



**Student's Exposure on Synchronous-Asynchronous-Tutorial Aided Distance Learning:  
Impact on Academic Performance in Mathematics.**

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**ABSTRACT**

The study attempted to examine student's exposure through SAT-Aided Modular Distance Learning and Academic Performance in Mathematics among Grade 9 students of Alubijid National Comprehensive High School, Alubijid Misamis Oriental. Specifically, it aimed to: 1. Determine the academic performance of students as exposed to SAT-aided modular distance learning in relation to: synchronous learning; asynchronous learning and tutorial learning; and 2. Find out the significant difference on students' academic performance as exposed to SAT-aided modular distance learning. A descriptive research method involving a pretest and posttest designed was employed. A total of ninety (90) students-participants were randomly selected. Three major groups of classes were assigned into the SAT, with thirty (30) students per group. Data mining on students' grades was used. Unstructured interview schedule was employed to validate students' learning outcomes. Mean, Percentage, t-test and Pearson product moment correlation coefficient were the statistical tools used to analyze the data. Results of the study revealed that students' exposure to synchronous and asynchronous indicate outstanding academic performance and very satisfactory in tutorial learning strategy. The overall results of students' exposure to SAT showed significantly different at 0.05 level. With SAT learning strategies, students generally achieved positive meaningful learning experiences aided with modular distance learning.

**KEYWORDS:** *Asynchronous, module, distance learning, synchronous, tutorial learning*

**INTRODUCTION**

The new Corona Virus Disease "nCovid-19" spread throughout the world and became a pandemic. Thousands of new cases were reported and discovered everyday prompting the Philippine government and health officials to conduct necessary measures to mitigate the spread and transmission of the virus.

According to WHO, most people infected with the COVID-19 virus will experience mild to moderate respiratory illness and recover without requiring special treatment. Older people, and those with underlying medical problems like cardiovascular disease, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illness. The best way to prevent and slow down transmission is to be well - informed about the COVID-19 virus, the disease it causes and how it spreads. The COVID-19 virus spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes.

The Department of Education specifically the Division of Misamis Oriental wherein Alubijid National Comprehensive High School (ANCHS) and Alubijid District is located was no exception. Thus, face to face classes were immediately halted and duty hours of its personnel were reformatted to On-site and Work from home schedules to minimize going out from the residence and in following the strict quarantine and lockdown protocols.

The current mode of learning in all levels of learning were shifted to modular, digital and online approaches due to the ongoing pandemic. In fact, during the enrolment,

the learners together with their parents were asked about their available gadgets and appliances and even as to the mode of learning delivery for this school year.

For the Printed Modular Learning Delivery Modality, the teachers prepare the learning materials, weekly study guides and other resources for the modular distance learning and these materials shall be accompanied by quality assured instructional packets wherein the parent/guardians or para-teachers shall meet with the teacher and receive instructions and the learning materials to be accomplished by the learner for the week.

Parents supervised their child's interaction with the materials and communication with the teacher. On the other hand, students must accomplish the module activities, complete the individual learning plan, connect with the teacher for feedback through text, messenger or any form of communication (Codamon, 2020).

Modular Learning Delivery was selected as the main mode of learning for school year: 2020 – 2021. The Learner's Enrollment and Survey Forms (LESFs) which was the main data source of DepEd distributed during the enrollment period showed that 8.8 million parents preferred modular, while 3.9 million wanted blended or a combination of two or more modalities (Arcilla, 2020).

In Alubijid District, the prevailing mode of learning delivery selected by the parents and students was modular distance learning with the aid of self-learning modules. Thus, teachers especially in Mathematics were encouraged to look for modifications and alternatives that will ease the burden of parents and students who chose to study and learn despite the current situation and challenges.

In search of finding innovations and practices that made contributions to the learners' academic performance, the teacher-researcher utilized the modular distance learning delivery to ensure that learning and acquisition of knowledge and skills were still at high level. Thus, SAT which stands for Synchronous, Asynchronous and Tutorial Learning Sessions were utilized as the modular distance learning delivery.

Academic performance is the measurement of student achievement across various academic subjects like Mathematics. As noted, teachers and education officials typically measure achievement using student activities like performance task, written works, portfolio and results from standardized tests.

Synchronous Learning Strategy happens in real time basis. Wherein teacher and students interact in a specific virtual place at a set time. In these cases, teachers commonly take attendance and include video conferencing, teleconferencing, live chatting, and live-streamed lectures that must be viewed in real time (Staff, 2020).

Asynchronous Learning Strategy happens on the schedule and non-real time basis. The teacher will provide materials for reading, lectures for viewing, assignments for completing, and exams for evaluation. Students can access and satisfy these requirements at their own schedule, so long as the students meet the expected deadlines. This includes

self-guided lesson modules, pre-recorded video content, virtual libraries, lecture notes, and online discussion boards or social media platforms (Staff, 2020).

Tutorial Learning Strategy is a follow up study of lectures which is highly individualized remedial teaching. The main focus of this strategy is to provide remedial help for the learners and develop their cognitive and affective domains of behaviors. (Lector, 2020).

## **THEORITICAL AND CONCEPTUAL FRAMEWORK**

Important theoretical contributions to current study are the theories of Freud, Watson, Herzberg and Maslow. These theories fostered positive mindset toward the subject Mathematics which can lead to positive learning outcomes. Educators valued the importance of mastery of basic skills in Math that will lead to learners' satisfaction and motivation to learn new and much more challenging topics.

In the field of education, behaviorism examines how students behave through learning. It focuses on observing how students respond to certain stimuli that, when repeated, can be evaluated, quantified, and eventually controlled for everyone.

The emphasis in behaviorism is on observable actions and not on the mind or cognitive processes. In sum, if one cannot observe it, it cannot be studied.

Modular approach through distance learning has shown relevant and timely findings that can aid the learners that were unprepared on being put under new normal of education setting due to the existence of pandemic that gravely affected all sectors of our society.

Despite the drastic changes that happened, Learning can still become fun and exciting with the aid of other learning approaches that are suited to the learner's needs and availability of gadgets or learning materials at home. The related literature of this study showed enough promised that quality of academic performance among learners is very much reachable and achievable.

In the past years, modular approach have been utilized as it gave various advantages to working individuals or those that cannot afford to use plenty of time at school attending formal classes. French (2015) stressed that modular structures were beneficial to both high school and college institutions as it allowed them to respond to the growing needs and demands of students and develop more efficient use of resources and increase opportunities of curricula breadth. Furthermore, Agarwal (2019) lamented that the latest teaching and learning research showed that learning online often results in similar or better outcomes than the traditional classroom setting because of its flexibility, personalized pacing and instant feedback, all based on the latest in cognitive science learning.

The self-isolation and distance learning in educational institutions because of the pandemic stimulated the use of e-learning technologies in practice. The sudden transition to distance learning can be considered as a transition of the education system to a new state a state of crisis characterized by the disappearance of a certain number of elements of the system and a change in its integral characteristics. The transformation of the education

system was the result of an extraordinary adaptation of the system to the conditions of the pandemic.

The study of Korolkov (2020) revealed that the main drawback of distance learning is the lack of social contact between participants in the educational process. It is necessary to ensure the educational component of the pedagogical system. Distance learning is only suitable for students with a high degree of motivation to learn. Thus, this form of approach can only be considered as an additional useful tool in the system of teaching. Distance learning can be recommended for use when conducting theoretical classes with students who have already mastered practical skills and with limited mobility in space.

The results of the study of Fidalgo (2020) showed that students' major concerns about distance learning were time management, motivation, and English language skills but still many believed and indicated interests in taking distance learning than skipping the school year.

## **METHODOLOGY**

A descriptive method was employed in the study with set of questionnaires for pretest and posttest to be answered by the students. The data gathered in the questionnaires was used to answer the research problems in this study. Likewise, it measured the effectiveness of the SAT Strategies in aiding students' academic performance under modular distance learning. A personal unstructured interview was also conducted by the researcher to confirm the data from the questionnaire.

The actual population of 90 students were the respondents of this study, no sampling procedure was employed; hence the whole universe is the total number of respondents.

## **RESULTS AND DISCUSSION**

This section presents the analysis and the findings of the research study.

Table 1 presents the student's pretest and posttest scores on synchronous learning strategy. As gleaned from the data the pretest score was 3 or 10% of the students got the scores of outstanding level, 9 or 30% of very satisfactory level, and 7 or 23% were of satisfactory results. There were 11 or 37% of students who obtained the scores of fairly satisfactory level and did not meet expectations level. This data implied that intervention must be conducted as there are students that are at borderline level and has the possibility of failing the subject.

Table 1: Students Pretest and Posttest Scores on Synchronous Learning

Rating		Pretest		Post Test	
Descriptors	Scale	F	%	F	%
Outstanding	90-100	3	10%	21	70%
Very Satisfactory	85-89	9	30%	7	23%
Satisfactory	80-84	7	23%	2	7%
Fairly Satisfactory	75-79	9	30%	0	0%
Did not meet Expectations	74 and below	2	7%	0	0%
Total		30	100%	30	100%

The posttest scores of the students on synchronous learning strategy showed that 21 30 or 70% were able to obtain scores outstanding results. Similarly, 7 or 23% of very satisfactory level, and 2 out of 30 or 7% were at satisfactory level, and none for fairly satisfactory and did not meet expectations level. This data indicate that synchronous learning strategy finding greatly improved the academic performance of the students. Thus, it guided the students to understand better the concepts and its application allows the learner to comprehend and absorbed the lessons introduced in the class, hence it can be an alternative in aiding modular distance learning.

This finding is supported by the study of Perveen (2016) that synchronous and asynchronous learning as an instructional model in math would results better learning outcomes. Moreover, it was beneficial to student's learning and stated that issues under asynchronous learning can be reinforced through synchronous learning.

Table 2 showed the student's pretest and posttest scores under asynchronous learning strategy. Data revealed that the student's pretest score was 9 or 30% of the students got the scores of outstanding results, 9 \or 30% were found at very satisfactory level, and 3 or 10% were of satisfactory level. There were 9 or 30% of students who got the scores of fairly satisfactory level, and did not meet expectations level. This data implied that in the class there seems to be intervention on the students that are having difficulty in the new normal set-up of education.

Table 2: Students Pretest and Posttest Scores on Asynchronous Learning

Rating		Pretest		Post Test	
Descriptors	Scale	F	%	F	%
O	90-100	9	30%	24	80%
VS	85-89	9	30%	4	13%
S	80-84	3	10%	2	7%
FS	75-79	4	13%	0	0%
DE	74 and below	5	17%	0	0%
Total		30	100%	30	100%

The posttest scores of the students on synchronous learning strategy showed that 24 or 80% were able to obtain scores of outstanding results, 4 or 13% of very satisfactory

results and 2 out of 7% were of satisfactory level and none for fairly satisfactory and did not meet expectations level. This data were found that asynchronous learning strategy results affects their learning outcomes greatly improved the academic performance of the students. a positive results was noted on the students academic performance, hence it can be an alternative in aiding students' cognitive learning while exposed to modular distance learning.

This result supported the study of Berry (2017) that valuable information can be gathered on the use of synchronous and asynchronous learning in Algebra that can improve online Math instructions

Table 3 presents the student's pretest and posttest scores on tutorial learning strategy. Data revealed that the student's pretest was 10 or 33% of the students got the scores of outstanding results, 3 or 10% of very satisfactory results, and 9 or 30% were of satisfactory results. There were 8 out of 30 or 27% of students who got the scores of fairly satisfactory results and did not meet expectations results. This data can be explained due to students at borderline level and has the possibility of failing the subject. This results can be attributed to poor comprehension level. Also, every student knowledge base is quite low to understand the concepts in the activity provided.

Table 3: Students Pretest and Posttest Scores on Tutorial Learning

Rating		Pretest		Post Test	
Descriptors	Scale	F	%	F	%
O	90-100	10	33%	12	40%
VS	85-89	3	10%	10	33%
S	80-84	9	30%	8	27%
FS	75-79	6	20%	0	0%
DE	74 and below	2	7%	0	0%
Total		30	100%	30	100%

Meanwhile the posttest scores of the students on tutorial learning strategy showed that 12 or 40% were able to obtain scores of outstanding results, 10 or 33% of very satisfactory results, and 8 or 27% were of satisfactory level and none for fairly satisfactory and did not meet expectations level. This data were found that tutorial learning strategy increases the academic performance of the students. Hence with tutorial learning the students were able to achieve the learning outcomes when exposed tutorial learning via modular distance learning.

This finding aligned with the study of Ting (2013) found out that tutorial was beneficial to learners learning outcomes specially the young ones with difficulties in absorbing information with the subject. Moreover, educators considered the importance the importance of individualized approach in learning.

Table 4 showed the student's overall academic performance on SAT learning strategy. Data indicated that synchronous learning pretest average was at 87% with very

satisfactory results while its posttest average was 95% with outstanding results. While the results of asynchronous learning strategy had the pretest average of 86% of very satisfactory results while its posttest average was 95% of outstanding results. Finally, Tutorial learning strategy had the pretest average of 85% reflects very satisfactory and posttest average of 87% still at very satisfactory results.

Table 4: Students' Overall Academic Performance by Percentage

Learning Strategies	Pretest	Description	Posttest	Description
Synchronous Learning	87%	Very Satisfactory	95%	Outstanding
Asynchronous Learning	86%	Very Satisfactory	95%	Outstanding
Tutorial Learning	85%	Very Satisfactory	87%	Very Satisfactory

This data reflects that synchronous learning strategy, asynchronous learning strategy and tutorial learning strategy were found to show positive impact on student's academic performance in mathematics. The overall data showed that SAT learning strategy can be utilized as aid in modular distance learning.

This is supported the study of Stoesz (2018) stressed that Synchronous, Asynchronous and Tutorial learning were found promising and effective in terms of instructional approach to the teaching of math among secondary students. The intervention, and changes in students' attitudes and knowledge of academic integrity.

Table 5 presents the test significance and correlation results. As shown with Synchronous learning strategy registered a computed r-value of 0.945 with very high positive correlation and a computed t-value of 6.745 which indicate significant at 0.05 level. This was followed by Asynchronous learning with t- value of 5.87 and Tutorial learning with a t-value of 5.42 respectively.

This data implied that the impact of synchronous learning on student's academic performance were found high and obtained the most preferred method by the students in Math under modular distance learning.

value.

Furthermore, it also indicated that as the student develop positive impression towards the subject mathematics it will also result to positive impact on the student's academic performance.

Table 5: Test Significance and Correlation on SAT Learning

Strategy	Correlation and T-test Results					
	r-value	P	Description	t-value	P	Description
SL	0.945	0.000	Very High	6.745	0.000	Significant
AL	0.955	0.000	Very High	5. 879	0.000	Significant
TL	0.557	0.000	Moderate	5.423	0.000	Significant

This findings claimed the same results with the studies of Uplane (2014), Lee (2018) and Rohani (2018) synonymously revealed that synchronous learning provides

better modular distance learning environment for learners and that it can be an effective and promising method in lieu of face-to-face learning.

Asynchronous learning strategy registered a computed r-value of 0.955 of very high positive correlation and a computed t-value of 5.879 which indicate significant at 0.05 level. This data finding also indicated that asynchronous learning on student's academic performance were of great value. Furthermore, the students develop positive impression towards the subject thus increases their academic performance.

This finding supported the studies of Shea (2016), Malik and Teng (2017) and Jena (2019) that a significant difference in students' responses regarding effectiveness of asynchronous learning towards academic performance. They added that students were found to have greater interest in asynchronous activities when they were exposed to various aided lessons students' accomplishments of given tasks through asynchronous allowed student's positive gains in mathematics.

Tutorial learning strategy registered a computed r-value of 0.557 of moderate positive correlation and a computed t-value of 5.423 significant at 0.05 level of significance. This data also indicate that tutorial learning on student's had increased academic performance. Furthermore, it also indicated that as the student develop positive impression towards the subject mathematics it will also result to positive impact on the student's academic performance.

Similarly this findings is consistent with the study of Santosa (2015) that tutorial was a big aid on students' decision to continue to study while Han (2016) suggested that tutorial system must be strengthened by conducting various trainings to staffs and teachers to make it more effective. Meanwhile the study of Tweedie (2019) showed tutorial was effective when combined with other instructional strategies to support students' learning needs.

Moreover, the research of Ullah (2018) and Armenta (2019) concluded that tutoring would enhanced the academic achievement of students and were found an effective method of instruction for teaching at secondary level. They further suggested that tutoring may be incorporated along with other teaching methodologies and it may be given due consideration in all teacher education practices.

Finally, Tweedie (2019) stressed that tutorial combined with synchronous and asynchronous learning provided high impact on students' motivation and self-beliefs. Similarly, the studies of Mori (2015), Tansel (2014), McKay (2016) and Odutayo (2017) revealed positive significant correlations among students' academic performance whenever tutorial are integrated as remedial activities to enhance academic performance.

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