

# HOW DO MATH TEACHERS HELP THEIR STUDENTS LEARN FROM THE FOUR LEARNING DELIVERY MODALITIES?

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## Abstract

*This qualitative case study aims to provide potential inputs for improving instruction in mathematics based on the participant-teachers' experiences in the use of the four learning delivery modalities, which are: (1) Online Distance Learning, (2) Modular Distance Learning, (3) Radio/TV-based Instruction, and (4) Blended Learning during the rise of the COVID-19 pandemic. Specifically, the study considered the arising issues about the learning delivery modalities, the teachers' practices, and recommendations of the 19 selected junior high school mathematics teachers from a large school in Pampanga, Philippines, who consented to participate. Findings show that foremost of the challenges encountered by the participant-mathematics teachers in implementing the distance learning modalities were adjustments to paradigm shift in teaching, imbalanced quality control, and difficulty in establishing rapport. Many issues arose as a result of the abrupt move from face to face learning to distance learning. One is the difficulty in dealing with problems related to the modules, which was a key source of concern for teachers. It is due to the lack of time to complete the modules considering the complex nature of Mathematics as a subject area. Also, insufficient educational resources pose a huge concern as this inhibits the teaching-learning process, particularly communication. The range of data obtained has given a relative portrait of the teachers' experiences, arising issues, challenges faced, and suggestions for improving the instruction in the new normal. Mathematics teachers help their students learn from the four learning delivery modalities by using tested teaching practices, innovative strategies, and coping mechanisms. Banking on this experience of difficulties, participants suggest utilizing appropriate practices and strategies to deal with the challenges experienced in teaching mathematics which were generalized as distance learning implications. These are applicable methods and motivation, continuous professional growth, and proper monitoring and evaluation. Participants also wished that the government will provide relevant educational resources and Mathematics teacher training through funding and financial sustainability.*

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**Keywords:** *delivery modality, distance education, COVID-19, mathematics, challenges, implications, advancements*

## INTRODUCTION

The COVID-19 pandemic had caused a tremendous impact on education. Schools were closed, and teachers were faced with the task of establishing alternative pedagogies, including using different learning modalities to educate at a distance (Tria, 2020). UNESCO disclosed that the closing of schools to curtail the spread of the virus worldwide had impacted around 1.6 billion students. This pandemic is a uniquely adaptable and transformative challenge for teachers, with no pre-determined playbook to guide proper responses. As the pandemic progresses, education leaders must create replies quickly — and with specific circumstances in mind.

Globally, countries are enacting measures to reduce the number of people congregating in public places as the COVID-19 pandemic progresses. The usual operation of schools and universities has been affected because of such initiatives. Since it is predicted to remain in some areas until a vaccine is developed, educational administrators have devised alternate alternatives for students and teachers to complete their responsibilities if they cannot attend school. They are figuring out how to make it safer to work in schools. Although stakeholders with access to digital devices and the internet may not constitute most countries, assisting governments in establishing effective forms of online education will free up institutional capacities and resources. It is allowing them to provide alternative learning modalities for those who do not have such opportunities. However, several challenges in education were encountered during the implementation of these alternative modalities.

In the United States, the common challenges schools face in distance learning are resources and internet access. As a result, it eventually widened the gap between students who have ready access to a device and those who do not have access to the Wi-Fi needed to interact with their teachers (ABC News, n.d.). In Australia, many people are concerned that the pandemic would increase the technology gap in education (Lalani & Li, 2020). The abovementioned is considered a barrier in utilizing distance learning modalities and achievement of learning competencies because of the current resource limitation.

Locally, the Philippines had also transitioned to distance education from a traditional setting of instruction. The Department of Education (DepEd) is working to find ways to provide quality education while also maintaining students' health, safety, and well-being, teachers, and school staff during COVID-19 (DepEd, 2020). The specific program suggested by DepEd is a formulation of the so-called Basic Education Learning Continuity Plan (BE-LCP) to ensure learning continuity despite the pandemic, in line with the President's desire that children's protection is the top priority (Abad, 2020).

One of the programs planted by the DepEd in this pandemic is implementing the Learning Delivery Modality (LDM) Course in the school year 2020-2021. This LDM Course aims to enhance and strengthen the preparedness of the education system, teachers, and school leaders in using different learning modalities. The LDM provides and identifies a road map of the learning resources needed for each category of distance learning delivery modalities (DLDM). The four types of distance learning modalities implemented in the Philippines are namely: (1) Modular Distance Learning (MDL), (2) Blended Learning (BL), (3) Online Distance Learning (ODL), and (4) TV-based/Radio-based Instruction.

In addition, the Programme for International Student Assessment (PISA) 2022 intends to analyze mathematics in a world that is fast changing due to new technologies and trends, in which citizens are creative and involved, making non-routine judgments for themselves and the society in which they live (PISA). Teachers can present new teaching and learning techniques to their colleagues to develop connections, build relationships, and monitor if these new techniques improve student progress. Educators gain confidence in their virtual teaching abilities while students adjust to their new learning environment.

In response, the school as an academic institution and as a laboratory of learning hones the potentialities and capabilities of learners for them to succeed in life's trials or challenges. As the UN High Commission for Refugees Special Envoy, Angelina Jolie, said, "We must speed up the ways we share experience, and help the most vulnerable, whether or not they have internet access." As the world deals with the extraordinary experience of living through the COVID-19 pandemic, the rebirth of using distance education in this time of pandemic causes many issues, concerns, and problems in delivering quality education (Webster & Whitworth, 2017; Basilia & Kvakadze, 2020). The philosophy of distance education is to showcase the values of different strategies to remove barriers in learning despite other circumstances (Terryleep, 2011).

As a result, teachers had to adapt their teaching strategies for lessons that occasionally occur online during the coronavirus outbreak. One of the most challenging subjects to handle is using online instruction in Mathematics. It is also the topic in which students appear to be falling behind the most. The idea of effective mathematics learning, in any case, is being challenged given across the board globalization. Developing mathematics involvement and achievement at the upper secondary level is a considerable focus amongst education systems worldwide (Noyes et al., 2016).

According to Webster and Whitworth (2017), distance education has been a model of teaching and learning for many years. It is not a modern paradigm in any way. Distance learning is described by Punzalan (2020) as a method of study in which teachers and students do not meet in a conventional setting but instead use technology, the internet, and other instructional materials.

However, teachers and students have faced several issues and challenges since distance learning began (Tria, 2020). They experienced tension, frustration, overwhelm, and other emotions (Marek et al., 2021). Locally, everyone has tried to maintain access to education through the availability of distance learning. Regrettably, the poorest can rarely access the technology solutions with the highest learning potential (Kim et al., 2020). Considerably, educational modalities are a critical issue for teachers; they should be aware of their student's needs and how they use their respective ways to learn. Therefore, different learning modalities influence the delivery of quality education in both the private and public sectors.

The learning modality used in the Philippines is mainly Modular Distance Learning (MDL). It is designed for students who do not have access to the internet. Printed or Digital Modules (PDM) are delivered to learners' homes or picked up by their parents or guardians at specific locations at pre-determined times. Learning packets are referred to as printed modules (worksheets, activity sheets, self-learning materials). The learning modules are electronic format, including interactive and inclusive e-books, courseware, and other offline content types.

Radio/TV-Based Instruction (R/TVI) is another modality used in public schools complementing modular. It is a learning modality that employs television or radio to educate. It entails modular development, in which the teacher prepares the lesson and script for TV broadcasting in the case of TV-Based Instruction (TBI). Also, the speech and scriptwriting for radio broadcasting in Radio-Based Instruction (RBI) before live broadcasting or pre-recording the lesson scripts. The students watch and listen to the broadcast lessons at home. Parents observe their children's work and provide comments to the teacher via phone calls or home visits. They may submit the completed task to the teacher through the barangay, community learning center, or any other available delivery support.

However, only learners and teachers with electronic devices that involve internet connections for Online Distance Learning will benefit from this mode. The DepEd Learning Portal and other DepEd-authorized learning management systems or platforms host learning resources such as the DepEd commons; Microsoft Teams, Google Classroom, Zoom, Edmodo, and Moodle. Synchronous is applied to various forms of television, digital, and online learning where students learn from teachers in real-time but do not need to be physically present. In contrast, asynchronous is self-directed and self-paced, requiring all learners to not be virtually present.

Another modality is Blended Learning. This type of learning delivery combines face-to-face instruction with Modular Distance Learning, Online Distance Learning, and Television/Radio-Based Instruction, or a combination of the three. Blended learning will allow schools to reduce the number of individuals outside the house at any given moment while also limiting face-to-face learning.

As schools pursue their mission of delivering quality education with different distance learning modalities, many teachers cannot meet the demands of the new education system. Thus, mathematics teachers must meet the needs and situations of students when considering Learning Delivery Modality (LDM) as part of the modern education system despite the change from conventional learning to distance learning (DepEd, 2020).

These LDMs have seen a significant impact in bringing effective teaching and learning. It has been observed as one of the effective methods teachers can use in teaching at a distance. Thus, it is essential to emphasize in dealing with the quality and adequacy of these modalities. The effectiveness of these modalities can also be seen through their effective utilization.

According to Carreon (2018), advancing 21st-century abilities requires the spread of interactive learning resources and the integration of contextualized pedagogy. The online class becomes an extension of the course by online tools for exploring Mathematics in an online delivery modality in teaching, making technology vital to support education. The advantages of using online learning include removing barriers and challenges in education such as time and place. Also, secondary education benefits from the availability of educational services incorporated into online learning platforms as supplemental resources for teaching and learning (Kim et al., 2020). Thus, on the one hand, teachers must acquire a particular level of IT skill and expertise to properly teach distant online learning. Otherwise, failing to adapt will become a roadblock to online learning's success and effectiveness. However, on the other hand, some students may struggle with distance learning because they do not have access to a virtual school (Lieberman, 2020).

However, the abovementioned alternative medium has brought to light some stark persisting realities regarding resource availability, which is required to attend these online classes/platforms. Due to the apparent difference in technology between states, the digital divide between rural and urban areas affects children's learning and progress. The availability of electronic gadgets such as laptops, phones, or computers and access to the internet appears to be a significant challenge for the ongoing online learning process.

In addition to this, Salac (2016) reported that the Philippines has a small web network in Asia. As a result, students' safety and well-being would compromise the nature of learning, and evaluation outcomes would be powerless. Teachers who were required to adjust their teaching techniques owing to the pandemic should understand the importance of adaptability and planning (Hebebcı et al., 2020), emphasizing the importance of doing whatever it takes to help their students learn (Mansfield et al., 2016).

Different learning modes are presented locally, one of which is Modular Distance Learning, which most schools currently use due to a lack of internet connection and educational materials. However, several obstacles have arisen among teachers, learners, and parents during the mentioned learning model implementation process. The barriers are namely: unstable internet connectivity or no internet connectivity at all, inadequate learning resources, overloaded lesson activities, errors in modules, and a poor learning environment (Rotas & Cahapay, 2020).

Also, Abad (2020) claimed that learning materials serve as essential learning tools for students in distance learning (DL). They provide learners with a rich and compelling learning atmosphere and high-quality materials (Webster & Whitworth, 2017). Many studies have formulated these attributes and the importance of modules (Telaumbanua et al., 2017). The modules are more public than conventional teaching in that they are available to the public for review or study. Thus, it is believed that the consistency, understanding, and communication of the modules to the end-users, in this case, the students, is critical to the success of distance learning teaching and learning.

Telaumbanua, Yakin, and colleagues (2017) stated that many aspects of mathematics learning influence learning objectives. The learning material is one of the elements (Tuttle, 2008), as most students hate and have trouble learning mathematics (Bavnbek, 2017), owing to a variety of factors such as teaching, learners' cognitive level, subject competencies, and learning materials (Stevens et al., 2009). In response, learning materials in the modular approach must apply to learning goals, student characteristics, and learning strategies (William, 2020). Hence, a math lesson's content and instructional design will draw students' attention and help them improve their skills (Khan, 2020).

However, to support modular distance learning, the DepEd TV and Radio were used to provide lessons by qualified teachers as teacher-broadcasters by the country's top journalists (Montemayor, 2020). As a result, presenting an educational video to students allows them to make conjectures based on their analyses, guiding them as they learn to think mathematically (Saunders, 2018).

Educators' initiative to train students in remote locations where the internet is limited is an example of adapted blended distance learning. According to Marek (2021), teachers had favorable reactions to blended distance learning based on their own experiences and findings from the four corners of the study hall to the outskirts of computer-generated reality. Also, despite limited internet access, students' blended learning experiences in education using an alternative online platform such as Facebook were commendable (Pimoubol & Sriwattanarothai, 2016). Blended learning is technology-enhanced online learning in which teaching is enabled by the availability of digital equipment and an internet connection (Ng et

al., 2013). Blended learning students performed substantially better than those who did not (Carreon, 2018).

As a result, school leaders can assist teachers by implementing teacher well-being strategies that increase collaboration among school leaders, teachers, students, and their families. These strategies should build trust, ensure safety, include teachers' voices, and empower teachers to make decisions that improve their teaching experiences and students' learning environments. Moreover, enable teachers to make decisions that enhance their teaching experiences and their students' learning environments. Also, nurture teacher well-being to create happier, wholesome, and more sustainable school systems that strengthen social interaction and provide wellness and recovery support to all classrooms while learning remotely and when schools reopen.

Many studies focused on learners' and parents' experiences and emotions during the pandemic (Rotas & Cahapay, 2020). According to Woday and colleagues (2020), students experience high anxiety, mood disorders, and stress during school closures because of unequal access to digital technology. In addition, Cicco (2020) claimed that the most significant obstacle to distance learning utilization was at the student level. He encourages more discussion about overcoming distance learning barriers while also maximizing the benefits of learning during and after the pandemic, emphasizing students' voices' importance. Schallom (2020) indicated that students are advancing in math, but not as rapidly as in a typical year.

Distance learning is challenging in developing countries since many parents have never attended school, and there is a lack of ICT facilities, computers, radio, and television to facilitate distance learning (Tadesse & Muluye, 2020). Also, many children in rural areas have working parents who are essential workers, leaving them with little or no help at home. These families cannot afford to engage a teacher to learn a module while their parents work (Garcia et al., 2020). Those from less privileged backgrounds suffered far more throughout COVID-19 than students from more privileged backgrounds (Di Pietro et al., 2020). To sum it up, the new education system is effective, practical, and appropriate, but it poses difficulties for poor parents and students (Pujari, 2020).

In response to this educational system becoming the new normal, parents, teachers, students, and stakeholders face additional challenges. These new modalities must be entirely accepted by teachers, students, and stakeholders to be successful. A good number of researches delve into the experiences of students and parents on the educational process, particularly on the teaching and learning of mathematics during the pandemic. However, few researchers have studied the teachers' experiences and perspectives concerning these continuously emerging learning modalities.

Hence, this study resolved to bridge this gap in research by considering the teachers' views and insights, particularly mathematics teachers. It was deemed imperative to gather information and insights from teachers because they are the front liners in planning and implementing the above-mentioned government-initiated program. Also, as the world becomes more globalized than ever, there are more parallels than differences in mathematics educational plan archives from different countries. As a result, this study was structured so that other information is solicited from the teachers' experiences in utilizing the distance learning delivery modalities to give an impression of the quality of the course in Mathematics. Therefore, this study is relevant as the findings may be advantageous in the future planning and implementation of distance education using the learning delivery modalities in teaching mathematics of the learning continuity plan.

The study's overarching objective is to highlight mathematics teachers' experiences toward providing inputs for improving instruction. Specifically, it sought to achieve the following specific objectives: (1) arising issues experienced by participants in teaching mathematics in the new normal; (2) participants' best practices and strategies to conquer the challenges met in teaching mathematics; and (3) participants' recommendation for the improvement and advancements of mathematics instruction.

In this period of the pandemic, the Department of Education is emphasizing the importance of learning continuity. As Duncan (2010) put it, educators have been stretched to deal with the challenge of extending skills and tools in new ways that have never been seen before. It recognizes its significance because it will support the following sectors and individuals:

**Government Officials.** The enhancement of teachers' skills by learning their experiences and challenges faced during the implementation of new normal education. To provide enough resources that the educators needed to be efficient teachers.

**Department of Education Leaders.** As part of this educational institution, we are responsible for implementing the K to 12 programs. The department and education leaders should also know the paradigm shift experiences of the teachers and the training need for their growth.

**School Administrators.** Enlightening them to understand teachers' experiences in the new normal education develops new skills and abilities in the new normal aspect. They may consider the benefits and importance of each learning modality to ensure an enabling and supportive learning environment for the teachers and students.

**Junior High School Math Teachers.** As facilitators of learning and as values formators, teachers will be given concise findings from this study. Hence,



they can think of an appropriate approach to dealing with and teaching the students using Distance Learning Delivery modalities (DLDM) in the new normal. Furthermore, the study can help Mathematics teachers to modernize and upgrade their teaching techniques through the formulated seminars in line with teaching strategies in the new normal.

**Guidance counselors.** As a guide in students' academic, behavioral, and social growth, guidance counselors may consider the findings and recommendations of this study to put up a guidance program for students from learning through various modalities.

**Future researchers.** Finally, the findings of this study will be helpful to other researchers who wish to perform similar studies as a complement to the literature. Future researchers also recommended this study by providing insights into what research they could tap into teachers' experiences in the new normal education. This study could also give them ideas as to what variables could be researched to enhance the skills and training of the Mathematics teachers.

The study was conducted to examine the educational experiences of Junior High School Mathematics Teachers in one high-performing school in the Schools Division Office of the City of San Fernando, Pampanga. The study participants were selected from one high-performing secondary school (JHS) in the Schools Division Office of the City of San Fernando, Pampanga. The school was identified as (1) a High-performing school, (2) MTAP achiever, (3) teachers practice and implement the 4 DLDM (4) recommended by Public Schools District Supervisor; and (5) has the willingness to participate in the study.

For a better understanding of the study, the following terms are defined:

**Academic performance.** A student's grade or marks obtain from the school examination. Although class contribution and participation can determine the strength of a student's work, the common method globally to assess a student's academic performance is through written examination and performance tasks.

**Distance learning.** It refers to a modality where learning occurs between the teacher and the geographically remote learners during instruction.

**Educational experience.** The amount of time and knowledge someone has in an academic environment.

## **METHOD**

To better understand the educational experiences of Mathematics teachers in the new normal, this study used a qualitative case study analysis approach. Qualitative research approaches look at a problem to better understand it and come

up with new hypotheses and ideas (Renata, 2020). Patterns in written or textual data are normally examined and interpreted using these techniques.

Case studies are qualitative research approaches that focus on a situation in depth. Unstructured interviews and observations are used to understand the experience or behavior of individuals (Conradin & Keller, 2018).

The researcher was the primary instrument in this analysis. Specifically, an open-ended questionnaire created with Google Forms was used extensively to extract in-depth information and introduce new ideas during the interview.

The participants in qualitative research were generally small, non-random, and purposeful (Craver, 2014). A definite sample is selected to deliver or produce the utmost data about a phenomenon of interest.

The sampling for this study was purposive. A purposive sample is a nonprobability sample. It is based on the characteristics of a population and the study's objective. Researchers frequently accept that they can get a representative sample by utilizing a sound judgment, which will bring about sparing time and money (Thornhill, 2015).

One high-performing school in the Schools Division Office of the City of San Fernando, Pampanga, was chosen as the study's participant based on the set inclusion criteria. The school is identified as (1) a high-performing school, (2) MTAP achiever, and (3) practice and implement the 4 DLDM, which are: Online Distance Learning, Modular Distance Learning, Radio/TV-based Instruction, and Blended Learning.

In the Junior High School Math Department, the participant-teachers in this study were highly experienced math teachers selected based on the following criteria: (1) practicing the teaching profession, (2) at least three years in service, (3) teaching during the pandemic, and (4) has the willingness to participate in the study.

For this study, nineteen (19) Mathematics teachers were prequalified and consented to answer the questionnaires. The participants were from different grade levels and with various teaching experiences. They are currently working as Mathematics teachers adopting the new normal system of education.

This group shared their teaching experiences, issues they encountered, and recommendations for improving instruction in the new normal. Table 1 shows the profile of the selected participants.

**Table 1****Profile of participants**

Participant	Number of Years as a Math Teacher
JHST1	20
JHST2	26
JHST3	6
JHST4	7
JHST5	27
JHST6	20
JHST7	3
JHST8	10
JHST9	16
JHST10	16
JHST11	7
JHST12	19
JHST13	22
JHST14	3
JHST15	8
JHST16	3
JHST17	18
JHST18	12
JHST19	6

The nineteen math teacher participants' preferences on the type of learning delivery modality used in teaching mathematics in the new normal are presented in Table 2.

**Table 2**  
**Preferred delivery modality**

Learning Delivery Modality	Frequency	Percent
Modular	5	26.32
Online	9	47.37
TV-based Instruction	1	5.26
Blended	4	21.05

Questionnaires effectively understand participants' actions, attitudes, preferences, opinions, and intentions more economically and speedily than other methods (Craver, 2014).

A common method of gathering qualitative data is through an open-ended questionnaire which consists of written questions answered through Google Form. Kanzaki (2004) claimed that the internet is increasingly being used for research since then. Hence it is a dynamic system for creating questionnaires and collecting responses. Participants accomplish the questionnaire by writing their answers to the questions on the questionnaire itself (Ogena et al., 2007).

The open-ended questionnaire used in this study was validated by three highly professionals, an Educational Program Specialist in Mathematics, a guidance counselor, and a Doctor of Education.

Each question is validated according to its: (1) content validity or responsiveness to the research objectives; and (2) appropriateness of language structure used. Validators' recommendations were incorporated into the final form of the questionnaire. These came out to be the final open-ended questions: (1) Given the new educational landscape during the pandemic, how would you describe your experience in teaching Mathematics as a subject? (2) What modality do you prefer to use in your Math class? Why do you prefer that? (3) What are the best practices and teaching strategies that you use in teaching Math? (4) What are the issues that you encountered in teaching Math during this pandemic? (5) What steps do you recommend addressing current and emerging issues in teaching Mathematics?

Data were gathered following these steps: first, a letter of permission from the Superintendent of Schools Division to perform the report was obtained. Next, the informed consent of each participant in the study was observed. They were

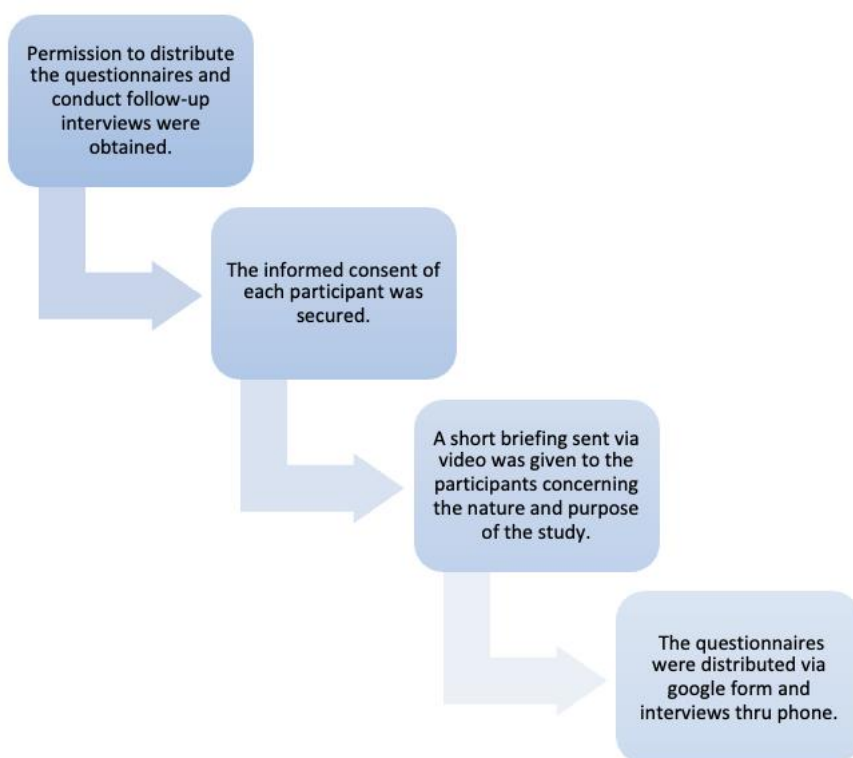
given a short briefing concerning the nature and purpose of the research included in the open-ended questionnaires to emphasize their importance in the study. Due to the pandemic and health protocols given by the COVID-19 Inter-Agency Task Force (IATF), the researcher distributed the questionnaires via google form and interviews thru video calls.

The follow-up interviews were scheduled at a time designated by the participants. The interview was a valuable tool for gathering information about respondents' mentoring experiences.

Each participant was interviewed only once, but they could add any further information, ask questions, or alter what was previously said if they desired. Converted each interview from google forms format into google documents. After data collection and interviews were completed, the recordings were transcribed verbatim and transformed into text analysis and categorization.

**Figure 1**

***Data gathering procedure***



Ethical and moral values in research undertakings were considered. The anonymity of respondents' identities and the secrecy of the answers are the top

priorities. Also, they were given a short briefing concerning the nature and purpose of the research included in the open-ended questionnaires to emphasize their importance in the study.

Furthermore, the paper's structural integrity was secured by following the standards set by the University and the APA in the research format.

Moreover, references that appeared and discussed in the study are properly cited for duly recognition of their respective authors and sources and to avoid any plagiarized research content.

In this study, they were oriented about the study's objective and informed them about why they were chosen as participants.

Qualitative data analysis is based on a descriptive philosophy. The researcher used this process to make sense of or explain the data collected during the research process.

Non-numerical information such as interview transcripts, statements, audio, and video recordings, photographs, and text documents are examples of qualitative data (Dudovskiy, 2018).

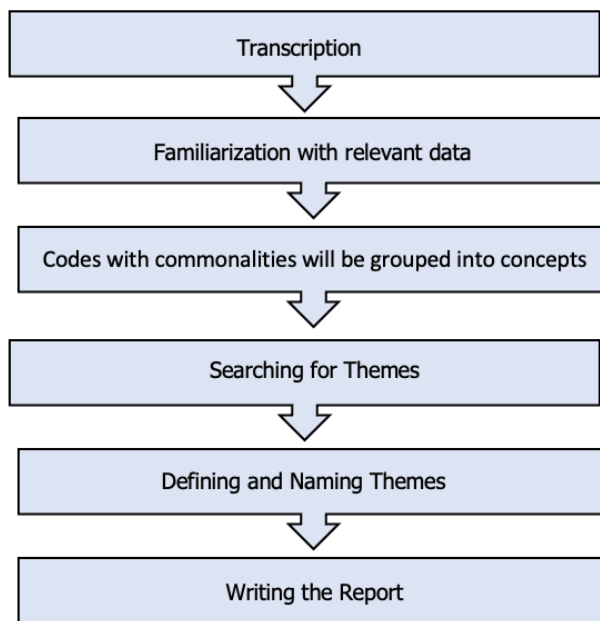
Following the data analysis process adapted from Braun and Clarke (2013), the researcher skillfully read the transcribed data line by line. Then, separated the data into meaningful analytical units, which were followed by key point coding.

The process of assigning codes, words, or phrases to identify which themes or issues portions of the data refer to and organize the data in a meaningful fashion for subsequent analysis is known as coding. Codes were assigned based on the similarities of the data; from the codes, new themes emerged. A theme's purpose is to organize data collection into a topic that encompasses a set of recurring ideas—formed themes or categories from related concepts. The constant comparative approach was used to construct themes, which involves repeatedly comparing one unit of data with another (Braun & Clarke, 2013).

Finally, conclusions and recommendations based on the findings were developed. Considering the studied data, interpreting their significance for the questions at hand, and linking them to the study topic and literature is what conclusion drawing entails (Craver, 2014).

**Figure 2**  
**Data analysis process adapted from Braun and Clarke (2013, pp. 202–203)**

Figure 2 presents the data analysis process which was applied in this study.



## FINDINGS

### Arising Issues Experienced by Participants in Teaching Mathematics in the New Normal

The data from the open-ended questionnaires and the follow-up interviews revealed the arising issues experienced by the participants in teaching mathematics during the pandemic. After a thorough evaluation of their notions, three themes or categories emerged: ***Adjustments in Paradigm Shift in Teaching, Imbalanced Quality Control, and Difficulty in Establishing Rapport.***

***Adjustments in Paradigm Shift in Teaching.*** The insights concerning significant challenges which were encountered during the implementation of new normal education were determined. Responses were analyzed thoroughly, and common challenges faced by the participants were identified.

***Imbalanced Quality Control.*** The participants confirmed the importance of constantly improving the quality of the learning materials used in distance learning.

As advised in the results of this study, teachers are continuously looking deeper into the learning content, alignment to standards, depth of knowledge, engagement, ability to meet student needs, and comprehension. Thus, the participants shared their experiences and observations during the implementation.

***Difficulty in Establishing Rapport.*** The participants confirmed the importance of proper communication and cooperation with the students and parents. They denote the value of having a rapport that could manifest learning and profound elaboration of concepts.

### **Participants' Best Practices and Strategies to Conquer the Challenges Met in Teaching Mathematics.**

The thorough assessment of the participants' perceptions concerning significant challenges and issues encountered during the utilization of distance learning uncovered three categories with the general theme as DISTANCE LEARNING IMPLICATIONS: ***Applicable Methods and Motivation, Continuous Professional Growth, and Proper Monitoring and Evaluation.***

***Applicable Methods and Motivation.*** Teaching methods and motivation are essential factors affecting the initiative, improving persistence in the field, and students' performance. Participants believed that both drive many behaviors complemented by effective methods in teaching, and using rewards leads to better outcomes in education.

***Continuous Professional Growth.*** The participants emphasized the importance of continuous professional growth. They believed that it would improve them and the entire school community.

***Proper Monitoring and Evaluation.*** The Mathematics teachers mentioned proper monitoring and evaluation as an important way in assessing the students' development in distance education. Addressing the anticipating needs of learners considering the part of their difficulty and necessities should be given attention.

### **Participants' Recommendation for the Improvement and Advancements of Mathematics Instruction**

It was mentioned that Mathematics was able to suggest applicable techniques for improving instruction methods in teaching Mathematics. These common notions emerged in three subthemes or subcategories with the general theme as DISTANCE LEARNING ADVANCEMENTS: ***Educational Resources, Funding, and Financial Sustainability, and Preferred Delivery Modality.***



**Availability of Educational Resources.** The participants emphasized that accessibility and availability of digital and non-digital materials are vital in using the DLDM in the new normal education. These are complete resources, instructions, materials, activities, assessments, and answer keys to help learners utilize the instructional material.

**Funding and Financial Sustainability.** A financially sustainable education sector is vital to delivering the education and training that the country needs. Participants affirmed the importance of continuous learning through seminars and training as well as educational materials.

**Appropriate Delivery Modality.** Four available learning delivery modalities can be used in the new normal education. Participants mentioned the importance of distinguishing and selecting the effective modality to be implemented in every school.

### Summary of Findings

**Arising issues experienced by participants in teaching mathematics in the new normal.** New normal education was challenging since everyone is new in the situation. The hardest part was to know and classify whether the students are learning from the new modes of instruction in the conditions imposed by the pandemic. The participants' experiences were challenged through many understandings and difficulties in facing further normal education. After a thorough evaluation of their notions, three subthemes emerged: **Adjustments in Paradigm Shift in Teaching, Imbalanced Quality Control, and Difficulty in Establishing Rapport.** These subthemes were generalized to as DISTANCE LEARNING CHALLENGES.

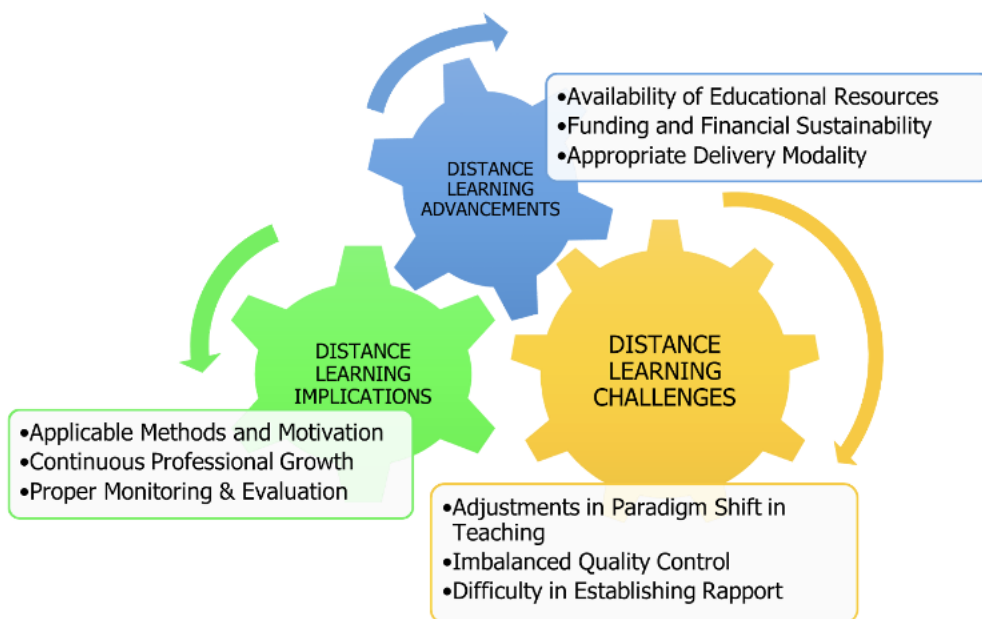
**Participants' best practices and strategies to conquer the challenges met in teaching mathematics.** Teachers are the first to experience the obstacles that the pandemic has raised in the classroom. Most of the responses were expressing experiences on the adaptation of new normal education. An assortment of noteworthy best practices and strategies revealed three categories: **Applicable Methods and Motivation, Continuous Professional Growth, and Proper Monitoring and Evaluation.** These subthemes were generalized as DISTANCE LEARNING IMPLICATIONS.

**Participants' recommendations for the improvement and advancements of mathematics instruction.** Teachers are the first to experience the difficulties caused by the pandemic for their students, for themselves, and their positions and their expertise and judgment are essential in solving these challenges as the pandemic continues. Participants' recommendations for advancements uncovered three: **Availability of Educational Resources, Funding and Financial Sustainability, and Appropriate Delivery Modality.** These subthemes were

generalized as DISTANCE LEARNING ADVANCEMENTS.

The frequency analysis of emergent themes emerged from leading words of teachers' responses. Themes were determined by the reoccurrence of words and phrases written by the participants during the interviews.

**Figure 3**  
**Emerging (3) General Themes and (9) Sub-themes**



## DISCUSSION

In the advent of COVID-19, the Department of Education ensured that all students had access to learning opportunities under its BE-LCP. Education was severely affected by the pandemic situation's difficulties and challenges, resulting in a significant learning crisis and a shift from conventional to distance learning. The variety of data gathered from the participants' responses has provided a relative portrait of the participants' attitudes, arising problems, difficulties encountered, and recommendations for enhancing instruction in the new normal.

Most of the participant-teachers have experienced the same situation and the commonalities that the participants had surfaced.

Regarding the first objective, despite multiple delivery modalities, the teacher participants faced many challenges and dilemmas in implementing the learning continuity plan, particularly in teaching mathematics. The challenges

mentioned are Adjustments in Paradigm Shift in Teaching, Imbalanced Quality Control, and Difficulty in Establishing Rapport.

Educators are gradually adapting or converting traditional face-to-face teaching methods into online, which is now necessary. This new scheme, however, would necessitate a paradigm shift. What works in the conventional classroom may or may not work in distance education. Making instructional design meaningful, unforgettable, inspiring, and, eventually, measurable is challenging for teachers. Switching their classes to distance learning and completing the school year in that mode resulted in a significantly higher workload and tension for math teachers on average (Marek et al., 2021). As a result, it is a big challenge for a teacher working their first online shift.

Modular learning is the most common choice for the first school year (SY 2020-2021) of distance learning in Philippine public schools. Many people, however, are suspicious of the materials and modules used in distance learning. According to Williams (2021), distance learning institutions must plan, develop, and provide high-quality instructional modules for all courses of study.

As a result, participants emphasized the importance of quality control over LMs to provide students with accurate and practical materials. They recommended incorporating supervision into both the learning method and instructional materials to show its importance in the self-learning phase of students. These methods included clarity in lesson delivery, effective learning transition, correct teaching technique, demonstration of lesson procedure, adherence to the course outline, material and language quality control, and critical teaching strategies. Hence, instructional materials must meet the highest standards in content, grammar, and error-free vocabulary. Since students rely heavily on the modules offered for their studies, the only way to ensure that those high expectations are retained and improved is to regularly track and develop distance learning modules.

The participants reported that they had difficulty communicating with the students and parents. Communication is a necessary action in any aspect of people's lives to maximize efficiency. It is a tool for public welfare to socialize people into desirable behaviors and is a key concept as one of the essential aspects of human life. Hence, rapport should not be an issue as one-sided but requires intercommunication between student and teacher. Attention and engagement are necessary, as well as continuous mutual communication. According to M. Abad (2020), the modules' material, comprehension, and communication to the end-users, the students, is essential to distance education. However, Rashid (2012) argued that communication barriers arise from the diversity of purpose and unclear encoding and selection of a wrong medium communication may fail in certain circumstances such as unclear instruction, lack of monitoring, and poor evaluation.

In addition, distance education communication challenges lead to a significant conclusion: as distance education technology advances, so do the opportunities to resolve barriers to communication problems and the complexity of the obstacles that participants face. Nevertheless, in creating an effective teaching-learning process in the education system, especially at distance education, which is a practical choice for everyone to get educated, effective communication must be established and maintained by eliminating communication barriers (Berge, 2013).

In response to the second objective, the teacher participants effectively cope-up with the much-anticipated distance learning by best practices and strategies utilized by the experienced mathematics teachers. Consequently, these are effective teaching methods and motivation, proper monitoring and evaluation of students' progress, and continuous professional growth for teachers.

Manuel (2020) said that a model guide is vital to administrators to effectively implement strategic planning for distance education utilizing strategic motivation, development, and evaluation. Data-based decisions were fundamental to improve the effectiveness, efficiency, and equity of education systems. Thus, it is essential to pay attention to learners' anticipating needs, considering their level of difficulty and requirements.

Education, just like the rest, requires much motivation. One can argue that teachers are at the front line of motivating students. Thus, they may teach and inspire students every time they interact (Manuel, 2020), especially in distance education.

However, due to a lack of motivation, communication problems, and a lack of interest in the subject, students in distance education are less likely to engage in group learning (Kaino, 2012; Dumford & Miller, 2018). As a result, the participants provided teacher-made videos to their students since they cannot discuss online because of an unstable internet connection or even no access to the internet. Llego (2020) stated that the teacher who maximizes supplementary resources and motivation to students predicts future success. Saunders (2018) complemented that mathematical problem solving and increased competence in mathematics likely leads to better outcomes for students when provided supplementary resources like videos.

Since educational institutions were reluctant to adopt technology, focused more on classroom teaching, and never seriously considered online education a viable alternative, they were slightly underequipped relative to other sectors. Educators had to quickly adjust to new teaching methods to ensure students could learn even in the current situation.

As a result, the participants had one typical appraisal of gaining mastery and improving ICT skills by implementing seminars and teaching mathematics training. Necessary to prepare all teachers to be technologically equipped in making strategies in teaching. Training and workshops on Information and Communication Technology (ICT) are needed to make all the teachers cope with the new teaching method in Math. According to Felipe (2013), the most effective distance education strategies depend on innovative, well-informed teachers. Therefore, the teacher should be trained to take advantage of their experience and adapt the experience to the current distance education world.

The Mathematics teachers mentioned that monitoring and evaluating students' development is essential in assessing the students' growth through the Distance Learning Modality or the new normal education. It gains information to understand a situation and act (IEEP, 2014). An educator's assessment part is an essential part of evaluating an individual's learning progress and improvement.

As a result, most of the teacher participants said that assessing students in the new normal situation is challenging because of different concerns and problems from the students. According to research, students learn better, teacher decision-making increases, and students become more mindful of their success when teachers use student progress tracking (Safer & Fleischman, 2005). It also reveals mistakes, offers paths for learning and improvements, and allows teachers to learn from each other's experiences, building expertise and knowledge. In addition, monitoring and evaluating students' progress enable teachers to reflect on their teaching and assess their instructional strategies.

For the third objective, the participant-teachers recommended the following to improve and advance mathematics instruction. Respond to instructing the learners in the new normal using a modality that includes online distance learning, funding and financial sustainability support from the government, and availability of educational resources.

Teachers want to see more changes, but they do not have enough resources to keep up with what they've done. They are low-paid, overstretched, and on the verge of walking away from their jobs (Marek et al., 2021). Similarly, based on the current technological difficulties found, most did not have computers, internet access, or inaccessibility at home. The government and educational institutions were both challenged by this issue.

The problem, which was deemed unforeseen, is that the new standard education necessarily requires a comprehensive online learning platform. In addition to the teacher and the facilitating and support systems, online learning necessitates planning, training, dedication, and a degree of competence.

Smith and colleagues (2020) emphasized the importance of academic leaders in the paradigm shift, not just in classroom practices but also in the overall transformation. The Department of Education (DepEd) offers tools to assist educators in adjusting to the modern educational environment. Despite being supplied with a variety of tools and portals, some participants indicated that adapting is insufficient because not everyone can do so.

On the one hand, the participants explicitly suggested that the government respond to the community's educational needs through funding and financial stability (Peytcheva et al., 2018). Also, they emphasized that access to these educational resources must be provided to make distance education comfortable and practical.

On the other hand, problems in the educational setting, such as the inaccessibility of technology for low-income students, are far from being solved. Hence, technology should not be a fundamental instrument for receiving a quality education. Instead, it should be seen as a choice to improve learning and increase opportunities (Kemp et al., 2014). Other than the expense of the technology innovation, there is the chance of not using all its latent capacity (Rashid & Rashid, 2012).

Access remains one of the most significant obstacles to distance learning, which is why the Department of Education invented multiple modalities to ensure that online learning is only one of several choices in the "new normal." While this is precise, the participants suggested a solution to the distance education challenge by determining and choosing the best distance learning modality for enhancing mathematics teaching in the new standard. Therefore, the proposed teaching and learning method is online distance learning (ODL).

Consequently, online distance learning is preferred by many because it is the most similar model to traditional instruction. Ng et al. (2013) cited many benefits of using blended learning programs that use the internet to provide students with a more customized learning experience in today's technological environment. In one section, they study in a supervised, brick-and-mortar classroom environment, while in the other, they learn online. Blended learning can be effective if used appropriately and designed to address the subject's concerns (Lagua & Calalo, 2020).

Overall, the difficulties faced by teachers in teaching mathematics encouraged them to work toward improving instruction. They will not be able to overlook the implementation of innovative learning delivery modalities and other DepEd changes.

We can see that naturally, delivering instructions shall be considered according to the expectations set up by the school administrators while navigating the abundance of available resources.

Different learning modes are presented, one of which being Modular Distance Learning, which most schools currently employ. However, several obstacles have arisen among teachers, learners, and parents during the implementation process of the said learning mode. Since the mode, as mentioned earlier, delivered the same modules, teachers could not consider students' different learning styles and do not have the opportunity to plan lessons that use differentiated instruction (DI) to suit their other skills and abilities.

Assessment is among the most significant challenges in distance learning, particularly in classes where evaluation is normally done with direct objective test methods. Proctoring a test is complex; therefore, exams must be conducted in an open-book format. It is not easy to clearly distinguish students' performance because of the wealth of learning resources available.

Communication barriers occur not just because of differences in purpose but also because of imprecise encoding and the wrong medium in specific situations. As a result, teachers must give opportunities for students to develop and improve their abilities.

Teachers appear to be concerned about their ability to use digital resources and online learning platforms. Whether teaching online using synchronous or asynchronous methods, best practices must be at the forefront of instruction. Thus, they must engage and master technology to make better connections and interactions to create a holistic education. However, it is not easy to learn meeting applications like Zoom and Google Meet; add to the familiarization of the learning platforms. Educators who are new to the program will have to face their learning curves.

Teaching in the new normal, especially online, must allow students to engage. The challenge to teachers is to make the instructional design relevant, meaningful, motivational, and measurable.

The study's findings suggest that the teachers must remain vigilant in implementing the Basic Education- Learning Continuity Plan during the pandemic. This is essential since the plan had already been started and will continue to be implemented through distance education. Likewise, the educational leaders must continue to be updated with the proposed changes and be abreast of the updates regarding the mentioned program.

It is suggested that all the problems and challenges be addressed to

facilitate distance education with the participants' best practices, strategies, and coping mechanisms. Anticipated issues need to be given proper interventions or actions to prevent the education during the new normal.

The school may consider collaboration with the Division to offer instruction and training in the use of Information and Communication Technology (ICT) to all teachers to adapt to modernized technologies and tools and be technologically equipped to teach Mathematics in the new normal education.

It is suggested to include and incorporate appropriate learning delivery modalities, especially online distance learning (ODL), the most reliable and effective approach for distance education.

It was proposed that a monitoring tool be used. It is a vital method for evaluating students' progress regarding their needs and difficulties in answering modules. It is also a method of defining and monitoring a child's development by collecting data to improve the educational system's effectiveness, efficiency, and equity.

Highlight the importance of the K-12 requirement that educators structure their lessons on the Most Important Learning Competencies (MELCS) or learning competencies. Faculty design learning materials, modules, and even courses for distance education using a set of standards/criteria. In addition, each school should implement some form of gatekeeping to help regulate the quality, usability, and potential effectiveness of learning materials associated with their institution.

Support from the government in funding and financial sustainability of essential educational resources to eliminate barriers in education and equal access in education for everyone.

Since this research depicted only the viewpoints of the mathematics teachers, other stakeholders such as school administrators and government officials must be added as participants. Hence, this will comprise the school administrators' readiness and awareness of the government officials regarding education in the new normal. In addition, this will make subsequent studies to be more holistic in nature.

Future researchers are encouraged to include a quantitative study to triangulate the finding of this study. This mixed method will further improve the study regarding its content. They may also have more respondents in other to gather relative and substantial data to support this research.



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