

Learning Environment in a Pandemic

Gennevie Mae C. Fernando

College of Graduate Studies, Ilocos Sur Polytechnic State College, Sta. Maria, Ilocos Sur, Philippines



ABSTRACT: The effectiveness of the learning paradigm shifted due to the outbreak of COVID-19 on the learning achievement of the Grade 9 students of Santa Maria National High School for the school year 2021-2022. This evaluated how learner characteristics, teacher's assessment of the students, resources, and learner support or e-learning affected the performance in mathematics besides the student profiles and learning environment. The research study used a descriptive-correlational design. A two-part questionnaire was used to collect data from 211 students' responses. Findings showed that most of the learners were from poor backgrounds in terms of financial status, and used smartphones in their learning. The learning environment was considered average, and the frequency of e-learning and resource usage was less. Mathematics performance was satisfactory. Statistically significant relationships were established between students' characteristics classroom contexts, and mathematics achievement. The study concludes that there is a need to improve the support for students which entails provision of resources, learning environment, and e-learning. More studies on the various learning scenarios during the pandemic are encouraged.

KEYWORDS: Learning Environment, Learners' Characteristics, E-Learning, Pandemic Learning, Learning Achievement, Teachers' Assessment

I. INTRODUCTION

Mathematics is a fundamental part of human thought and logic integral to attempts at understanding the world and ourselves. Mathematics provides an effective way of building mental discipline and encourages logical reasoning and mental rigor. In addition, mathematical knowledge plays a crucial role in understanding the contents of other school subjects such as science, social studies, and even music and art. Mathematics is a subject that needs close supervision and constant assistance from the teacher.

It was during the early days of January 2020 that scientists identified a new infectious disease caused by a novel coronavirus. Since then, the COVID-19 pandemic has caused massive disruptions to schools and universities. The COVID-19 pandemic is forcing educational institutions such as universities to shift rapidly to distance and online learning. COVID-19 has forced schools around the world to adopt distance and online learning. During these school closures, all face-to-face lessons were canceled, compelling many institutions, including to immediately transition from face-to-face in-person learning to completely online lessons. The abrupt switch to fully online learning has been particularly stressful for many instructors and students who prefer in-person instruction. Online learning is often stigmatized as a weaker option that provides a lower quality education than in-person face-to-face learning (Hodges et al. 2020).

The learning environment includes learning materials and technology, teaching methods, learning styles, and ties to societal and international contexts. The phrase also refers to aspects of human behavior and culture, especially the crucial part that emotion plays in learning. Similar to how an ecology combines living creatures and the physical environment, the learning environment is a composite of human practices and material systems (Balog, 2018). Modern learners require learning spaces that cater to both their individual and group needs. To tackle this challenge, educational leaders must create motivating and interesting physical and cultural environments (Chukwuemeka, 2013).

The academic, emotional, and social success of students in the classroom depends on their learning environment. It takes effort and planning to create a learning environment that is conducive to learning. They should be developed through deliberate actions, such as having positive interactions with students and acting in ways that would encourage learning activities in the classroom (Becton, 2017).

Learning Environment in a Pandemic

Teaching and learning mathematics in the new normal is a challenge for teachers, students, and even parents. Since the government already prohibits face-to-face interaction between teachers and students, distance learning has been the learning modality that the Department of Education adopts. This modality has three types, namely: modular learning (printed or digital), television/radio-based instruction, and online learning. In modular learning, printed modules provide the students with the lesson, activities, and performance tasks that they can finish at their own pace and with the support and supervision of parents or guardians. Performance tasks were submitted on a scheduled time and were evaluated and assessed by their subject teachers. All works submitted were given equivalent grades based on the guidelines provided by the Department of Education.

Online learning is another methodology with the use of technology. Online mode is done when students study with their teacher and classmates through an application such as Google Meet, Zoom, and other online platforms. The goal of online learning is to keep the students engaged academically to retain what they have learned.

With these new methods, educators and learners face many challenges. Teachers and students were both struggling to live with the challenges this pandemic brought. This new way of learning caused by the COVID-19 pandemic can be an additional challenge during this tough time.

Santa Maria National High School's learning environment presents particular difficulties for students, teachers, and parents. Each of these individuals has proven resilient and adaptable in the face of these difficulties. Nevertheless, difficulties persist. Most of the issue's students run into in this learning environment are isolation, lack of access to technology, difficulty picking up new skills, difficulty focusing, and difficulty managing time.

Learning mathematics through TV/radio or even in Printed modules is hard because it is impossible for a learner to imagine a figure or to draw an illustration. After all, he can't see anything. Learner fails to comprehend an instruction. Chalk and board are indeed indispensable instructional materials when teaching and learning math. Even if a solution to a math problem is well-presented in a module, or learning activity sheet, it will never be enough without a teacher explaining the concepts and processes systematically for learners to understand both concept and content.

The implementation of an education system in response to the coronavirus outbreak and schools being closed can be supplemented with a curriculum that involves parental guidance. This would help in improving the education systems at large and ensure learning attainment in home settings. Learning through TV broadcasting and printed modules can be made possible with the help of parents/guardians or other elderly family members. Most parents are found to be facilitating learning at home. It was revealed that parents found the sudden closure of the schools extremely disturbing and they were concerned about their children's routine. According to (Bhamani et al., 2020) parents believe that through schools, a formally structured routine is followed on most days of the week and this helps children understand the importance of time, scheduling, and doing assignments on a given timeline. All these elements of systematic routine help them shape their future work habits. According to a few parents, school plays a significant role in disciplining children. Parents also have struggled with providing time for their children especially when they have more than two kids at home going to the same school and having classes at the same time.

Therefore, it is essential to know how the students' learning environment affects how well they perform in mathematics. To provide correct and appropriate action that a teacher can take in this new normal, the outcome of this study may be helpful to both instructors and pupils. The policy-making body can develop activities and methods that meet the demands of the instructors and students in this new normal by understanding the learning environment and its level of impact on students' mathematical performance.

II. RESEARCH METHODOLOGY

Research Design

The researcher used a descriptive research design employing a correlational approach. Descriptive research design is a scientific method that involves observing and describing the existing phenomenon as cited by Garcia (2022). Thus, the profile of the respondents in terms of age, sex, educational attainment of parents, occupation of parents, and their level of performance will be described. In addition, it also utilizes a correlational method to determine the significant relationship of variables, correlational research design to be used. In this study, in particular, the researcher will look into the relationship between the profile, learning environment, and level of mathematics performance of students.

Population and Locale of the Study

The respondents of the study were the Grade 9 Students of Santa Maria National High School for the School Year 2021-2022, with a total population of 408. A total of 211 respondents were involved and determined using the simple random sampling technique.

Learning Environment in a Pandemic

Table 1. Distribution of Respondents

Section	Population	Sample
Diamond	40	22
Emerald	39	21
Garnet	40	21
Sapphire	42	21
Amethyst	41	21
Turquoise	42	21
Aquamarine	40	21
Pearl	41	21
Jade	41	21
Ruby	42	21
Total	408	211

Research Instrument

To gather the data needed in this study, the researcher made use of a two-part survey questionnaire. Part I was used to elicit the demographic profile of the respondents such as age, sex, educational attainment of parents, occupation of parents, number of siblings, monthly income, and gadgets used by the respondents.

Part II is the set of questions that elicit the learning environment of the respondents in terms of learners' characteristics, an assessment used by the teacher, resources used in learning, learners' support system, and e-learning. These components were adapted from Teaching in a Digital Age by Anthony William (Tony) Bates, and modifications were made. The questionnaire was made by the researcher but some of the indicators were based on the study of McGhee et al (2007) and Pat-El et al (2013) and it was validated by six mathematics teachers and pilot-tested in Burgos National High School, Burgos, Ilocos Sur with the following results. It is computed using Cronbach's alpha.

Table 2. Reliability coefficient of the questionnaire

Indicators	Reliability Coefficient	Interpretation
Learners' Characteristics	0.864	Good
Assessment used by Teacher	0.901	Excellent
Resources used in Learning	0.847	Good
Learners Support System	0.874	Good
E-learning	0.928	Excellent

Assessment used by teacher and E-learning obtained a reliability coefficient of ≥ 0.9 with an interpretation of excellent while learners' characteristics, resources used in learning, and learners support system obtained a reliability coefficient of ≥ 0.8 with an interpretation of good. This means that the instrument is deemed reliable. For validity purposes, it was validated by six experts in Mathematics with a computed mean of 4.95, thus, the questionnaire is valid.

Data Gathering Procedure

Prior to the conduct of the study, a letter of request was forwarded to the office of the Schools Division Superintendent to conduct this study on the Grade 9 learners of Santa Maria National High School for the School Year 2021-2022. The researcher also sought permission from the Principal and advisers of all sections.

Upon approval, the researcher floated the questionnaires to the respondents through Google Forms. The questionnaires were collected and the responses were tallied and treated with the appropriate statistical tools. Before this, the researcher had already requested the grades of the respondents from their respective advisers for documentary analysis.

Statistical Treatment of Data

The Statistical Package for Social Science (SPSS) was utilized in the statistical analysis and treatment of data to be gathered. Specifically,

Learning Environment in a Pandemic

Frequency count and Percentage were used to describe the profile of the respondents.

Weighted Mean was utilized to determine the level of the learning environment and the level of mathematics performance.

Simple Correlation Analysis was used to determine the significant relationship between the profile and the level of mathematics performance and the relationship between the level of learning environment and the level of mathematics performance.

Data Categorization

To determine the level of learning environment of the students, the following 5-point Likert scale was used:

Rating	Statistical Limit	Descriptive Rating	Overall Descriptive Rating
5	4.21 – 5.00	Always	Very High
4	3.41 – 4.20	Often	High
3	2.61 – 3.40	Sometimes	Moderate
2	1.81 – 2.60	Seldom	Fair
1	1.00 – 1.80	Never	Low

The following ranges, which were modified from the DepEd standard grading system, were used to assess the students' level of mathematical performance.

Mathematics Performance

Grades	Descriptive Rating
90 – 100	Outstanding (O)
85 – 89	Very Satisfactory (VS)
80 – 84	Satisfactory (S)
75 – 79	Fairly Satisfactory (FS)
75 and below	Did Not Meet Expectations (D)

III. RESULTS AND DISCUSSIONS

Profile of the Respondents

Age. The results showed that, with 119 responses, or 56% of the total population, the majority of respondents are 15 years old, while the least ages of the respondents were 16, 17, and 19 years old. The figures state that most students are of the common entry age for a ninth grader. They are already capable of accepting new responsibilities under the supervision of responsible adults, based on their developmental tasks at 15 years old. The findings of the study are aligned with the study, which revealed that most of the respondents were 15 years of age, which was also the most dominant age of junior high school students in a study conducted by Naungayan (2017).

Gender. The data shows that, of the total population, females made up 110, or 52 %, while males made up 101, or 48 %. The findings suggest that there are more women than men in the sample, which is normal in a setting like a school where it has long been observed that there are more girls than boys. The fact that girls are more likely than boys to be interested in attending school may help to explain this. This is supported by studies from Escalona (2015) and Barcelona (2017), where women outweigh men. Additionally, Garcia (2022) overview of Philippine Education study, which states that there are more females than boys enrolled in higher education. However, the results of the study contradict the findings of Milan (2018) articulating that there are more boys than girls.

Father and Mother's Educational Attainment. The results demonstrate that only a small number of individuals were unable to complete formal education. These results suggest that the majority of parents have high school and college degrees. According to Dagaylo-An and Tancinco (2016), majority of the respondents' parents had a college education. It accounted for 44% of the total number of responders. Ten of the parents who responded were elementary school teachers, while 17.5 percent were college graduates. However, according to Naungayan (2017), the majority of respondents have parents who have completed high school. Despite the disparities in results, both studies imply that the majority of respondents' parents were unable to complete any degree. Parents' educational level has been found to be an influence in academic achievement, quoted by Escalona (2015). By developing educational resources in the home and having specific attitudes and beliefs toward their children's learning, parents serve as a role model and a guide in encouraging their children to seek high educational objectives and ambitions. In this example, parents' educational attainment acts as a predictor of attitudes and values that parents utilize to establish a home environment that can influence their children's learning and achievement.

Parents Occupation. The statistics show that 44% of their mothers simply stay at home and take care of the household while 38% of their fathers are farmers. This could imply that the mother is preoccupied with how to care for the family's requirements

Learning Environment in a Pandemic

while the father is working in a physically demanding field. The table also revealed that the second highest percentage belongs to others – fathers who are drivers, welders, technicians, and merchandisers. The third highest are parents who work abroad. This finding confirms the study of Barcelona (2017) who found out that the parents of her study were semi-skilled - farmers, fishermen, housekeepers, laborers, and other non-professional jobs. From the data, it can be inferred that 13% of moms are farmers. Mothers who work as laborers in the public or private sector make up a very small percentage of the workforce. This study suggests that moms choose to labor in the field alongside their husbands to make a living.

Number of Siblings. The data gathered shows that 33% of all respondents, or the majority of respondents, have two siblings. Whereas 18% of people have three siblings and 28% have one sibling. The families with 4 to 7 siblings are represented by the remaining percentages. This shows that families are conscious of their own socioeconomic demands and are able to plan for the betterment of their family while taking their priorities into consideration.

Monthly Income. It may be deduced that 52% of respondents said their monthly income was below 5,000 pesos, while 9% said it was between 21,000 and 30,000. This indicates that the majority of respondents are from low-income families and may not have extra money to spend on other resources that could help enhance students' academic progress. The results support a 2020 study by the National Association of Secondary School Principals (NASSP), which found that children living in poverty often lack the means at home to do their homework, study, or participate in activities that prepare them for success in the classroom. Although three-fourths of households presently have access to high-speed broadband, many low-income families lack access to computers, high-speed internet, and other resources that can help a kid outside of the classroom. These families' parents frequently work several jobs or longer hours, making it possible that they are unavailable to help their kids with their education.

Gadgets Used in Learning. It was noticed in the data that half of the respondents used smartphones as their gadgets for learning. Other gadgets are tablets with 21% of users, Cable TV with 13% of users, and only a few use Desktop computers and Laptop. And 1% have nothing to use for their learning. This indicates that the students have very limited technology resources to aid their learning experience. This implies that, given the available resources for their studies, it would be challenging for the students to build new knowledge and existing competencies. This is in consonance with the findings of Alfawareh and Jusoh (2014) as cited in the study of Pantaleon (2022) which revealed that ninety-four percent of students owned smartphones, and the majority of them used mobile by using as a computer connected to the internet and a digital camera.

Learning Environment of Grade 9 students along Learners' Characteristics

Table 2. presents the Level of Learning Environment of the students along Learner's Characteristics.

Indicators	Mean Score	Descriptive Rating
1. My goal in learning is to gain knowledge	4.68	Always
2. I am eager to learn new things	4.43	Always
3. I can easily remember the lessons during my previous grade level	3.48	Often
4. I review the lessons I've learned in my previous grade level	3.46	Often
5. I am competent in using the technology	3.72	Often
6. I prefer to learn from the internet than from module	3.09	Sometimes
7. I can learn from how others learn	3.71	Often
8. I can understand the lessons from my module without any help	3.36	Sometimes
9. I can focus on learning even with the temptations caused by gadgets.	3.44	Often
10. Doing household chores do not distract my concentration in my studies.	3.68	Often
11. I can always motivate myself to learn my lessons	4.09	Often
12. I have high sense of responsibility in accomplishing the task provided in the module.	3.94	Often
13. I accept feedbacks positively from my teachers which help me in doing my tasks.	4.21	Always
14. I can learn at home because I have the assistance of my parents.	3.49	Often
15. I can submit my deadlines for SLMs without any pressure.	3.76	Often
16. I am capable to learn independently from the modules.	3.64	Often
17. I follow the schedule set for the submission of module	4.37	Always
18. I submit complete answers for a particular module	4.19	Often
19. I properly labeled my answer sheets	4.38	Always
20. My handwriting is readable and clear.	3.91	Often
Overall Mean	3.85	High

Learning Environment in a Pandemic

On Learners' Characteristics. As reflected in Table 2, respondents consistently feel that learning is about gaining knowledge, are ready to learn new things, welcome good feedback from their teachers that aids them in completing their assignments and are organized enough to label their response sheets. These indicators coupled with the features of the learners have a mean value that falls between 4.21 and 5.00, which is interpreted as Always while the item "I can understand the lessons from my module without any help" received the lowest mean rating, which was described as "Sometimes." This shows that while students' objectives are to complete the module's assigned tasks, they find it challenging to fully comprehend them. This also explains why students are responding to the exercises without fully comprehending the contents. The overall mean of all the indicators on the Level of Learning Environment of Grade 9 students along Learners' Characteristics is 3.85 and interpreted as Often, meaning the respondents often display the above-mentioned characteristics/indicators.

This supported a study by Itorralba (2022), which found that high school students struggle mightily with their reading and comprehension abilities. As a result, failing to completely understand the lessons and modules intellectually presents additional obstacles. Some kids no longer have the required depth of interest to maintain the required endurance as a result. Even worse, some leave out and forfeit their opportunity to pursue further education—college or senior high.

Learning Environment of Grade 9 students along Assessment used by Teacher

Table 3. presents the Level of Learning Environment of the students along Assessment used by the Teacher.

Indicators	Mean Score	Descriptive Rating
1. Authentic assessment tests focus on my analytical skills and ability to integrate what they have learned	4.06	Often
2. I can demonstrate what I have learned through the assigned tasks and activities	3.83	Often
3. I can calculate, explain, and describe whatever is asked in the assessment tool.	3.60	Often
4. I can use portfolio in assessing my mathematical performance.	3.77	Often
5. I can fully understand the activities given in the performance tasks and assignments	3.83	Often
6. My teacher provides feedbacks to my answer in the assessment.	3.95	Often
7. My teacher stressing my strengths and weaknesses concerning my learning	3.34	Sometimes
8. My teacher encourages me to reflect on how I can improve my assignments/activities	4.25	Always
9. My teacher gives me guidance to assist my learning	4.27	Always
10. My teacher discusses with me the progress I make	4.20	Often
11. After each assessment my teacher informs me how to improve the next time	4.22	Always
12. My teacher discusses with me how to utilize my strength to improve my assignment	4.17	Often
13. My teacher and I consider ways to improve my weak points	4.05	Often
14. My teacher tries to explain in a different way when I do not understand a topic,	4.38	Always
15. I have an opportunity to show what I have learned during class	4.02	Often
16. My teacher asks questions that help me gain understanding of the subject matter	4.31	Always
17. I am aware with the criteria by which my assignment will be evaluated	4.07	Often
18. My teacher makes me aware the areas I need to work onto improve my results	4.23	Always
Overall Mean	4.03	High

On Assessment used by the Teacher. As reflected on the table, respondents believe their teacher "always" encourages them to reflect on how they can improve their assignments/activities, guides them to assist their learning, informs them how to improve the next time, explains in a different way when they do not understand a topic and asks questions that help them gain an understanding of the subject matter. This means that feedback for teacher assessment is useful and effective in improving students' academic performance.

The lowest mean score of 3.34 which is interpreted as "Sometimes" was given to indicator number 7 which is my teacher stressing my strengths and weaknesses concerning my learning. This implies that teachers failed to give frequent feedback on

Learning Environment in a Pandemic

students learning on their strengths and weaknesses. According to Fine et al. (2022) quantity of feedback delivered during the pandemic identified concerns relating to students' anxieties about having to study remotely from home and often in an isolated fashion. The teachers felt that one approach to allay student concerns was to increase the individual feedback they delivered. However, some teachers delivered less feedback to their students during the pandemic due to the technological challenges of working remotely. Some participants reported that the introduction of blended learning had been well received by students, despite the increased reliance on technology and the changes in learning and teaching behaviors.

Most of the indicators were given the descriptive rating "Often" with mean scores in the range of 3.41 – 4.20, resulting in the overall mean of 4.03 which is interpreted as "Often" means that students often receive feedback from assessment used by teachers, and this will improve their learnings. This result is consistent with a study by Ampofo (2020) that feedback helps students to know the benefit of learning, encourages students to be more active and participate in class activities, help students to internalize and process the demands of a task given to them by their teachers, increases the self-esteem of students, guides students in on their performance, feedback deepen the understanding of students on their performance and also clarify what students should do.

Learning Environment of Grade 9 students along Resources used in Learning

Table 4. presents the Level of Learning Environment of the students along Resources used in Learning.

Indicators	Mean Score	Descriptive Rating
1. All printed modules are always available for distribution.	4.49	Always
2. I have a sufficient access to learning technology.	3.86	Often
3. I have competency and proficiency in using various interfaces or systems that allow me to control a computer or another embedded system for studying	3.58	Often
4. I am updated with the latest learning technology.	3.85	Often
5. I have strong Internet access during online classes.	3.39	Sometimes
6. I have a sufficient access to library resources.	3.00	Sometimes
7. I have a sufficient access to laboratory equipment and materials.	2.84	Sometimes
8. I have unlimited access to textbooks, worksheets, and other instructional materials	3.23	Sometimes
9. I do not experience financial challenges when accessing learning resources and technology	3.21	Sometimes
10. Laptops or computers are available for use.	2.98	Sometimes
11. The geographical location of our home is a hotspot to access strong internet connection.	3.38	Sometimes
12. Internet access is available at all times.	3.55	Often
13. Printer and photocopier machines are available at home.	2.54	Seldom
Overall Mean	3.37	Moderate

On Resources used in Teaching. As reflected on the table that students gave the highest score on "All printed modules are always available for distribution" with a mean score of 4.49 an interpreted as always. All public schools in the Philippines currently use this learning method. Modular distance learning is the method that most parents and students prefer.

Other indicators on the table are all about the use of technology, library resources and laboratory equipment and material in learning environment. The range of the mean score is 2.84 to 3.39 with a descriptive rating "Sometimes", This result means that using technology challenges of students varied in terms of type and extent. Their greatest challenge is the availability of learning resources at home and they are also challenge on their technological literacy and competency.

Indicator number 13 got the lowest mean score of 2.54 and it is interpreted as "Seldom", this means that printers and photocopier machines are seldom available at home.

The overall mean of 3.37 is interpreted as "Sometimes", implies that respondents have limited access or knowledge in using technology as resources in learning. Students' responses suggest that their learning environment in terms of the resources in learning is a great challenge to them. According to the findings of Rahayu et al. (2022) that access to technology greatly supports distance learning implemented by the government during the current COVID-19 pandemic. Through good access to technology, learning materials can be fully attained.

Learning Environment in a Pandemic

Learning Environment of Grade 9 students along Learners Support System

Table 5. presents the Level of Learning Environment of the students along Learners Support System.

Indicators	Mean Score	Descriptive Rating
1. My parents support me to learn at home.	4.05	Often
2. My parents have the capacity to facilitate the modular learning sessions for me.	3.78	Often
3. My parents and other members of the family assist me in answering the SLMs	3.52	Often
4. My parents provide materials for my project	4.34	Always
5. My parents help me in making my projects.	3.52	Often
6. My parents communicate to my teachers if there are some unclarified instructions.	3.35	Sometimes
7. My parents can manage to help me learn while looking for ways to earn	3.77	Often
Overall Mean	3.76	High

On Learner's Support System. The high mean score on item 4 means that their parents always provide materials for their project. Indicators 1, 2, 3, 5, and 7 with mean scores interpreted as "Often" means that parents often support them in learning at home, parents can facilitate the modular learning sessions, parents assist them in answering the Self Learning Modules, and parents can manage to them learn while looking for ways to earn. The overall mean of 3.76 which is interpreted as "often" means that student great support system from their parents which is very important in this new learning environment. According to Daniela et al. (2021), a large role was played by the parents of the students, who had to become homeschoolers within a few days without prior training. While parental involvement has previously been analyzed as necessary but often insufficient, parents were now the ones who helped students to learn digital skills, helped them to learn, and helped them to understand how to organize the learning process of children in a balance with other daily responsibilities.

This corroborates the result of the study by Mau et al. (2021) that shows the positive beliefs of parents, students, and schools in parents' involvement to influence students' academic achievement, especially in Distance Learning. At home, parents agreed to control and guide their children in doing the assignments.

Learning Environment of Grade 9 students along E-Learning

Table 6. presents the Level of Learning Environment of the students along E-learning.

Indicators	Mean Score	Descriptive Rating
1. I receive appropriate help during online classes.	3.31	Sometimes
2. I possess the ability to control my own thoughts, emotions, and actions during online classes.	3.39	Sometimes
3. I have enough preparation time before an online class.	3.30	Sometimes
4. I have good time management skills during online classes.	3.33	Sometimes
5. I properly use online peer learning strategies.	3.25	Sometimes
6. I am always willing to learn new technology	3.95	Often
7. I have full understanding of directions and expectations during online classes	3.36	Sometimes
8. I perceive technology as an instrument to getting help from other during online classes.	3.40	Sometimes
9. I do not experience online distractions such as social media during online classes.	3.16	Sometimes
10. I do not experience distractions at home as a learning environment.	3.35	Sometimes
11. I do not have difficulties in selecting the best time and area for learning at home.	3.43	Often
12. Home set- up does not limit/hinder the completion of certain requirements for my subject.	3.62	Often
Overall Mean	3.40	Moderate

Learning Environment in a Pandemic

On E-learning. The table revealed that item 6 has the highest mean score which is 3.95 and it is interpreted as “Often”. The respondents are willing to learn new technology. This result means that respondents are trying to embrace the new Learning environment caused by the pandemic and one way to learn is to use the technology. This result means that respondents are trying to embrace the new Learning environment caused by the pandemic and one way to learn is to use the technology.

Almost all indicators (indicators 1, 2, 3, 4, 5, 7, 8, 9, and 10) got low mean scores which were interpreted as “Sometimes”, resulting in an Overall Mean of 3.40 as interpreted as “Sometimes” implies that the impact of E-learning on the respondents remains a challenge to them as they are not much satisfied on how E-learning helped them in their learning environment. This is similar to the findings of Maatuk et al. (2022) that students claim that the introduction of e-learning is difficult and that the low-quality of internet services is the biggest obstacle to its application. students demonstrate that there are limitations to e-learning and that the biggest downside is that it decreases the workload for teaching staff and raises the pressure on students. This corroborates the result of the study by Mahyoob (2020) that most EFL learners are not satisfied with continuing online learning, as they could not fulfill the expected progress in language learning performance.

Learning Environment of Grade 9 Students

Table 7. presents the Summary of the Learning Environment of Grade 9 Students.

Indicators	Overall Mean	Descriptive Rating
Learners' Characteristics	3.85	High
Assessment used by Teacher	4.03	High
Resources used in Learning	3.37	Moderate
Learners Support System	3.76	High
E-learning	3.40	Moderate
Overall	3.68	High

As reflected in Table 7 the indicator Assessment used by Teacher got the highest overall mean which is 4.03 and it is interpreted as “High” This result implies that students often receive feedback from assessments used by teachers, and this will improve their learning. It is important that during the pandemic the learners should be given feedback from teachers and use their feedback for continuous improvement. According to Bazan (2022), feedback (supervision of practice, feedback itself, and evaluation) has a direct influence on the student’s performance in adjusting to feedback and improving their performance, a variable that, in turn, positively influences the students’ application and adjustment in self-assessed evaluations. Jellicoe and Forsythe (2019) also outlined as crucial steps, the relationship between the teacher’s feedback actions and the student’s incorporation of such feedback into their behavioral repertoire implies the student accepting the feedback provided by their teacher and having trust that said feedback will demand plausible challenges and changes in their behavior and learning.

Another indicator that got an overall mean that is interpreted as “High” is Learners' Characteristics. This also implies that Learners' Characteristics influence the learning environment during this pandemic. The learner's Support system got an overall mean of 3.76 and was interpreted as “High” which also implies the great influence of the support given to the learners to the learning environment in this pandemic. The most identified and common support system of the learners during this pandemic is the support they got from home.

Resources used in learning and E-learning are the two indicators with the lowest overall mean. This result implies that although these are useful in the learning environment during this pandemic, students still believe that utilizing these does not make their learning at the fullest considering the availability of these resources and their knowledge of how to utilize them.

However, the student's learning environment received a mean rating of 3.68, which is considered to be "High." This suggests that an environment conducive to learning will ensure both students' academic success and an effective procedure for teaching and learning.

Mathematics Performance of the Students

Table 8 presents the Level of Mathematics Performance of the respondents.

Numerical Ratings	F	%	Level of Performance
90 – 100	19	9	Outstanding
85 – 89	61	29	Very Satisfactory
80 – 84	19	9	Satisfactory
75 – 79	112	53	Fairly Satisfactory

Learning Environment in a Pandemic

74 and below	0	Did Not Meet Expectation
TOTAL	211	100

Results revealed that a high percentage (53%) of the students obtained a final grade of 75-79 which indicates that a great number of students have a “Fairly Satisfactory” level of performance. The highest level of performance attained is “Outstanding” achieved by a small number (9%) of students, and there were no respondents who “Did Not Meet Expectations”. However, there is an average percentage of students who acquired “Very Satisfactory” (29%) and “Satisfactory” (9%) levels of performance. Furthermore, the mean grade of the students is 81.77 which indicates a “Satisfactory” level. This result suggests that Grade 9 students of Santa Maria National High School, in general, have an average level of performance in Mathematics.

Sunga (2015) obtained a mean grade of 82.8 % in his study of the Fourth-Year students of the public secondary schools in Pinamalayan, Oriental Mindoro. It is revealed in his study that 36.73% of the student-respondents fall under poor performance in Mathematics while only 0.36% of the respondents showed excellent performance. His findings denoted that students’ performance in Mathematics is affected by some other factors which are not indicated in this study. He implied that achieving high-quality Mathematics performance does not only call for coherent, well-articulated Mathematics curricula, competent and knowledgeable teachers who can integrate instruction with assessment, educational policies that enhance and support learning, classrooms with ready access to technology, and a commitment to both equity and excellence but of course, students’ factors must also be put into consideration.

Similarly, Escalona (2015), as cited by Dandin (2019), revealed that most of his respondents have a moderately satisfactory level of mathematics performance. The results mentioned above are similar to the findings of Millan (2018). He unveiled that fourth-year students from Sta. Lucia District, both from public and private schools is approaching proficiency level. This approaching proficiency has the same range of grades as the Satisfactory level of the current grading system. However, when taken individually, there seems to be a dissimilar result. Most of the public high school students perform fairly in the subject while their counterparts in the private schools are at a notch higher, a descriptive rating of Good. In terms of failed grades or those whose grades were lower than 75, the most number is observed at the public high schools with 66 out of 321 while only 13 out of 281 in the private schools.

Relationship between the Profile and the Level of Learning Environment

Table 9. presents the Relationship between the profile and the level of learning environment of the respondents.

Profile	Learning Environment									
	Learner’ Characteristics		Assessment used by Teacher		Resources used in Learning		Learners Support System		E-Learning	
	Computed r	p-value	Computed r	p-value	Computed r	p-value	Computed r	p-value	Computed r	p-value
age	0.102*	0.040	0.096	0.166	0.887	0.115	0.010	0.887	0.081	0.241
gender	0.093	0.179	0.054	0.432	-0.021	0.766	.135*	0.050	-0.333	0.631
Fathers Educational Attainment	0.064	0.356	-0.018	0.045	0.028	0.689	-0.028	0.689	-0.006	0.934
Mothers Educational Attainment	0.052	0.449	0.010	0.885	-0.061	0.378	-0.044	0.528	-0.036	0.605
Fathers Occupation	-0.062	0.369	-0.078	0.259	0.002	0.974	0.062	0.368	-0.050	0.472
Occupation	-0.105	0.130	-0.065	0.349	-0.072	0.300	0.046	0.504	-0.065	0.349
Month Income	0.079	0.251	-0.015	0.832	0.019	0.786	-0.095	0.168	-0.052	0.547
Number of Siblings	0.056	0.422	0.125	0.69	-0.002	0.973	0.095	0.168	0.071	0.308
Gadgets used in Learning										

Learning Environment in a Pandemic

Cable tv	0.071	0.303	0.023	0.741	.178**	0.009	0.019	0.779	-0.048	0.492
Non-Cable Tv	0.022	0.747	0.015	0.833	0.024	0.728	-0.001	0.990	0.087	0.210
Basic Cellphone	0.090	0.192	0.085	0.219	-0.096	0.164	0.075	0.277	0.094	0.172
Smartphone	0.047	0.502	-0.041	0.551	0.110	0.112	-0.096	0.165	-0.022	0.755
Tablet	0.113	0.102	0.068	0.329	.144*	0.036	-0.031	0.654	0.084	0.224
Radio	0.058	0.403	.157*	0.023	0.076	0.271	-0.006	0.935	0.031	0.651
Desktop Computer	0.110	0.110	0.047	0.496	.143*	0.037	0.036	0.602	0.098	0.157
Laptop	0.126	0.067	0.089	0.197	.234*	0.001	-0.060	0.388	0.029	0.675
None	-0.059	0.391	0.014	0.836	-0.011	0.869	-0.015	0.834	-0.037	0.597

The findings show a substantial correlation between the age of the respondent, the characteristics of the learner, and the learning resources. The preference of students for particular sorts of online learning environments, particularly in terms of the types of learning resources employed, may be predicted by the student's age. For instance, older students have stated that they strongly prefer to watch videos of the professor lecturing, but younger students have stated that they prefer more interactive learning tactics (Simonds & Brock, 2014). Additionally, it demonstrates that there is a strong link between respondents' gender and the Learner's Support System. This supports Lino's findings, which were mentioned by Barcelona (2017) and revealed that gender had a substantial impact on pupils' math performance.

Regarding the technology utilized by the respondents, the results indicate that using cable TV as a learning resource has a substantial relationship to the learning environment in addition to other learning resources. Lessons from TV broadcasts are also utilized in this new learning environment or during a pandemic. Due to the strong correlation, learning environments can be improved by watching cable TV lessons. Countries used educational television during COVID-19, and a rapid reaction guidance note on using educational television programs during school closures was created. DepEd TV Channel - Lessons are broadcast on 207 television channels to all students around the nation. DepEd Commons - An online forum for public school teachers to encourage distance learning modes.

It is gleaned from the table that there is a significant relationship between using Tablets in the Learning Environment and Resources used in learning. This implies that using tablets as Resources in learning can promote an effective Learning Environment.

The result also shows that there is a significant relationship between using Desktop Computers and learning environments along with resources used in learning only and not significant to Learners' Characteristics, Assessments used by Teachers, Learners Support System, and E-learning. This result means that using Desktop Computers can promote an effective Learning Environment.

Lastly, using a Laptop has a significant relationship to the Learning Environment along with Learners' Characteristics and Resources in Learning. This implies that using laptops can greatly support students with learning difficulties, develop independence in students, help them master skills, and improve their proficiency as the major impacts of learning resources.

With the above significant relationships between using tablets, desktop computers, and laptops in the learning environment this means that students can improve Academic/Mathematics Performance by using the gadgets. The results revealed that the most popular tools used by learners throughout the pandemic were laptops (48.1%) and mobile phones (45.5%). However, only 2.5% of students used iPad tablets during the pandemic and just 3% used personal computers.

These gadgets facilitate communication and monitoring between teachers and students as if they were in the classroom. It is an easily accessible tool for students in terms of learning materials. For example, they can use tablets, desktop computers, and laptops to access E-learning. Gismalla et al. (2021) found that students strongly agreed it was necessary to close the university and use E-learning during the pandemic to control the spread of the virus. Thus, the majority of the students had a positive opinion of online learning using their gadgets. The main difficulties experienced by the students about online learning were a limited internet connection, a lack of familiarity with the online system, and technical support during exams.

Learning Environment in a Pandemic

Relationship Between the Level of Learning Environment and the Level of Mathematics Performance

Table 10. presents the level of Learning environment and the level of mathematics performance of the respondents.

Learning Environment	Mathematics Performance	
	Correlation Coefficient	p-value
Learners Characteristics	0.045	0.518
Assessment used in by the Teacher	-0.052	0.451
Resources used in Learning	0.172*	0.012
Learners Support System	0.118*	0.008
E-learning	-0.019	0.781

The correlation between the level of the learning environment and the level of mathematical performance is shown in Table 10. The computed correlation coefficient between learner characteristics and mathematics performance, which is 0.045, is less than the p-value of 0.518, as shown in the table. The outcome implies that there is no connection between the respondents' mathematics performance and their learner characteristics. This study suggests that learner characteristics, particularly in this novel learning environment, cannot affect their mathematics performance. This indicates that their attitude toward their studies in this new learning environment is insufficient to enhance their performance in mathematics. The majority of students had negative perceptions of the new learning environment. Bringula et al. (2021) assert that the transition to an educational environment had a detrimental effect on students' self-concepts in mathematics. More than 80% of the survey participants thought their math grades would be lower. Additionally, they have unfavorable ideas about how students see their abilities in mathematics, including their ability to comprehend lessons, solve problems, complete courses, do better than their peers or other students, and enjoy taking online classes. The new learning environment is still new to the students. On the other hand, students who have a positive self-concept in mathematics are more optimistic about passing the course, showing interest in learning, and performing well in the course as a whole. They are more likely to attend classes, complete assignments, assist their classmates with their assignments, remember lectures, and pass the course.

It also found that there is no significant relationship between the Assessment used by the Teacher and Mathematics Performance. Although students often receive feedback from assessments used by teachers, it does not guarantee that it will improve their Mathematics Performance of the students. Formative and summative assessments come after the lesson is discussed. In the new learning environment, there are no face-to-face discussions made therefore assessments were not as effective as when there's an explicit discussion made. Although students often receive feedback from assessments used by teachers, it does not guarantee that it will improve their Mathematics Performance of the students. Dargo & Dimas (2021) revealed that having no interactive relationship between the teacher and the learners will lead the learners to not be interested in learning and refuse to explore their potential on their own. Learners are not able to interact with their teacher to ask questions about their lesson which leads to a lack of processing of the module's content as well as a lack of explanation coming from the teacher. Some learners rely on the key answers included in their self-learning modules, so even errors were copied which gives teachers the thought that pupils aren't reflecting well on what they are studying. In that case, the teacher will no longer determine if the pupils understood the content of the module or if it is the work of the learners.

Lastly, as to E-Learning to Mathematics Performance, it was found that there is no significant relationship. This result is similar to the findings of Balbague et al. (2020) that there were no significant relationships between the effect of electronic gadgets, level of proficiency in the use of electronic gadgets, and study habits on academic performance. Learners are aware of the effects, yet responsive and educated about the ill effects of gadgets. The study of Baticulon et al. (2021) categorized the inability to understand the content of the course as a personal barrier to E-learning and showed that this is a pedagogical challenge rather than a personal problem. Bringula et al. (2021) found out that some online learners have physical learning space limitations which make online learning inconvenient. This limitation contributed to their low academic self-concept.

On the other hand, it was found that there is a significant relationship between Resources used in Learning and Mathematics Performance. This result implies that resources used in learning such as printed modules, technology, internet access, library resources, computers, and laptops are essential in the learning environment, and utilizing these could improve the Mathematics Performance of students. The significant relationship between Resources used in Learning and Mathematics Performances means that in this new learning environment, these are the only ways to be successful academically since traditional face-to-face teaching and learning is not possible. The more the Learning resources used the more improved the Mathematics Performance is.

Learning Environment in a Pandemic

According to Wanjala, Khaemba, and Sindabi (2010), the moves to competency and performance-based curricula are well supported and encouraged by emerging instructional technologies and aids, such curricula tend to require access to a variety of information sources like teaching and learning aids. This would enable learners to acquire the expected experience.

Aksan (2021) also revealed that students' perceptions agreed on using the modular distance learning approach (MDLA). It means the students had positive perceptions regarding MDLA in Mathematics. The study also revealed that students agreed that using the modular distance learning approach (MDLA) in Math has few challenges. It had also a positive effect on students' performance. Students performed very satisfactorily in Mathematics which means they had good quality performance.

Lastly, the result found that there is a significant relationship between Learners' Support System and Mathematics Performance. Parent support in a child's education is consistently believed to be positively associated with a child's academic performance. Children whose parents are more involved in their education have higher levels of academic performance than children whose parents are involved to a lesser degree. Since schools were forced to close during the pandemic, the learning environment shifted from traditional school settings to home learning, therefore Learners' Support systems from their parents are much needed especially in learning mathematics. The significant result means that the Learners Support System can improve the mathematics performance of the students.

IV. CONCLUSIONS AND RECOMMENDATIONS

The learning environment of the students in a pandemic is a great challenge. The learning environment for both the teachers and students needs to be considered in taking proper and appropriate action to implement in this new normal caused by the pandemic, especially in school setting. Knowing the learning environment and its effect on the mathematics performance of the students is an effective way to address and cater to the needs of the teachers and students in this new normal.

Based on the conclusions of the study the following are recommended:

1. Parents may prioritize the needs of their students by providing them with the resources that they need especially during pandemic times.
2. The learning environment of the students during the pandemic went through drastic change hence, it is recommended that parents and teachers assist them as they adjust from the normal before to the new normal at present.
3. To help the students improve their mathematics performance, teachers may provide supplemental and remedial activities that suit the needs of the students in the new normal or during a pandemic.
4. The proper use of gadgets in learning may be supervised by parents and teachers as this is one of the predictors of their mathematics performance.
5. Constant support from the parents is needed during a pandemic and in this new Learning Environment the students, hence parents, and other members of the support system must be aware of this great role.
6. A study may be conducted to include the other learning environments of the students during a pandemic and in the new normal to provide necessary assistance and support that cater to the needs of the students, especially in their mathematics learning.

REFERENCES

- 1) Hodges, C. B., Moore, S., Lockee, B. B., Trust, T., & Bond, M. A. (2020). The difference between emergency remote teaching and online learning.
- 2) Balog, N. (2018). Impacts of the Learning Environment on Developer's Progress. Accessed 4/10/2019 from <https://www.codingdojo.com/blog/impacts-of-the-learning-nvironment>,
- 3) Chukwuemeka, O. (2013). Environmental influence on academic performance of secondary school students in Port Harcourt Local Government Area of Rivers State. *Journal of Economics and Sustainable Development*, 4(12), 34-38.
- 4) Becton, L. (2017). Strategies for Building a Productive and Positive Learning Environment: Accessed 7/10/2019 from: <https://www.educationcorner.com/building-a-positive-learning-environment.html>
- 5) Bhamani, S., Makhdoom, A. Z., Bharuchi, V., Ali, N., Kaleem, S., & Ahmed, D. (2020). Home learning in times of COVID: Experiences of parents. *Journal of education and educational development*, 7(1), 9-26.
- 6) Garcia, M. T. T. (2020). The Development of a strategic intervention material in mathematics in the modern world. Unpublished Master's Thesis, Ilocos Sur Polytechnic State College, Sta. Maria, Ilocos Sur.
- 7) McGhee, D. E., Lowell, N., & Lemire, S. (2007). The classroom learning environment (CLE) questionnaire: Preliminary development. University of Washington Office of Educational Assessment.
- 8) Pat-El, R. J., Tillema, H., Segers, M., & Vedder, P. (2013). Validation of assessment for learning questionnaires for teachers and students. *British Journal of Educational Psychology*, 83(1), 98-113.

Learning Environment in a Pandemic

- 9) Naungayan, R. R. (2017). "TEEPS and SCOPE Program in the Secondary Schools of Banayoyo and Lidlidda". A Master's Thesis, ISPSC Sta. Maria, Ilocos Sur.
- 10) Escalona, Engelbert. (2015). Factors affecting the NCAE and mathematics performance of fourth year students of candon national high school. Unpublished masters' thesis, Ilocos Sur Polytechnic State College, Sta. Maria, Ilocos Sur.
- 11) Barcelona, M. P. (2017). Development of strategic intervention material for grade 10 students. Unpublished master's thesis, Ilocos Sur Polytechnic State College, Sta. Maria, Ilocos Sur.
- 12) Millan, R. B. (2018). Remediation activities in mathematics for grade 9 students. Unpublished masters' thesis, Ilocos Sur Polytechnic State College, Sta. Maria, Ilocos Sur.
- 13) Dagaylo-An, M. B., & Tancinco, N. P. (2016). Mathematics anxiety and the academic performance of the freshmen college students of the naval state university. *Int. J. Eng. Sci. Res. Technol*, 5, 1125-1136.
- 14) Alfawareh, H. and Jusoh, S. (2014). Smartphones usage among university students: Najran university case. Retrieved on December 22, 2021 from <https://bit.ly/3Gmqip0>
- 15) Pantaleon, A. (2022). Development and Validation of Instructional Material in Basic Calculus. *International Journal of Innovative Science and Research Technology*, ISSN - 2456-2165, PP :- 228-232. [https://ijisrt.com/assets/upload/files/IJISRT22MAY490_\(1\).pdf](https://ijisrt.com/assets/upload/files/IJISRT22MAY490_(1).pdf)
- 16) Itorralba, M. (2022). Research Based Articles towards Professional Development. Retrieved on July 5, 2020 from https://simplyeducate.me/2022/06/29/k12education/?fbclid=IwAR3Y1R1XpTKoqfd1aUCKxjla0Mkt9oaQyQhyyzJlpKcsJ1N9bTRTX_e4TIY
- 17) Fine, P. D., Leung, A., Tonni, I., & Louca, C. (2022). Teachers' feedback practices in COVID-19: Has anything changed?. *Journal of dentistry*, 120, 104087. <https://doi.org/10.1016/j.jdent.2022.104087>
- 18) Ampofo, J. A. (2020). Teachers feedback and its impact on students academic performance in Ghana: A case study of New Edubiase Senior High School. *International Journal of Applied Research in Social Sciences*, 2(6), 166-186.
- 19) Rahayu, S., Rahmadani, E., Syafitri, E., Prasetyoningsih, L. S. A., Ubaidillah, M. F., & Tavakoli, M. (2022). Teaching with Technology during COVID-19 Pandemic: An Interview Study with Teachers in Indonesia. *Education Research International*, 2022.
- 20) Daniela, L., Rubene, Z., & Rüdolfa, A. (2021). Parents' perspectives on remote learning in the pandemic context. *Sustainability*, 13(7), 3640.
- 21) Mau Kasi, Y. E., Suparno, S., & Asib, A. (2021). Parents' Involvement in Students' Academic Achievement in Distance Learning Process During the Pandemic of Covid-19. *Randwick International of Education and Linguistics Science Journal*, 2(1), 76-88. <https://doi.org/10.47175/rielsj.v2i1.202>
- 22) Maatuk, A. M., Elberkawi, E. K., Aljawarneh, S., Rashaideh, H., & Alharbi, H. (2022). The COVID-19 pandemic and E-learning: challenges and opportunities from the perspective of students and instructors. *Journal of Computing in Higher Education*, 34(1), 21-38.
- 23) Mahyob, M. (2020). Challenges of e-Learning during the COVID-19 Pandemic Experienced by EFL Learners. *Arab World English Journal (AWEJ)*, 11(4).
- 24) Jellicoe, M., and Forsythe, A. (2019). The Development and Validation of the Feedback in Learning Scale (FLS). *Front. Educ.* 4, 84. doi:10.3389/educ.2019.00084
- 25) Sunga, E.T. (2015). "Determinants of Mathematics Performance of the Fourth Year Students in Public Secondary Schools in Pinamalayan". Retrieved on December 15, 2020 from <https://bit.ly/3wKu47o>
- 26) Dandin, R. D. (2019). "Mediating Role of Self-Efficacy on Mathematics Anxiety and Performance of Grade 7 Students". Unpublished Master's Thesis, Ilocos Sur Polytechnic State College, Santa Maria, Ilocos Sur.
- 27) Simonds, T. A., & Brock, B. L. (2014). Relationship between age, experience, and student preference for types of learning activities in online courses. *Journal of Educators Online*, 11(1), n1.
- 28) Gismalla, M. D. A., Mohamed, M. S., Ibrahim, O. S. O., Elhassan, M. M. A., & Mohamed, M. N. (2021). Medical students' perception towards E-learning during COVID 19 pandemic in a high burden developing country. *BMC Medical Education*, 21(1), 1-7.
- 29) Bringula, R., Elon, R., Melosantos, L., & Tarrosa, J. R. (2019). Teaching agile methodology through role-playing: What to expect and what to watch out. In *Proceedings of the 2019 3rd international conference on education and multimedia technology* (pp. 355–359). New York, NY: Association for Computing Machinery.
- 30) Dargo, J. M., & Dimas, M. (2021). Modular Distance Learning: Its Effect in the Academic Performance of Learners in the New Normal. *JETL (Journal of Education, Teaching and Learning)*, 6(2), 204-208

Learning Environment in a Pandemic

- 31) Balbagueio, L. B., Bantillo, M. M., Magabolo, N. J., Borres, E., Capuslanan, M., Jabagat, R., ... & Muyco, V. I. B. (2020). Effects of Electronic Gadgets in the Academic Performance of Senior High School Students. Kenneth Ron and Bantillo, Mary May and Magabolo, Noli John and Borres, Ella and Capuslanan, Marlon and Jabagat, Renaleen and Panes, Jerson M. and Panes, Mary Rose and Muyco, Vincent Ian B., Effects of Electronic Gadgets in the Academic Performance of Senior High School Students (November 24, 2020).
- 32) Baticulon, R. E., Sy, J. J., Alberto, N. R. I., Baron, M. B. C., Mabulay, R. E. C., Rizada, L. G. T., Tiu, C. J. S., Clarion, C. A., & Reyes, J. C. B. (2021). Barriers to online learning in the time of COVID-19: A national survey of medical students in the Philippines. *Medical Science Educator*, 31, 615–626.
- 33) Bringula, R., Reguyal, J. J., Tan, D. D., & Ulfa, S. (2021). Mathematics self-concept and challenges of learners in an online learning environment during COVID-19 pandemic. *Smart Learning Environments*, 8(1), 1-23.
- 34) Wanjala, M. S.; Khaemba, E. & Sindabi, O. (2010). The Role of Ict in Higher Education for the 21st Century: Ict a Change Agent for Education. In *Kenya Journal of Education Planning, Economics & Management*. 2, 109-116
- 35) Aksan, J. A. (2021). Effect Of Modular Distance Learning Approach To Academic Performance In Mathematics Of Students In Mindanao State University-Sulu Senior High School Amidst Covid-19 Pandemic. *Open Access Indonesia Journal of Social Sciences*, 4(4), 386-409. <https://doi.org/10.37275/oaijs.v4i2.64>



There is an Open Access article, distributed under the term of the Creative Commons Attribution – Non Commercial 4.0 International (CC BY-NC 4.0) (<https://creativecommons.org/licenses/by-nc/4.0/>), which permits remixing, adapting and building upon the work for non-commercial use, provided the original work is properly cited.