons or even in asynchronous discussions, the teachers may post simulations as replacement for actual movements to be done in the class. It could also be mini-videos with display of visual or gestures to emphasize and demonstrate some concepts in the lessons. This strategy was posted by most teachers as very highly employed as shown in weighted average mean of 4.67. Other highly employed strategies include the use of waiting time for students' responses, modeling new concepts for students, speaking slower for students to understand and to improve communication, scaffolding lessons and grouping students to help and support each other in the group.

In Table 1A, the grand mean of 4.44 implies that most of the teachers registered is very highly employed in their mathematics teaching strategies. The highest weighted average mean is 4.81 which denoted asking students if they have questions before going into an activity. This is very important as there might be point of clarifications which needs more discussions before proceeding to an application or analysis part of the lessons. A short evaluation question may be posted or asked to students to cross for understanding before jumping into another aspect of the lesson.

The results of the (5) study show a close similarity to the present study. Teachers' use of teaching approaches was found to be moderate overall, with high use of behavioral tactics and moderate use of cognitive and affective strategies by teachers. Furthermore, the findings demonstrated significant discrepancies in the use of teaching styles in connection to the scientific level variable, with postgraduate teachers being favored. According to the researcher, math teachers should be trained in how to employ the teaching methods.

Table 1A

Teachers' Perceived Use of Mathematics Teaching Strategies Employed During Blended Learning

Teaching Strategies	Teachers Perceptions		
	WAM	SD	I
1. Uses pictures when introducing unknown words.	4.37	0.69	VHE
2. Uses movements in class to help students understand new concepts.	4.67	0.55	VHE
3. Models using new concepts for students.	4.56	0.64	VHE
4. Speaks slower for students to understand.	4.59	0.75	VHE
5. Uses videos and multimedia to introduce new concepts.	4.52	0.58	VHE

6. Asks open-ended questions in class.	4.44	0.75	VHE
7. Scaffolds lessons in class.	4.41	0.69	VHE
8. Asks literal questions.	4.22	0.89	VHE
9. Uses wait time for students' responses.	4.63	0.74	VHE
10. Uses partner to work in class.	3.93	0.96	HE
11. Groups students to help support their language needs.	4.37	0.84	VHE
12. Uses more group work and partner work than teacher led lessons.	4.15	1.03	HE
13. Asks students if they have questions before going into an activity.	4.81	0.49	VHE
Grand Mean	4.44	0.74	VHE
Legend: 4.20 – 5.00 Very Highly Employed (VHE)	3.40 – 4.19	Highly Employed (HE)	
2.60 – 3.39 Moderately Employed (ME)	1.80 – 2.59	Employed (E)	
1.00 – 1.79 Less Employed (LE)			

Students' Perceived Effectiveness of Mathematics Teaching Strategies Employed During Blended Learning. Table 1B presents the perceptions of the Grades 7, 8 and 9 students as regards the teachers' mathematics teaching effectiveness. The Grade 9 students registered the highest grand mean of 4.33 which indicates "very highly employed" perceptions. The Grades 7 and 8 have denoted their teachers to be effective in their mathematics teaching strategies during blended learning. The two groups registered weighted average means of 4.12 and 3.77, both were "highly employed".

Based on the Grade 7 students' perceptions, they considered it very effective when their teachers give them compliments for their good manners, and when their teachers pay close attention when they raised some questions or point of clarifications. Both teachers' skills can be considered as soft skills of the teachers, however, these could bring some positive impact on their students as they noted these skills as very effective. It could be that when students are given acknowledgment and recognition of their good behaviors and manners, these may bring their attention and initiate more participation from the students. These students' observations were also true among the Grade 8 students when they considered it very effective if their teachers compliment on their good manners. So much so, when the students are given accorded time and attention by the teachers' patiently and attentively deliberate and dwell on the lessons or topics which students have some questions.

The Grade 9 students have considered several mathematics teaching strategies of their teachers as very effective. For the students, they considered it very highly employed if their teachers listen to them patiently whenever they asked questions, when their teachers gave them more time explaining and helping them understand on some points of their lessons, when their teachers treat them with fairness, when their teachers encouraged them, maintained caring voice, respected their personal privacy, and allowed them to express their personal views.

(6) believed that it is critical for the instructor to reflect on and explain the use of methods, as well as provide an appraisal of their success. as a response, the employment of teaching

strategies has a set of goals in mind that the instructor wishes to achieve in order to finish any work assigned to the students' teaching techniques.

Table 1B

*Students' Perceived Effectiveness of Mathematics Teaching Strategies
Employed During Blended Learning*

Teaching Strategies	Grade 7		Grade 8		Grade 9	
	WAM	I	WAM	I	WAM	I
1. My teacher compliments me on my good manners.	4.38	VHE	4.22	VHE	4.22	VHE
2. My teacher encourages me to finish my work independently.	4.20	VHE	3.64	HE	4.13	HE
3. My teacher respects my personal privacy.	4.10	HE	3.87	HE	4.27	VHE
4. My teacher uses a caring voice to ask me to maintain good behavior.	3.91	HE	3.82	HE	4.26	VHE
5. My interest in learning stems from the encouragement of my teacher.	4.00	HE	3.52	HE	4.28	VHE
6. My teacher treats students fairly.	4.09	HE	3.82	HE	4.49	VHE
7. I am allowed to express my personal views freely.	4.10	HE	3.34	E	4.29	VHE
8. My teacher explains to me and helps me fully understand the homework if I have a problem.	4.16	HE	3.97	HE	4.47	VHE
9. My teacher listens to me patiently when I go to ask him/her questions.	4.34	VHE	3.86	HE	4.51	VHE
10. My teacher uses the school rules and regulations to confine and restrict my behaviors.	3.96	HE	3.68	HE	4.39	VHE
Grand Means	4.12	E	3.77	E	4.33	VE

Level of Students' Attitudes Toward Mathematics in the Blended Learning Modality

Factors than can influence mathematics performance are demonstrated by (7); and (8); when they show that poor performance in Mathematics is a function of cross-factors related to students, teachers and schools. Among the students' factors, attitude is regarded by many researchers as a key contributor to higher or lower performance in mathematics (9). Attitude refers to a learned tendency of a person to respond positively or negatively towards an object, situation, concept or another person (10).

Attitudes can change and develop with time (11), and once a positive attitude is formed, it can improve students' learning (12); and (13). On the other hand, a negative attitude hinders effective learning and consequently affects the learning outcome henceforth performance. Therefore, attitude is a fundamental factor that cannot be ignored. The effect of attitude on students' performance in mathematics might be positive or negative depending on the

individual student. In response to this problem, this study seeks to investigate students' attitudes towards learning mathematics in Tanzania.

In Table 2, the self-perceived attitudes of the students are shown. The Grades 7 and 8 students have generally highly favorable attitudes toward Mathematics in the blended learning modality as revealed by the grand means of 3.80 and 3.60. However, the Grade 9 students have reflected a favorable level of attitudes toward Mathematics in the blended learning modality.

The highest weighted average means converged with the statement that Mathematics helps students develop their mind and teaches them to think. For the students, their good attitudes towards Mathematics generated from this concept which pointed out the perceived usefulness of Mathematics as it helps them develop their mind and their ability to think. They considered Mathematics as important along this aspect. (11) noted that if students recognize the importance of Mathematics in their lives, they will become motivated to study, practice, and learn the subject.

The perceptions also revealed the students' enjoyment on the subject which indicated their good attitudes toward Mathematics in the modular learning modality. They enjoyed studying mathematics in modular mode of learning, they like to solve new problems, they really like Mathematics and they are happier in a Mathematics class manifest their good attitudes and how they enjoy and like Mathematics. (7) pointed out that enjoyment of mathematics is manifested by their enjoyment of doing and learning Mathematics. In addition, (11) opined that students' enjoyment while learning can influence their behavior or cognitive aspect of attitude. According to PISA 2012 results, students may learn mathematics because they find it enjoyable and interesting. They further posit that interest and enjoyment affect both the degree and continuity of engagement in learning and in depth of understanding.

In this light, mathematics teachers need to build positive attitudes in Mathematics and they need to project a positive attitude in Mathematics. Teachers need to support students and establish partnerships with the students' parents/caregivers to better support students.

Table 2

Students' Attitudes on Blended Learning Modality

Attitudes	Grade 7		Grade 8		Grade 9	
	WAM	I	WAM	I	WAM	I
1. I am able to do fairly well in any math lesson I take.	3.93	HF	3.80	HF	3.33	F
2. Mathematics helps me develop the mind and teaches a person to think.	3.96	HF	3.90	HF	3.76	HF
3. I learned Mathematics easily.	3.77	HF	3.52	HF	3.39	F
4. I am confident that I could learn Math independently.	3.60	HF	3.51	HF	3.24	F
5. I have usually enjoyed studying Mathematics in modular mode of learning than face-to-face classes.	3.81	HF	3.63	HF	3.00	F

6. I like to solve new problems in Mathematics.	3.77	HF	3.62	HF	3.29	F
7. I really like Mathematics.	3.81	HF	3.22	F	3.20	F
8. I am happier in a Math class than any other class.	3.76	HF	3.56	HF	3.17	F
Grand Means	3.80	HF	3.60	HF	3.30	F

Teachers' Perceptions on the Attitudes of the Students in Blended Learning Modality

Students may have differing dispositions about the blended learning modality. Students and teachers alike may have favorable attitude while others may have reluctance on the learning modality especially in Mathematics subject. Table 3 shows the perceptions of the teachers on the attitudes of their students in blended learning modality. Generally, the students revealed good attitudes in modular learning modality. This is evident in the grand mean of 3.80 which signifies “good,” while a standard deviation grand mean of 0.70. This implies that most of the responses of the teachers were closed to 3.80 which could range from average to very good.

The teachers observed that their students were happier learning mathematics with the blended learning modality, considered the subject as helpful in the development of students' ideas and teach them how to think. These two indicators have the highest weighted average mean of 3.95 and 3.92 which are all interpreted as “highly favorable.” The blended learning modality helped the students to learn quickly and seemed to enjoy solving new math problems. This could be due to the fact that with the modular learning environment, students were forced to work independently, should be creative and critical and should take initiative to solve problems and exercises.

The overall results show that students display highly favorable attitudes when at good situation. The grand mean implicates that students' attitudes towards blended learning is positive when such effective teaching strategies is employed.

(12) revealed similar findings of the current researcher. It was revealed in (14) study that the attitude of the pupils in Mathematics using the modular learning modality was positive. The pupils' parents agreed that their pupils had a positive attitude in Mathematics in the modular learning modality. Pupils showed certain positive attitude which is not present with their other subjects in modular learning modality.

Table 3

Teachers' Perceptions on the Attitudes of the Students in Blended Learning Modality

Teaching Strategies	Teachers Perceptions		
	WAM	SD	I
1. In a modular learning environment, students learned mathematics quickly.	3.68	0.62	HF
2. I am confident that students will be able to learn Math with their own.	3.71	0.63	HF
3. Mathematics would help with the development of students' ideas and teach them how to think.	3.95	0.53	HF

4. Students perform excellently in all math classes.	3.86	0.60	HF
5. Students seemed to appreciate mathematics in a modular approach more than in face-to-face classes.	3.74	0.78	HF
6. I've found that students enjoy solving new math problems more than they did previously.	3.77	0.81	HF
7. Students enjoy mathematics when it is taught in a modular approach.	3.75	0.93	HF
8. Students are happier when learning mathematics than in any other subject.	3.92	0.71	HF
Grand Mean	3.80	0.70	HF

Academic Performance of the Students in Mathematics

The students' academic performance was generated from their test scores of the summative test given at the end of the third grading period. The test items were subjected to normality test as part of its reliability analysis.

Most of the Grade 7 students have satisfactory scores as manifested by the 44 out of 90 students or 48.89 percent; while the Grade 8 students have mostly satisfactory scores as shown by the 75 students out of 90 or 83.34 percent. The Grade 9 students have majority of very satisfactory scores as evident by the 51 students out of 90 or 56.67 percent.

The Grade 9 students have an average score of 24.31 with a standard deviation of 3.08. This explains why there were no students who fall in the fairly satisfactory level of academic performance. Compare to the Grade 7, the mean score is 23.68 which is close to 24.31, however, the standard deviation of their scores is 5.20, much greater than the 3.08 standard deviation of the Grade 9 scores. As regards the mean score of Grade 8 students, it registered a mean of 18.63, much lesser than the Grades 7 and 9 students, with a standard deviation of 2.68.

From the first to the second grading periods, it can be inferred that Grade 9 students have met the minimum learning abilities in Mathematics topics extremely satisfactorily. They have a good understanding of the ideas and have acquired good computational and problem-solving abilities. Students in grades 7 and 8 have completed the competencies of their classroom setting satisfactorily so far.

(15) present how to deliver effective distance education by focusing on learning resources, pedagogy, learner support, and management. Students should be encouraged to study and learn through distance education. The research is carried out in authentic, realistic, relevant, and information-rich environments, with a focus on instruments that address students' specific needs and learning styles. Through remote learning, students are encouraged to take initiative, make decisions, and learn intentionally, and a cooperative learning environment should be developed between students and teachers, which is best accomplished by using dynamic, generative learning activities that encourage analysis, experimentation, synthesis, and problem solving while also assessing student learning progress through realistic assignments and performances.

Table 4

Academic Performance of the Students in Mathematics

Academic Performance	Grade 7		Grade 8		Grade 9	
	F	P	F	P	F	P
Outstanding	9	10.00	-	-	-	-
Very Satisfactory	34	37.78	3	3.33	51	56.67
Satisfactory	44	48.89	75	83.34	39	43.33
Fairly Satisfactory	3	3.33	12	13.33	-	-
Total	90	100.00	90	100.00	90	100.00
Means	23.68		18.63		24.32	

Test for Significant Difference Among the Perceptions of the Three Groups of Students on the Effectiveness of Mathematics Teaching Strategies

Table 5

Tests for Significant Difference Among the Perceptions of the Three Groups of Students on the Effectiveness of Mathematics Teaching Strategies

Variable	Kruskal-Wallis or H-value	p-value	Df	CV	Decision
Effectiveness of Mathematics Teaching Strategies	22.184	0.00	268	1.97	Significant

Table 5 manifests that the H-value of 22.184 exceeds the critical value of 1.97 at the 0.05 probability level with 268 degrees of freedom. The H-value is significant at 0.00 probability value. This implies that the null hypothesis is rejected. Hence, there is a significant difference among the perceptions of the three groups of students on the effectiveness of Mathematics teaching strategies.

The Grade 9 students have higher weighted average means of the different indicators of teaching effectiveness compared to the Grades 7 and 8 students' counterparts.

(16) conducted research and found that management skills influence students' perceptions of their teachers in terms of material understanding, communication abilities, instructional approaches, and classroom students' attitudes toward mathematics. Students have a negative attitude toward mathematics because they have a low perception of their teachers' characteristics.

Table 6

Tests for Significant Difference Among the Perceptions of the Three Groups of Students on Their Attitudes on Blended Learning Modality

Variable	Kruskal-Wallis or H-value	p-value	df	CV	Decision
Attitudes towards Mathematics in Blended Learning Modality	13.778	0.001	268	1.97	Significant

The test statistic reveals that the computed Kruskal-Wallis test of H-value of 13.778 exceeds the critical value of 1.97 at the 0.05 probability value with 268 degrees of freedom. The H-value of 13.778 is significant at the 0.001 level of significance or p-value. The null hypothesis is thus rejected. There is a significant difference among the students' attitudes toward Mathematics in modular learning modality.

The Grades 7 and 8 students have higher level of attitudes towards Mathematics in the blended learning compared to the Grade 9 students.

(17) revealed that students have a positive attitude toward mathematics at first, but that this attitude changes as they progress through higher levels of education. It has been demonstrated that there is a strong positive weak relationship between student attitude and performance. In our study, students' enjoyment of mathematics and attitude significantly predicted their success. Students' aptitude, instructional, and social psychological environmental factors all influenced their love or dislike of mathematics.

Table 7

Test for Significant Relationship Between the Teaching Effectiveness and the Academic Performance

Variables	<i>Spearman rho</i> Correlation Coefficient	t-value of r	P-value	CV	Decision
• Teaching Effectiveness and the Academic Performance of Grade 7 Students	0.31	3.059	0.003	1.988	Significant
• Teaching Effectiveness and the Academic Performance of Grade 8 Students	0.151	1.433	0.155	1.988	Not Significant
• Teaching Effectiveness and the Academic Performance of Grade 9 Students	0.34	3.392	0.000	1.988	Significant

The data indicates that there is a significant relationship between the perceptions of teaching effectiveness and the academic performance of the Grades 7 and 9 students. The findings rely on the statistical inferences which generated the t-values of 3.059 and 3.392 which

exceed the critical value of 1.988 at the 0.05 probability level with 88 degrees of freedom. The data leads to the rejection of the null hypothesis. The perceptions of the students that their teachers were effective in teaching Mathematics were related to their performance in Mathematics. Students who have good perceptions and considered their teachers effective in the utilization of diverse strategies in Mathematics teaching may have more motivation and encouragement to work harder to achieve better performance in the subject. They considered the teaching strategies of their teachers useful and assistive of better understanding on the math concepts and acquisition of computational and analytical skills in mathematics.

Researchers agree that teachers are one of the most important school-based resources in determining students' future academic success and lifetime outcomes (18); (19); and (20). (21) argued that measures of teacher' professional knowledge like subject-matter, curricular and pedagogical knowledge were correlates of students achievement in mathematics and reading.

Table 8

Test for Significant Relationship Between the Students Attitudes on Modular Learning Modality and the Academic Performance

Attitudes of Blended Learning Modality and:	<i>Spearman rho</i> Correlation Coefficient	t-value of r	P-value	CV	Decision
• Academic Performance of Grade 7 Students	0.106	1.000	0.32	1.988	Not Significant
• Academic Performance of Grade 8 Students	0.08	0.753	0.476	1.988	Not Significant
• Academic Performance of Grade 9 Students	0.45	4.727	0.000	1.988	Significant

The findings imply that among the Grade 9 students, they considered their favorable attitudes in modular learning modality to have connections and attributes their academic performance in Mathematics. (14) noted that the positive attitudes of the students towards Mathematics in the modular learning modality helps improve their performance. Their positive attitude is an important educational outcome that should be nurtured to bring out their best abilities even during the use of modular learning modality.

(7) and (11) posit that interest and enjoyment affect both the degree and continuity of engagement in learning and the depth of understanding. This means that the more students enjoy doing mathematics the more they are likely to engage in problem-solving thus enhancing their learning and performance. Since enjoyment, students' learning and performance are related, it is worth evaluating the students' status of mathematics enjoyment in order to keep track of students' learning and performance.

CONCLUSIONS

The teachers always employed some mathematics teaching strategies which they considered very effective. The teachers considered it very effective if they use movements in class to help students understand new concepts, use wait time for students' responses and asking students if they have questions before proceeding into an activity. The students considered some effective strategies of the teachers, such as having the teacher giving compliments to their students and patiently listening whenever there are questions were among the effective strategies from the Grade 7 students. The Grade 8 students considered their teachers' giving compliments as very effective. The Grade 9 students noted that their teachers were very effective in treating them fairly, explaining and helping them understand their homework and problems, and patiently listening whenever there are questions asked. The students have good attitudes towards Mathematics as they were able to do fairly well in their math lessons, and regarded Math that helped them develop their mind and teaches them to think. They have good attitudes as they learned Mathematics easily and they were encouraged and interested to solve new problems in Mathematics. The teachers observed that their students have good attitudes toward the Mathematics subject as the subject helped with the development of students' ideas and teach them how to think, and the students were happier when learning Math. The students have diverse considerations on their mathematics teachers teaching effectiveness in the modular learning modality. Students have different self-perceptions, beliefs and mindsets related to their mathematics subjects. The teachers teaching effectiveness can be instrumental in promoting the academic performance of the students in Mathematics subjects. The students' good and positive attitudes toward Mathematics can be crucial to the success of their mathematics subjects.

RECOMMENDATIONS

Teachers should appropriately adopt instructional techniques and strategies in Mathematics that may include students' diversities or barriers to learning, minimizing fear, enhancing active interest, and enjoyment in their mathematics lessons. They should provide support to their students whenever they may require. Teachers should foster mutual understanding in a non-threatening teaching and learning environment. Students should utilize their time wisely and effectively so that they can have enough to practice and internalize mathematical concepts learned. The government through the DepEd may provide professional enhancement activities for teachers especially in continually improving their teaching strategies along with technology integration. Future researchers may investigate the impact of teaching practices with technology integration as used in the blended instruction on the academic performance of the students, and their engagement to mathematics projects and activities.

REFERENCES

- i. Hightower, A., Delgado, R., Lloyd, S., Wittenstein, R. Sellers, K., & Swanson, C. (2011). Improving student learning by supporting quality teaching: Key issues, effective strategies, Editorial Projects in Education, Inc., Bethesda, MD.
- ii. Gagnon, Danielle (2019). Qualities of a good teacher. <https://www.snhu.edu/about-us/newsroom/education/qualities-of-a-good-teacher>
- iii. Yelon, Stephen L. (1996). Powerful principles of instruction, White Palins, NY: Longman. Retrieved: <https://onlinelibrary.wiley.com/doi/abs/10.1002/hrdq.3920080213>.
- iv. Joyce, B. and Weil, M. (1986). Models of teaching. Prentice-Hall International Editions. Retrieved: <https://www.biblio.com/book/models-teaching-joyce/d/988876724>.
- v. Hamzeh, Mohammad. (2014). Teaching strategies used by mathematics teachers in the Jordan Public Schools and their relationships with some variables. American Journal of Educational Research. DOI: 10.12691/education-2-6-1. Retrieved: https://www.researchgate.net/publication/274524083_Teaching_Strategies_Used_by_Mathematics_Teachers_in_the_Jordan_Public_Schools_and_Their_Relationship_with_Some_Variables
- vi. Cormack, M. (2004) Developing minority language media studies. Retrieved: https://www.researchgate.net/publication/251511692_Developing_Minority_Language_Media_Studies
- vii. Kupari & Nissinen. (2013). Background factors behind mathematics achievement in Finnish education context: Explanatory models based on TIMSS 1999 and TIMSS 2011 data. IEA CONFERENCE 2013, Proceedings. https://www.iea.nl/fileadmin/user_upload/IRC/IRC_2013/Papers/IRC2013_Kupari_Nissinen.pdf
- viii. Tshabalala, T. and A.C. Ncube (2016). Cause of poor performance of ordinary level pupils in mathematics in rural secondary schools in Nkayi District: learner's attributions. DOI:10.20286/NOVA-JMBS-010113. Retrieved: <https://www.semanticscholar.org/paper/Causes-Of-Poor-Performance-Of-Ordinary-Level-Pupils-Tshabalala-Ncube/d002c8cbf22d55573d31651cd0b9be7cae6aa8f8>
- ix. Mohamed, L. and Waheed, H. (2011). Secondary students' attitudes towards mathematics in a selected school of Maldives. International Journal of Humanities and Social Sciences. Retrieved: <https://www.scirp.org/%28S%28vtj3fa45qm1ean45vffcz55%29%29/reference/referencpapers.aspx?referenceid=2160715>
- x. Sarmah, A. and Puri, P. (2014). Attitude towards mathematics of the students studying in diploma engineering institute (Polytechnic) of Sikkim. IOSR Journal of Research and Method in Education. Retrieved: <https://iosrjournals.org/iosr-jrme/papers/Vol-4%20Issue-6/Version-3/B04630610.pdf>

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- xi. Syyeda, F. (2016). Understanding Attitudes Towards Mathematics (ATM) using a Multimodal modal Model: An Exploratory Case Study with Secondary School Children in England. *Cambridge Open-Review Educational Research e-Journal*, 3, 32-62. http://corerj.soc.srccf.net/?page_id=224
- xii. Akinsola, M. and Olowajaiye, F. (2008). Teacher instructional methods and student attitudes towards mathematics. *International Electronic Journal of Mathematics Education*. Retrieved: <https://scirp.org/reference/referencespapers.aspx?referenceid=3066241>
- xiii. Mutai, K.J. (2011). Attitudes towards learning and performance in mathematics among students in selected secondary schools in Bureti District, Kenya. Retrieved: [https://www.scirp.org/\(S\(lz5mqp453edsnp55rrgict55.\)\)/reference/referencespapers.aspx?referenceid=3066254](https://www.scirp.org/(S(lz5mqp453edsnp55rrgict55.))/reference/referencespapers.aspx?referenceid=3066254)
- xiv. Suson, Mary Jane C. (2021). Learning attitude and performance of Grade I pupils in Math on modular distance learning. *International Journal of Advanced Multidisciplinary Studies*, Vol, 1, issue 2. <https://www.ijams-bbp.net/wp-content/uploads/2021/07/MARY-JANE-C.-SUSON.pdf>
- xv. Zapalska, A., S. Zelmanowitz, C. LaMonica, K. Heckman, K. Mrakovcich. (2020). Development of effective distance learning in response to covid-19 pandemic. *International Journal for Infonomics*. DOI: 10.20533/IJI.1742.4712.2020.0206. Retrieved: <https://www.semanticscholar.org/paper/Development-of-Effective-Distance-Learning-in-to-19-Zapalska-Zelmanowitz/22fcd1708a8fd0df8df9eba340c3385098b45c85>
- xvi. Etuk, E., Afangideh, M., and Uya, A. (2013). Students' Perception of Teachers' Characteristics and Their Attitude towards Mathematics in Oron Education Zone, Nigeria. <http://dx.doi.org/10.5539/ies.v6n2p197>
- xvii. Mazana, Mzomwe Yashya; Calkin Suero Montero; Respickius Olifage Casmir. (2019). Investigating students' attitude towards learning mathematics. *INTERNATIONAL ELECTRONIC JOURNAL OF MATHEMATICS EDUCATION* e-ISSN: 1306-3030. 2019, Vol. 14, No. 1, 207-231 <https://doi.org/10.29333/iejme/3997>
- xviii. Chetty, R., Friedman, J. N., & Rockoff, J. E. (2014). Measuring the impacts of teachers II: Teacher value-added and student outcomes in adulthood. *American Economic Review*, 104(9), 2633–2679.
- xix. Rivkin, S., Hanushek, E., & Kain, J. (2005). Teachers, schools, and academic achievement. *Econometrica*, 73(2), 417–458.
- xx. Rockoff, J. (2004). The impact of individual teachers on student achievement: Evidence from panel data. *The American Economic Review*, 94(2), 247–252.
- xxi. Darling-Hammond, L. (2000). Teacher quality and student achievement. *Education Policy Analysis Archives*, 8, 1. <https://epaa.asu.edu/ojs/article/viewFile/392/515>.