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Lived Experiences of Struggling Students in Mathematics through Distance Learning

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Abstract: Distance Learning During COVID-19: Lived Experiences of Struggling Students in Mathematics. **Objectives:** The research looked at the experiences of struggling students in mathematics during distance learning amidst the pandemic. **Methods:** Semi-structured interviews were utilized as part of the study's phenomenological interpretive research design. Non-probability sampling technique was used to select six students to interview for the collection of raw data. Thematic analysis was used to record and examine transcripts. **Findings:** Four developing themes that were summed up into CLAS (Content, structure, assessment of self-learning modules and instructional materials, Learning environment, Accessibility of modality, and Support system) were recognized which describe the struggling students experiences in time of pandemic. **Conclusion:** According to one conclusion, problems with operationalization and learning delivery continue to be barriers, and modular distance learning is not appropriate for all types of students due to a number of factors.

Keywords: modular distance learning, mathematics learning, phenomenological research.

Abstrak: Pembelajaran Jarak Jauh Selama COVID-19: Pengalaman Hidup Siswa yang Berjuang di Bidang Matematika. ***Tujuan:*** *Penelitian ini melihat pengalaman siswa yang bergelut di bidang matematika selama pembelajaran jarak jauh di tengah pandemi.* ***Metode:*** *Wawancara semi-terstruktur digunakan sebagai bagian dari desain penelitian interpretatif fenomenologis studi. Teknik non-probability sampling digunakan untuk memilih enam siswa yang akan diwawancarai untuk pengumpulan data mentah. Analisis tematik digunakan untuk merekam dan memeriksa transkrip.* ***Temuan:*** *Empat tema pengembangan yang diringkas menjadi CLAS (Isi, struktur, penilaian modul dan bahan ajar mandiri, Lingkungan belajar, Aksesibilitas modalitas, dan Sistem pendukung) diakui yang menggambarkan pengalaman siswa berjuang di masa pandemi.* ***Kesimpulan:*** *masalah operasionalisasi dan penyampaian pembelajaran terus menjadi hambatan, dan pembelajaran jarak jauh modular tidak sesuai untuk semua jenis siswa karena sejumlah faktor.*

Kata kunci: *pembelajaran jarak jauh modular, pembelajaran matematika, penelitian fenomenologi.*

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INTRODUCTION

When COVID-19 started to spread in the Philippines, the government took steps to stop the widespread outbreak of the virus by restricting human interaction. Abruptly, COVID-19 has rapidly impacted the daily lives of people. Battling the virus has an effect on almost every aspect of human life, including education. Over 28 million Filipino students were among the 1.6 billion learners from 190 different countries who were affected (UNESCO, 2020). Due to the fact that education was at the cutting edge, countries began to seek a way to continue their learners' education, which resulted in the imposition of distance learning. The transition from in-person instruction to distance learning was difficult for everyone involved: teachers, students, parents, and the community. Many countries have recently learned that this is the best way to address the educational needs of their learners. However, a former Indonesian Prime Minister stated that distance learning requires approximately 5 years of preparation (Chaterine, 2020), but in order to respond to the new normal teaching and learning procedures within the pandemic, it is important that educators, students, and parents instantly adapt to the current situation.

In the Philippines, the Department of Education (DepEd) issued DepEd Order 12, s. 2020, titled "Adoption of the Basic Education Learning Continuity Plan for School Year 2020-2021 in Light of the COVID-19 Public Health Emergency," on June 12, 2020, enabling the utilization of individual self-learning modules (SLMs) based on the most crucial learning competencies (MELCs).

Modular distance learning (MDL) is the most accessible approach to the new standard form of learning, according to Panti (2021). Utilizing this instruction was extremely beneficial to the current educational system. However, it does provide a number of challenges for teachers, pupils, and parents, including a shortage of school funding, students who struggle with self-study, and parents who lack knowledge about how to properly educate their children (Dangle & Sumaoang, 2020). Teachers must find ways to engage with students and improve their understanding of mathematical ideas because self-paced learning does not guarantee mastery of DepEd-mandated MELCs (Labrado et al., 2020).

Students frequently expressed dissatisfaction with mathematics, which most students rate as the most difficult subject. A comprehensive international review that offers accurate and timely statistics on mathematics and science is called the Trends in International Mathematics and Science Study (TIMSS). It is carried out by the National Center for Education Statistics (NCES) in the US every four years (Mullis, 2013). The Philippines took part in TIMSS for grade four between 2003 and 2019, resulting in scores of 358 and 297 in the mathematics achievement of the fourth grade, respectively. In terms of average mathematics achievement, the Philippines' ratings differed between the TIMSS 2019 and 2003 cycles (Mullis et al., 2020).

The younger generation has recently acquired a negative perception of mathematics (Mahanta, 2019). The rapid shift from in-person instruction to modular distance education reduced interaction between teachers and students, which forced parents to take on the role of teachers for their children right away. This transition caused considerable academic difficulties for children who were unable to acquire adequate learning resources and eventually failed to deal with instruction, causing them to fall behind. Furthermore, for parents who are unable to guide and help their children in a variety of subjects due to various conditions that they must deal with (Magsambol, 2021), students' education may be impacted by a lack of secure study space, their living environment, a lack of educational

technology or resources, financial insecurity, and family responsibilities, all of which make learning at home unsuitable.

Internet access in the Philippines was one of the factors that led to the majority of parents selecting MDL as their preferred learning modality for their children, as it was considered to be a suitable modality for students who did not have access to a dependable connection or the financial means to buy educational supplies (Bernardo, 2020; Nacar and Camara, 2021; Statista Research Department, 2021). Thus, not all students own cell phones, laptop computers, or other remote learning gadgets. According to Blackburn (2020), retaining students' attention is extremely challenging in mathematics, particularly in MDL. Parents are increasingly major collaborators in student education, which provides a number of advantages for students. The best indicator of academic achievement was family involvement in a student's education, as students felt more supported by their parents and became more driven to learn (Delgado, 2017).

There has been research on the impediments to achieving quality in distance learning (Lassoued et al., 2020), the problems of modular learning for teachers and their effects on academic behavior (Solis, 2021), and student performance (Agarin, 2021). Several studies on secondary math teachers' experiences with distance learning (Akar & Erden, 2021) and teachers in a Philippine environment (Nacar & Camara, 2021; see also Castroverde & Acala, 2021) have also been conducted. Furthermore, studies on parents' experiences with remote learning (Agaton & Cueto, 2021) and technical help in the use of modular distance learning (Bayucca, 2021) were carried out. While studies on Norwegian students' homeschooling experiences (Maelan et al., 2021) and Indonesian students' homeschooling experiences (Putra et al., 2020) have been conducted, there has also been research on island students' coping mechanisms in modular distance learning (Barcenas & Bibon, 2021). However, researchers have yet to find a study that examined the experiences of struggling children who needed additional support to be successful in math.

Teachers and parents stand out when it comes to studying lived experiences. However, no research regarding the feelings, obstacles, or experiences of struggling students in the Philippines' new educational delivery system has been conducted. The researchers wanted to document the lived experiences of six struggling math students at a national high school in Laguna who were enrolled in a modular distance learning program. The objective of this study was to gather baseline information on the struggles and experiences of math learners in the context of modular distance education. The researchers envisioned that by sharing these experiences, teachers would have a better grasp of their students' prior knowledge and make adjustments to their classroom instruction and pedagogy. In this regard, the new normal of learning may require an analysis and modification of current strategies. Similarly, this would serve as a foundation for developing and refining educational resources, initiatives, and practices geared at assisting children who are experiencing difficulties.

METHODS

Participants

This study used purposive sampling in order to select the six participants from one national high school in the Philippines who were enrolled in modular distance learning. Purposive sampling was used to identify pupils with a numerical value of 74% or lower who required remedial instruction. Researchers focused on the struggling students, and the data from the grade math 10 teacher revealed that out of 124 students, 9 or 7.26% in the first quarter and 18 or 14.52% in the second quarter are below 74%. Additionally, 24, or 19.35%, in the first quarter and 34 or 27.42% of grade 10 students in the second quarter need remedial education.

Research Design and Procedures

The researchers employed a phenomenological interpretive research approach to reveal and interpret the participants' lived experiences, allowing the researchers to trace and assess the participant's experiences in relation to a specific phenomenon (Ivey, 2013) and to interpret that from the perspective of the researchers as part of the study (Peat et al., 2019).

The researchers secured permission to conduct this study on the high school administration and the participants. Participants were ensured that the data was subject to confidentiality. Code names were used in the data analysis to protect the identity of the participants.

Since the semi-interview was utilized, the instruments were validated from the 3rd week of March to the 4th week of April 2022. After ensuring the quality of the instrument, the researchers conduct face-to face interview on the 1st week of April; 2022. In order to be successful, this strategy necessitates a conversation between the participant and the researcher, which is aided by a flexible interview process and strengthened by follow-up questions. This gives the researchers the chance to understand the viewpoints of the participants on how they approach their learning challenges at home, particularly in math subjects, and how their surroundings influence them while they engage in the modular distance learning modality. In order to learn more about the participants' experiences, the researchers occasionally asked follow-up questions and provided enough opportunity for participants to explain their answers. This was done to make the interview more casual and inclusive of everyone.

Instruments

The research instrument used by the researchers is a type of test instrument that consists of twenty-one interview questions outlining the study's purpose and specifying the anonymity and confidentiality of data responses. A semi-structured interview was utilized by the researchers and was approved and evaluated beforehand by a number of professionals and experts in the field of education.

Data Analysis

Thematic analysis was the method used to study the data. According to Braun and Clarke (2012), thematic analysis is a technique for systematically identifying, gathering, and explaining meaning patterns (themes) that are present across a data set. By concentrating on meaning throughout a data collection, thematic analysis enables the researcher to see and recognize common or shared meanings and experiences. This method is used to describe facts, but when choosing codes and creating themes, it also involves interpretation. The researchers employed open coding as a starting point.

The initial step in organizing distinct thoughts and topics was to use open coding (Williams & Moser, 2019). Researchers read the interview transcripts carefully and frequently. Then categorize and align the common student responses before drawing conclusions about the emerging themes. It simply implied that the researchers discovered the rising themes by repeatedly reviewing students' first-hand transcripts. The researchers adopted axial coding after open coding. In contrast to open coding, which derives the emerging themes, axial coding determines the relationships of the students' responses that will fall into place and support the developing themes that emerge (Williams & Moser, 2019).

In order to generate the statements of student responses, the researchers used axial coding by connecting the categorization of participants' identical responses. Additionally, the number enclosed in parentheses at the conclusion

of any statements that researchers infer from axial coding would represent the number of quantities that the students' responses have in common. The categorization and existence of the emerging themes were validated and checked by an expert in qualitative research. In doing so, we made sure that the responses provided by the participants were relevant to the themes.

Tables 1–4 in the following chapter present the ten (10) rising themes from the students' responses throughout the interview process. Open coding was utilized to represent the statements of the students' responses, and axial coding was employed to reflect the emerging themes. Researchers created four (4) themes to summarize the findings based on the emerging themes.

■ RESULTS AND DISCUSSION

The study investigated the lived experiences of struggling math students while they participated in distance learning. The analysis of the research results revealed four key emerging themes, which were combined into the acronym CLAS (Content, Structure, Assessment of Self-Learning Modules and Instructional Materials, Learning Environment, Accessibility of Modality, and Support System), that describe the lived experiences of struggling students during the time of distance learning. These key emerging themes were formed by utilizing open coding, axial coding of William & Moser (2019), and thematic analysis based on the recorded interviews with the participants of the study. Furthermore, these emergent themes were determined as data saturation have been reached indicated by saturation of code (Hennink et al., 2016) wherein after series of interviews, responses have been noted and heard repeatedly. On the other hand, enough information have been reached to support and replicate the study (O'Reilly & Parker, 2012).

Content, structure, assessment of self-learning modules and instructional materials

Students struggled to focus and connect with their peers and teachers through the monitor. Thus, the majority of students choose to use printed materials (Kim et al., 2021). However, it was discovered that although self-learning modules were provided by the school, students still encounter difficulties understanding their contents, and the examples given are not sufficient for them to understand.

Meniano and Tan (2022) discovered that the Department of Education's modules have low printing quality, which is in accordance with Panganiban and Madrigal (2021), indicating that there are insufficient resources in the Philippines for the development of modules. *"There are parts of the printed materials that were printed poorly" (Student D).* Leaving students and teachers unsatisfied with its quality and content (Dangle & Sumaoang, 2020).

School provides them with various learning materials, *"Along with the modules, we were given booklets containing guides that we can read. It is a way for us not to rely on the internet" (Student C)*. These materials allow them to obtain knowledge on their own (Sonza et al., 2022). However, some students expressed that *"...I experience hardships in those items where I have to show my solution since it means that I cannot cheat. You need to present the solutions based on how you understand them" (Student C)*. The amount of knowledge that students acquire is one of the effects of modular distance learning. Learning, especially in mathematics, becomes difficult and draining for them with the number of activities that they need to finish within a week and with the quality of materials that they need to study and understand. Teaching mathematical concepts and formulas and the need to expose the students to different types of mathematical problems will help them become

efficient problem solvers, as it requires analytical thinking (Siniguian, 2017). Apparently, teacher-student interaction was restricted due to barriers, as stated by parents, and it is manifested that students struggled to absorb information written in English (Kim et al., 2021).

Quizzes or assessments are administered in a synchronous setting to see if students have learned anything. And most of the participants expressed that *"There are times I cannot answer due to poor internet connection and accessing the internet in our place is too difficult" (Student C)* which results in stress (Biwer et al. 2021).

Students' evaluation affects the current state of their learning. Additional tasks are listed in the self-learning modules, but determining the learners' growth and progress by evaluating their module work does not ensure that they have learned or not. This crisis is seen by the Philippine Education Under Secretary as an ideal opportunity for parents to teach their children honesty in answering learning materials. However, one teacher in Quezon province, along with her coworkers, raised concern about their students, who may not be responsible for answering their activity sheets (Bernardo, 2020). In this case, it is difficult to determine if the student is truly learning.

Learning environment

While learning mathematics at home, students had numerous distractions. The learners described their dissatisfaction with their conditions as a source of distraction because they do not have their own personal learning place where they may study without being interrupted. *"I do not have a personal learning space except my own room and it is hard since my siblings are noisy" (Student A)*. There are students who are also committed to household duties. *"There are times I cannot accomplish my modules since I am always asked to run errands and it is a must to comply" (Student D)*.

Learning at home is one of the advantages of modular distance learning (Meniano & Tan, 2022). However, distractions are everywhere, and some pupils are susceptible to them depending on their surroundings. Students in self-learning modules reported that the most common challenge they faced during modular distance learning was the noisy atmosphere. *"There are loud vehicles passing by in front of our house and my siblings disturb me" (Student B)*. *"It is incredibly noisy, and it is coming from our neighbors, who are shouting like crazy. It is difficult to concentrate on answering my modules since it is so loud and distracting" (Student D)*.

Students appear to be unable to concentrate on their work owing to vehicle noise and unwelcome noise from their family and neighbors. According to Yang et al. (2020), students in noisy situations have lower focus levels, which affects their performance. MDL aims to fill the learning gap during the pandemic. But learning and studying at home has made the learners perform two roles: student and son or daughter, which has made it more difficult for them to follow up.

Accessibility of modality

A specific procedure for retrieving and distributing self-learning modules within the school grounds was imposed by the school in order to keep people safe. *"The modules were sorted per subject. There are certain baskets allotted for each subject for organization. After that they gave a new module to answer" (Student C)*.

Despite the school's best efforts, COVID-19's fear continued to plague the students, parents, teachers, and other school staff members. *"I am still not 100% sure of my safety because there is still a possibility of contracting the COVID-19 virus" (Student A).* The school took precautions to ensure their safety, including having facilities for good hygiene and hand washing, cleaning shared areas frequently, sharing health

information with parents, teachers, and students, physical separation and small groups, adequate and appropriate ventilation, and, of course, the use of face masks (UNICEF PHILIPPINES, 2021).

One of the beneficial outcomes of modular distance learning, according to Dargo and Dimas (2021), was cost-effectiveness. It saves time and money, particularly when it comes to student transportation allowances. However, it goes against the findings of this study. Students who reside far from their school face similar difficulties in passing and delivering their modules during the interview. *"It is difficult since the tricycle drivers either refuse to have a single passenger or decide to ask for an expensive fare" (Student C).* This behavior becomes one of the reasons why students fall behind in passing and receiving modules.

Support system

Self-learning modules allow students the freedom to decide what they will study, how they will learn it, when they will learn it, and where they will learn it (Sequeira, 2012). During the interview, some students stated their dissatisfaction with their families' lack of direction as to why they were unable to develop their mathematical grasp in modular distance learning. *"I cannot understand mathematical concepts since no one is available to teach me" (Student A). "If only there is someone who can explain the concepts to me, there is a possibility that I can understand it" (Student F).* Students who lack parental support struggle to understand the lessons. It is reasonable to conclude that any relatives' help is critical for students to complete a task successfully (Dangle & Sumaoang, 2020; see also Manlangit et al., 2020). It can be noted that studying independently is not totally plausible without the aid of any family members (Gueta & Janer, 2021; see also Dangle & Sumaoang, 2020).

This study discovered that students face difficulties in analyzing and understanding mathematics; thus, insufficiency in understanding is evident. Students tend to depend on someone who is older than them and forget the essence of modular distance learning, which is to encourage independent learning. *"Actually, my older sister completes my math assignments rather than me. I either ask her questions or let her respond to them because I don't understand the concepts" (Student A).* Due to the ease of getting the uncomplicated and correct answers, some students choose a "spoon-feeding" learning strategy (Khan, 2018).

The findings revealed that students do not take modular remote learning or autonomous study seriously. Poor guidance from their parents or guardians, who are expected to act as their teachers and instruct them in answering their self-learning modules at home, results in insufficient understanding. The Department of Education claims that some parents have acknowledged paying someone to answer their children's learning modules. This act is forbidden, according to a Philippine senator, because it hinders the teaching and learning of honesty (Nelz, 2021).
This study also found out that the teacher-student interaction was problematic among some participants. *"I felt shy approaching my teacher via message to ask questions, and I was nervous because the answer was already in the module, but I was still asking for something" (Student A).* Also, it was found that there was a paucity of feedback between the teacher and the students. *"Our answer sheets were not given back to us. We are also not provided with feedback regarding our work. Moreover, we do not know our score so we cannot reflect on the items if we did it right or wrong" (Student F).*

Students are unable to communicate with their teachers to seek clarification or ask questions about the module's content and subjects (Dargo

& Dimas, 2021). According to Sarvestani et al. (2020), students are having difficulty adapting to this type of modality due to inadequate communication between the student and the teacher. Which results in peer learning. A process by which students learn from and with one another, a learning that involves an individual exchanging knowledge (Andrews & Manning, 2015). *"I sometimes seek assistance from my classmates through messenger. If someone is knowledgeable about a certain topic, he or she explains it to the class" (Student E). "We shared and exchanged ideas about solving" (Student B).*

Mathematics is one of the most difficult courses for certain students (Gafoor et al., 2015; see also Ramadhan & Surya, 2021). And modular distance learning makes it much more difficult for the struggling learners who complained that math questions were difficult to solve and that there was no clear explanation offered. This seems to go against the findings of Hodgman et al. (2021), who discovered that students' academic achievement in the classroom depends on their ability to form meaningful relationships with their teachers.

■ CONCLUSIONS

While distance learning offered opportunities for learning continuity amidst the pandemic, it also entailed several challenges, especially among students who are struggling with Mathematics.

Students encountered learning difficulties in a variety of areas of the MDL adopted in their school, which were identified as key emerging themes from the study, namely Content, structure, assessment of self-learning modules and instructional materials, Learning environment, Accessibility of modality, and Support system (CLAS). These issues contributed to their learning difficulties, notably their understanding of the concepts in mathematics.

Furthermore, the use of open coding in this study revealed that the struggling students encountered a variety of learning blockages and challenges throughout the implementation of the distance learning modality. On the other hand, it was found that their experiences within the MDL framework were identical. As a result, it is reasonable to draw the conclusion that struggling students have the same difficulties studying mathematics in the post-learning environment.

Students are prone to learning barriers and require assistance to become independent learners. However, because of the complexity of the mathematics content and their lived experiences in the modular distance learning modality, it is guaranteed that the challenges from these factors combined will cause additional learning difficulties for struggling students. Students' learning is also influenced by their learning environment. As a result, unsettling learning environments result in poor learning and study habits. Furthermore, the MDL's accessibility cannot be applied to all sorts of learners due to a variety of circumstances that are beyond their control or may be a result of their socioeconomic condition. Students may find it difficult to submit their learning outputs. Thus, implementing the basic education learning continuity plan into practice does not guarantee the overall standard of the students' educational experiences. For struggling learners, issues with its operationalization and learning delivery remain a barrier. Furthermore, school-based support mechanisms can assist struggling students in adapting to the complexity of distance learning. On the other hand, the findings of this study can be used as baseline in improving distance learning among schools to better equip students with the competencies intended for learning continuity.

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