



Research Article

Learner’s Difficulty and Coping Mechanisms in Mathematics under Modular Distance Learning

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ABSTRACT

The COVID-19 pandemic transformed the educational landscape. MDL was the most preferred modality by learners, yet this exposed difficulties in studying Mathematics independently. This study covered 164 Grade 9 learners of Cuenca NHS for the SY 2021-2022, which were randomly sampled. A mixed-method research design was used. A researcher-made questionnaire was administered through Google Forms as the main data-gathering tool. Responses were sorted, tabulated, and summarized using tables. Statistical treatments applied were frequency, mean, standard deviation, and chi-square. It was found that learners have a moderate extent of difficulty in learning resources (LR) and learning support (LS) but a slight extent of difficulty with a learning environment (LE) and learning motivation (LM). Coping mechanisms of learners during MDL include utilizing online sites, maximizing safe and secure spaces around the house, having internal motivation to improve their Mathematical skills, and asking for help from immediate family members. There is a significant relationship between coping mechanisms for LR and LE and difficulties encountered with LR, LE, LM, and LS. In addition, a significant relationship was unearthed between coping mechanisms for LM and difficulties encountered with LR, LM, and LS. However, there was not a significant relationship between coping mechanisms for LM and the difficulties encountered with LE. There is a significant relationship between coping mechanisms for LS and the difficulties encountered with LR, LE, LM, and LS. With these, recommendations are embedded in an action plan that aims to aid the learners in dealing with their difficulties and maximize their coping mechanisms to improve their academic performance further while under MDL.

INTRODUCTION

The Corona Virus Disease (COVID-19) pandemic transformed the educational landscape into a new phase and brought about a lot of challenges and opportunities. The shutdown of schools forced learners to adapt to new ways of learning.

The Department of Education, through DepEd Order No. 12 s. 2020, introduced the Basic Education Learning Continuity Plan (BE-LCP). This plan includes four learning modalities that learners may adapt depending on their capacity and alert level of

their place. Schools in areas with no COVID-19 cases were allowed to continue with face-to-face learning, while the rest had three other options: modular distance learning (MDL), online distance learning (ODL), and blended learning.

Modular distance learning, which maximizes the utilization of modules, is the most preferred modality by learners in the Philippines (Malipot, 2020). Although this modality limits the interaction between teachers and students, it allows the conduct of



teaching-and-learning in a remote setup (Magsambol, 2020). These self-learning modules are in printed or digital format (Llego, 2020).

Each module contains objectives, experience, and activities following sequential and logical completion that aims to help the learners achieve the learning competencies and develop sufficiency based on self-learning speed (Alelaimat & Ghoneem, 2012). It also includes sections for motivation and assessment based on the Most Essential Learning Competencies (MELCs) (Manlangit et al., 2020).

Modules become tools that help learners to become more self-sufficient in their learning (Taufikurrahman et al., 2021) as quality learning experiences do not occur only within the four walls of the classroom but at any time and from any location (Pentang, 2021). However, modules are not substitutes for teachers (Estrada, 2021). Teachers' role is the supervision of learners' progress, provide feedbacks, and give remediation or enrichment activities when needed (Manlangit, et al., 2020).

According to Charles (n.d.), the MDL approach in Mathematics was proven to be an effective and efficient tool in helping learners to learn the subject independently. This is helpful for learners with high academic ability as they become active in the discussion process. In addition, it also aids those learners with poor mathematical background and who lack motivation (Jazim & Rahmawati, 2017; Balderas, 2012). These are advantageous for Mathematics as it is seen as the most difficult learning area due to its abstract nature (Malik, 2012; Alcantara, 2015; Lim, 2016)

even before the pandemic.

In grade 9 mathematics, learners submit diaries on a weekly basis as part of their requirements for their quarterly portfolio. These contain their comments, suggestions, questions, and their experiences when answering the activities and performance tasks. As observed by the researchers and based on their journal entries, learners are having difficulty with the subject matter but have made efforts to compensate for it. They also have sentiments on improving the lesson through the aid provided by their learning supports.

Although, MDL was found to have a positive effect on learners in Mathematics, it cannot be denied that learners struggle with it. Hence, this paper was formulated. This paper aims to identify the difficulties encountered by the learners in mathematics under modular distance learning and the coping mechanisms that they utilized. An action plan was the output of the study to address the problem.

Modular Distance Learning. The Department of Education listed the available learning modalities that learners can adhere to when they enroll during the pandemic based on DepEd Order No. 12 s. 2020, which introduced the Basic Education Learning Continuity Plan. The most common modality parents and guardians chose was Modular Distance Learning (Dangle & Sumaoang, 2020; Cos et al., 2021; Manlangit et al., 2020). In this mode, interaction takes place between the teacher and the learners who are geographically apart from each other during instruction through a non-traditional face-to-face setup (Magsambol, 2020). It utilizes self-learning modules (SLM) based



on the most essential learning competencies (MELCS) provided by DepEd in print or digital format (Llego, 2020; Manlangit, et al., 2020). Moreover, MDL is a method of teaching based on building up skills and knowledge on measurable units through SLMs that self-instructional and with clearly defined objectives (Sejpal, 2013).

Modular instruction is an alternative instructional design that uses instructional materials developed to address the needs of the learners. It provides interesting and challenging activities to help learners maintain focus and be engaged in learning the concepts presented in the module. In this way, modular instruction encourages independent study and develops a sense of responsibility in learners to complete required tasks. With little or no assistance from the teacher, the learners progressed independently (Nardo, 2017). This modality increases the student-centered approach to learning (Ambayon, 2020).

Sejpal (2013) listed the advantages of MDL. First, learning becomes more effective. Second, it establishes a system of assessment other than marks or grades. Third, learners study in their own working environment. Fourth, learners can study without disturbing their normal duties and responsibilities. Fifth, it offers flexibility so that implementation can be made by various patterns. Sixth, it can be administered to a single-use of small groups or large groups. Seventh, it is more appropriate to mature students and demands smart classrooms. Eighth, it enables the learners to have control over their learning. Ninth, accept greater responsibility for learning. Lastly, it is economical to use.

Difficulties in Mathematics under Modular Distance Learning. Despite its effectiveness, MDL also presented challenges to teachers, students, and parents.

Galano (2021) found out that the teachers had managed to prepare for the printed modular distance learning before the formal opening of classes. However, the circumstances were difficult as this modality required them to go through tough preparations. They faced challenges like stress (Hidalgo-Andrade et al., 2021; Flack et al., 2020; Hamilton et al., 2020), incomplete and unanswered modules (Cabardo et al., 2022), knowledge and skills needed in the delivery of distance learning education (Alea, et al., 2020; Cabardo et al., 2022), parental roles on distance learning (Agaton et al., 2021; Cabardo et al., 2022), availability of resources (Robosa et al., 2021), students' difficulties in following instruction (Flack et al., 2020; Hamilton et al., 2020; Agayon et al., 2022), time for the implementation of competencies (Arrieta, 2020), and loss of interest among students (Chan et al., 2021). These problems, if not addressed properly, could significantly impact the academic behavior and performance of the students according to Agarín (2021).

Dangle & Sumaoang (2020) found that learners enrolled in Modular Distance Learning had the greatest difficulty with Mathematics. In addition, most Math problems are very difficult to solve and have less to no detailed explanation provided; hence, it requires essential learning resources for quality learning (Panganiban & Madrigal, 2021). Time is also their problem, as only so much can be accomplished with only one week of instruction (Martin & Furey, 2018;



Jayani, 2021). Although distance learning seemed to be a viable substitute for face-to-face classes, not all students gain equally (Tomasik et al., 2021). Also, the language barrier was another problem for the learners (Panganiban & Madrigal, 2021). They also lack the opportunity to learn mathematics with and from their peers (Kalogeropoulos et al., 2021). Moreover, household chores consumed most of their time (Claro, 2021). A polluted environment with loud noises also negatively affects their cognitive abilities (Diacio, 2014; Elastika et al., 2021). These problems can lead to learners' low motivation, math anxiety, and poor understanding of how to apply and perform mathematical operations (Serra et al. 2021).

Parents, on the one hand, experience difficulties supporting their children's studies due to a lack of knowledge and abilities on the subject matter (Martineau et al., 2020). In addition, they have chores that consume most of their time (Cabardo et al., 2022). However, San Jose et al. (2021) emphasized that due to the COVID-19 pandemic, parents are asked to extend their maximum support to their learners especially in answering their learning modules.

Modular distance learning is very challenging for students and teachers, especially in teaching and learning mathematics subjects, because knowledge and skills are needed. Additionally, throughout the pandemic, there was a decrease in the performance of students in mathematics (Contini et al., 2021)

Coping Mechanism for Difficulties Encountered in Distance Learning. The coping mechanism refers to how people respond to and interact with

problem situations (Baqutayan, 2015). The following are recommendations for teachers, learners, and parents/guardians as part of their coping mechanisms in MDL.

First is time management (Castroverde & Alcala, 2021). Heath and Shine (2021) mentioned that time management is a challenge for teachers conducting remote and online learning as they are adjusting, and their knowledge and skills are not yet fully developed for such a modality. For learners, it is recommended to plan their activities to maximize their time studying the lessons and answering the learning tasks.

Second is regular communication with parents and learners. This provides a view of the learners' status. This is helpful both for teachers and learners. De Leon (2021) emphasized for consistent communication between teachers and other stakeholders in the effective implementation of MDL, as parents now serve as learning coaches and facilitators (Malipot, 2020).

The third is on reskilling and upskilling educators (Castroverde & Alcala, 2021). The provision of trainings and capacity building for teachers equates to better learning experiences for learners. They must be trained to be more acquainted with the teaching process under MDL. Moreover, they must acquire the knowledge and skills to give intervention to students when they encounter difficulties. This also aids the learners in the long run. Reimers et al. (2020) asserted the need to train and upskill teachers in the current modality to ensure that their pedagogical content knowledge would be responsive to the need of the learners in this new normal.



Fourth is the utilization of blended learning (Castroverde & Alcalá, 2021). Blended learning transformed the classrooms into one that can engage the learners effectively (Jones, 2019).

Fifth, provision of aid through home visitation. As learners were forced to study independently, they must also be provided with other learning resources and support. Teachers are tasked to supervise, facilitate, guide, and supervise students' learning. Without the teachers, learning would not be totally achieved (Roman, 2021).

Sixth is the utilization of supplementary video materials. Video lessons help learners in understanding the mathematics concepts complementing lessons in the modules. Moreover, they enjoyed watching the teacher-made videos since they see the teacher explaining the lesson. However, the students suggested having regular posting of videos with more examples and explanations having a clear and loud voice of the teacher.

These are but a few of the recommendations for the teachers, parents, and learners to cope with the new modality. However, learners are at the forefront of this massive change in the educational landscape. They are the ones that needs more help.

While MDL positively affect learners in their academics, their struggles are still around. With that, this paper was formulated. This study generally aims to identify the difficulties encountered by the learners in mathematics under modular distance learning and the coping mechanisms that they utilized.

Specifically, this study seeks to answer the following questions:

1. What is the extent of difficulty experience by the learners under Modular Distance Learning in terms of:
 - 1.1. learning resources;
 - 1.2. learning environment;
 - 1.3. learning motivation; and
 - 1.4. learning support/aide?
2. What are the learner's coping mechanism to face the difficulties of Modular Distance Learning under the four areas?
3. Is there a significant relationship between the difficulties faced by the learners and their coping mechanisms?
4. What output can be extracted from this study?

MATERIALS AND METHODS

The study covered 164 Grade 9 learners of Cuenca National High School for the school year 2021-2022. These learners were taken through random sampling.

This study utilized a convergent mixed method research design in dealing with the issue. This design was appropriate in this study as it is a one phase design where both quantitative and qualitative data collected and analyzed were compared to see if the data confirmed or disconfirmed with each other (Creswell & Creswell, 2018).

The confidentiality of the respondents and their responses was primarily considered by undergoing the process of seeking permission from the School Head for conducting the study, parents for allowing their



children to participate, and the learners for partaking in the study. Learners are given the choice to opt out in the study. Their data and responses are treated under Data Privacy Act of 2012.

The study utilized a researcher-made questionnaire. The researcher used a two-part questionnaire as an instrument for data gathering which was answered individually. The first part deals with the extent of difficulties the learners encounter in four areas of education. Part II involves open-ended questions about their coping mechanisms. In constructing the questionnaire, various reading materials were consulted. These ideas are put into the questionnaire to come up with a questionnaire that is aligned with the research questions and is more contextualized. The questionnaire underwent face validation by the head of the Mathematics Department and the Mathematics coordinator. Its reliability was checked during pilot testing. It results in a Cronbach alpha of 0.91, interpreted as excellent. The questionnaires were administered through a Google form. Permission was sought from the school head, advisers, parents, and learners. Upon approval, links were provided.

The data gathered were sorted, tabulated, and summarized using tables. Statistical treatments applied were frequency, mean, standard deviation and chi-square.

RESULTS AND DISCUSSION

This section shows the results of the study and their corresponding interpretation and discussion.

Table 1. Extent of Difficulty Experience

	Areas of Education	Composite Mean	SD	VI
1.	Learning Resources	2.93	0.95	ME
2.	Learning Environment	2.30	1.01	SE
3.	Learning Motivation	2.40	0.93	SE
4.	Learning Support/Aide	2.61	0.95	ME

Legend: VI – verbal interpretation
 GE – Great extent
 ME – Moderate Extent
 SE – Slight Extent

Table 1 shows the extent of difficulty experienced by learning mathematics in the areas of education. A moderate extent of difficulty is seen in learning resources and learning support/aide. This means they are having trouble with the available learning resources and support. This includes all learning materials and individuals that help the learners in their studies. Additionally, Table 1 shows slight difficulty with the learning environment and learning motivation. This implies that learners experience less difficulty studying at home and having the drive to learn.

Based on the responses to the open-ended questions on learning resources, 110 learners (67%) depended greatly on online sites and tools like Google, YouTube, and other educational platforms available. For their preferred learning environment, 80 learners (49%) wanted to study or conduct performance tasks in areas around their house that are due to the presence of COVID-19. Meanwhile, the learning motivation of 65 learners (40%) was on improving Mathematical skills. This implies an internal motivation to deal with Mathematics. On learning support, 84 learners (51%) asked help from immediate family members.

Table 2. Relationship between Difficulties Encountered and Coping Mechanisms in Each Areas of Education

	Variables combined	X ²	p	VI
1.	Difficulties encountered with	60.515	.000	Sig.



	and Coping Mechanism for Learning Resources			
2.	Difficulties encountered with Learning Resources and Coping Mechanism for Learning Environment	14.641	.023	Sig.
3.	Difficulties encountered with Learning Resources and Coping Mechanism for Learning Motivation	22.141	.001	Sig.
4.	Learning Resources and Coping Mechanism for Learning Support/Aide	39.817	.000	Sig.
5.	Learning Environment and Coping Mechanism for Learning Resources	38.723	.000	Sig.
6.	Learning Environment and Coping Mechanism for Learning Environment	40.657	.000	Sig.
7.	Learning Environment and Coping Mechanism for Learning Motivation	9.702	.138	Not
8.	Learning Environment and Coping Mechanism for Learning Support/Aide	28.641	.004	Sig.
9.	Learning Motivation and Coping Mechanism for Learning Resources	58.050	.000	Sig.
10.	Learning Motivation and Coping Mechanism for Learning Environment	15.595	.016	Sig.
11.	Learning Motivation and Coping Mechanism for Learning Motivation	18.980	.004	Sig.
12.	Learning Motivation and Coping Mechanism for Learning Support/Aide	47.882	.000	Sig.
13.	Learning Support/Aide and Coping Mechanism for Learning Resources	47.543	.000	Sig.
14.	Learning Support/Aide and Coping Mechanism for Learning Environment	49.218	.000	Sig.
15.	Learning Support/Aide and Coping Mechanism for Learning Motivation	23.417	.001	Sig.
16.	Learning Support/Aide and Coping Mechanism for Learning Support/Aide	35.512	.000	Sig.

Legend: VI – Verbal Interpretation Sig. – Significant
 Not – Not Significant

It can be gleaned from Table 2 that the extent of difficulty in all areas of education shows a significant relationship with the coping mechanism of the

learners in all areas which implies that the difficulties that were being encountered by the learners are being utilized in crafting their coping mechanism. However, difficulties encountered in the learning environment are not significant with the coping mechanism for learning motivation. This implies that the challenges they have in the place where they study have nothing to do with their learning motivation.

CONCLUSION AND RECOMMENDATIONS

Considering the foregoing results, the following conclusions were drawn.

Learners have a moderate extent of difficulty learning resources (LR) and learning support/aide (LS). They have trouble answering and accomplishing the tasks given to them and have fewer people helping with the lessons. Meanwhile, a slight extent of difficulty with learning environment (LE) and learning motivation (LM) was found. They see little problem with the environment and are motivated to learn and do math under MDL.

Learners cope with the difficulty with LR through the usage of online sites such as Google and YouTube. Additionally, they cope with the difficulty on LE by studying in the areas around the house under safety and security. Furthermore, learners were internally driven by their desire to improve their skills in Mathematics, serving as their LM. Moreover, immediate family members were consulted as LS.

Significant relationships were found between coping mechanisms for LR, LE, LM and LS and difficulties encountered with LR, LE, LM and LS. However,



LE and LM have no significant relationship.

Considering the foregoing results, the following are hereby recommended:

1. Learners must be supported in dealing with the tasks in Mathematics under LR. Their coping mechanisms for LR are through online sites which can be maximized, too.
2. With less difficulty with learning environments, there is not much need to dwell on this, but parents can be tapped to provide more conducive learning spaces as learners' choice of the study area is within their home, too.
3. There is low difficulty with motivation for the learners this might be due to their innate desire to do well in Mathematics. This is a nice resource to tap into and maximize for them to do better too in their assessment.
4. There is a difficulty with LS as learners have no known people to call for help in Mathematics, although they prefer to ask for help from their immediate family. With that, a learning support packet can be created for those family members that acts as supports in this kind of learning modality.
5. With most difficulties encountered in Mathematics under MDL being significantly related to the coping mechanisms of the learners, tapping those coping mechanisms to deal with difficulties might help ease the burden of this modality among learners, parents, and teachers. With that, Project ADMIRAL is recommended.

ACTION PLAN

Grade 9 Mathematics aims to aid the learners in dealing with their difficulties and maximize the coping mechanisms that they utilize to further improve their academic performance under MDL. This will be attained through:

Project ADMIRAL

(Alleviating Difficulties in Mathematics through Independent and Responsible Action for Learning)

This project is based on the salient findings of the study with focus on the moderate extent of difficulty in Mathematics and the successful coping mechanisms that they utilized. When it comes to LR, online resources will still be maximized but with some addition of offline resources for those who are in capable of accessing such online sites. For LE, parents and guardians are to be guided on provision of conducive home learning environment. For LM, learners are to undergo short motivational seminars to help them acquaint, love, and learn Mathematics. For LS, a committee will be designated to aid the learners in dealing with their queries on the subject. Details of the project is presented on the following table.

KRA	Activity Title	Objectives	Activities	Persons Involved	Time Frame
	Project Orientation	<ul style="list-style-type: none"> ▪ Orient the key partners, members, and participants of the project 	<ul style="list-style-type: none"> ▪ Orientation on the project's activities, tasks, and timeline 	<ul style="list-style-type: none"> ▪ Project Leader ▪ School Head ▪ Teachers ▪ Parents ▪ Learners 	Aug 2022
Learning Resources	Learning Resources for All Modalities	<ul style="list-style-type: none"> ▪ Craft/Designate a database (online and offline) of learning resources that learners may need 	<ul style="list-style-type: none"> ▪ ONLINE: Create a unified website for all learning resources ▪ OFFLINE: Have a 	<ul style="list-style-type: none"> ▪ Project Leader ▪ School Head ▪ Teachers ▪ Parents ▪ Learners 	Year Round



		<ul style="list-style-type: none"> Maximize online sources (DepEd prescribed sites) and learning resource center (library) in acquiring LRS 	working library system		
Learning Environment	Conducive Home Learning Environment	<ul style="list-style-type: none"> Create or adopt a webinar on conducive home learning environment Collect data on learning space 	<ul style="list-style-type: none"> Conduct a short webinar on conducive home learning environment Collect narrative reports on learning space 	<ul style="list-style-type: none"> Project Leader School Head Teachers Parents Learners 	Aug 2022
Learning Motivation	Motivation: Innate and In Action	<ul style="list-style-type: none"> Conduct webinar sessions about motivations for mathematics education Discuss independent learning 	<ul style="list-style-type: none"> Webinar for motivation in Mathematics Webinar on independent learning 	<ul style="list-style-type: none"> Project Leader School Head Teachers Parents Learners 	Year Round
Learning Support/Aide	Alliance for Learning	<ul style="list-style-type: none"> Designate working committee for inquiries and help for Mathematics 	<ul style="list-style-type: none"> Working Facebook page, group or contact person that could answer queries and provide aid to learners 	<ul style="list-style-type: none"> Project Leader School Head Teachers Parents Learners 	Year Round
	Project Evaluation	<ul style="list-style-type: none"> Evaluate the project implementation 	<ul style="list-style-type: none"> Evaluation on the project's activities, tasks, and timeline 	<ul style="list-style-type: none"> Project Leader School Head Teachers Parents Learners 	July 2023

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