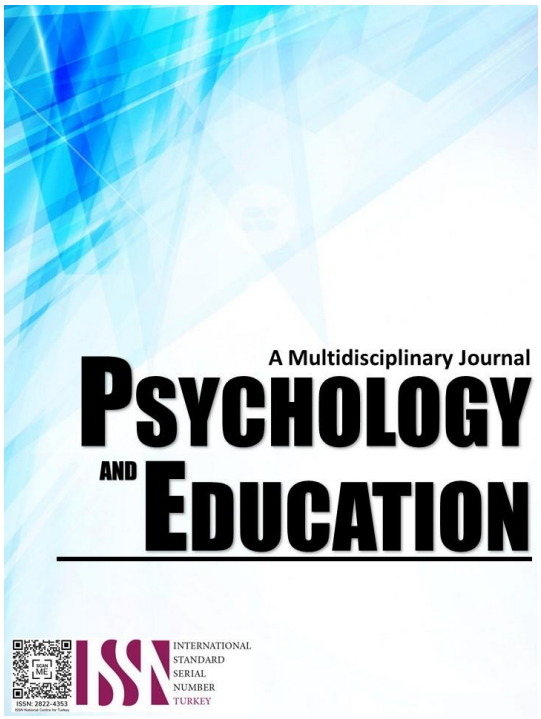
DELIVERING MATHEMATICS INSTRUCTION IN THE SENIOR HIGH SCHOOL AMIDST THE PANDEMIC: BASIS FOR ENHANCED LEARNING CONTINUITY PLAN



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Research Article

Delivering Mathematics Instruction in the Senior High School Amidst the Pandemic: Basis for Enhanced Learning Continuity Plan

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Abstract

This study investigated how teachers delivered mathematics instruction and how parents received it during the pandemic. Using mixed methods, 31 parents of 31 students, who took a 24-item mathematics test, responded. Thematic analysis was used for qualitative, while frequency counts, percentage distribution, mean, Kruskal-Wallis, and Wilcoxon Signed Ranks Test was used for quantitative. Teachers were highly active in terms of (1) packaging, distribution, and retrieval of self-learning modules, (2) learning activities, and (3) learning assessment, whereas parents perceived teachers to be highly involved in terms of (4) health safety. However, students' performance on numeracy fell short of expectations. Classifying parents by profile revealed significant differences in students' performance and teachers' engagement. Similarly, there was a correlation between the four instructional delivery components and students' performance. Parents cited their inability to assist their children at home as one of the teachers' difficulties but they perceived that teachers delivered a good education despite difficulties.

Keywords: *mathematics instructional delivery, modular learning, student performance*

Introduction

The nation's education system faced a critical time as a result of the coronavirus disease 2019 (COVID-19) epidemic (Toquero, 2020; United Nations [UN], 2020; World Health Organizations [WHO], 2020). The Basic Education-Learning Continuity Plan (BE-LCP), which was created by the Department of Education (DepEd) in response, saw schools adopt a new learning model after consulting closely with several affiliated agencies (DepEd, 2020; Philippine News Agency [PNA], 2020).

With the implementation, Salingay et al. (2021) highlighted how teachers gave mathematics instruction using the Assess-Practice-Present-Reflect (APPR) module. Activity sheets, study guides, and other self-study tools with different strategies were also used (Casing et al., 2021; Abante et al., 2021; Agaton & Cueto,2021), with parents as partners in assessing and monitoring students' progress (Batac et al., 2021; Gumapac, 2021). Meanwhile, Olivo (2020) found vital areas of challenges in the distribution and retrieval of modules, learning activities, assessment, and health safety measures, confirmed by Dargo and Dimas (2021) in their findings on how teachers gave instructions and how parents received them. Parents had issues with how they received instruction and their duties in assisting their students (Castroverde & Acala, 2021). Consequently, teachers must demonstrate flexibility to enable learning and communication in various ways (Edweek, 2020). Every home had become a school, and there were no longer any teachers to encourage and monitor learning. Therefore, teachers must be inventive to keep students interested (Worldbank, 2020).

Studying the delivery of mathematics instruction in the printed modular distance learning modality amid the pandemic is instrumental in describing how teachers deliver instruction and how parents receive it with their kids. Hence, this study focused on gathering and analyzing data on the delivery of mathematics instruction amid the pandemic as the basis for the enhanced continuity plan. These findings would help enhance the current learning continuity plan during the pandemic.

Research Questions

The study aimed to explore how teachers delivered mathematics instruction and how parents received it in the printed modular distance learning modality during the COVID-19 pandemic. This research specifically sought to provide answers to the following questions:

1. What is the socio-demographic profile of the respondents in terms of:
   1.1. Sex
   1.2. Highest Educational Qualification
   1.3. Occupation?
2. What is the extent of teachers' delivery of mathematics instruction as perceived by parents in terms of:
   2.1. Packaging, distribution, and retrieval of Modules

2.2. Learning Activities
2.3. Learning Assessment
2.4. Health Safety?

3. What is the level of a students' performance on a mathematics test?
4. Is there a significant difference in the extent of teachers' delivery of mathematics instruction when grouped according to the parent's profile?
5. Is there a significant difference in the students' performance on mathematics tests when grouped according to their parents' profiles?
6. Is there a significant relationship between the teachers' delivery of mathematics instruction as perceived by parents and students' performance on mathematics tests in the printed modular learning modality?
7. What are the difficulties of teachers' delivery of mathematics instruction during the pandemic, as perceived by parents?
8. What enhanced learning continuity plan can be devised to improve the students' mathematics performance in the printed modular learning modality?

Literature Review

Department of Education (DepEd) Learning Continuity Plan

The Philippines adopted a similar framework to other Southeast Asian countries like Brunei, Cambodia, Indonesia, and the Lao People's Democratic Republic. The 1987 Constitution's Article XIV, Section 2mandate requiring cooperation between public and private institutions in the educational system led to the creation of the Basic Education Learning Continuity Plan (BE-LCP), which has an adopted curriculum termed as most essential learning competencies (MELCs). Meanwhile, updated educational materials complied with the Philippine Intellectual Property Code. The Philippine Intellectual Property Code (PIPC) governed various school instructional delivery methods. Learners used self-learning modules (SLMs) in print or digital format/electronic copy with the help of trained parents, guardians, or tutors. DepEd surveyed to identify the type of delivery method that would be most effective given the specific location, economic situation, and topography of learners. Parents selected the printed modules. The teacher remotely assisted the learning process by checking andmonitoring students' progress and performance and, if circumstances permit, by home visits. Learners under printed modular distance learning also utilized other learning resources like activity sheets, study guides, and other helpful self-study materials.

Mathematics Instruction

K to 12 mathematics education is constantly evolving because mathematics teachers have been in adjustment not only in the content they teach but also how they teach (Braza & Supapo, 2014). In delivering mathematics instruction, students were more engaged when lessons were contextualized and localized (Jaudinez, 2019). Because of this, educators must integrate lessons into the students' daily routines. A modified assessment strategy could help if there were no board and seat work because of the pandemic. Performance tasks should take individual learners into account. For instance, general mathematics teaching in senior high would take time because it would be necessary to explain how to solve a specific problem and respond to any clarifying questions from the students. Constructivism employs a comparison (Mumu et al., 2017). It involves applying mathematics to practical circumstances. Constructivist mathematicians compared reasoning to the outside world. Students were able to link abstract ideas to actual ones because of this. Teachers would use analogies to help students understand mathematical concepts when demonstrating how to solve a particularproblem. When students had access to solutions and knew how to complete tasks, their comprehension and confidence increased (Edweek,2020).

Instructional Delivery

The interaction between the students, the teacher, the subject matter, and the curriculum happens in the delivery of instruction (DepEd, 2017). Teachers should find ways to teach students academic content in conjunction with instructional strategies (Bailey et al., 2013). Due to the students' educational needs and other classroom disruptions, it is now challenging to cover all DepEd-required competencies, such as those in mathematics (Jaudinez, 2019). According to reports by PNA and UNESCO in 2020, topographical conditions have historically posed a significant challenge. Amid the crisis, how much more? Locally, the division and regional offices implemented capacity-building programs through learning action cells (LAC), improved resource materials, and other methods to ensure that school teachers were ready. DepEd provided training and specialized programs for teacher development to meet the demands of the time. The national government generally implemented public health measures to minimize virus transmission, and educators discovered ways to adapt to and address the pandemic's changes. The community's needs during the pandemic led to modifications to traditional practices. As an educator at a senior high school,

Lanchico (2020) considered the changes the pandemic had made to his daily activities. He pointed out that the adjustments brought about by the suspension of laboratory activities and the postponement of off-campus activities led them to search for alternatives. He further stated that all parties involved, including the teachers, parents, and students, should take the initiative to deal with difficult situations. When faced with obstacles and changes, he suggested thinking of furthering teachers' education. There should be opportunities to provide excellent education even amid the pandemic. Similar to how DepEd began offering access to its various platforms, it also promoted learners' readiness by introducing them to the regional modalities that would be most helpful. Teachers, families, and community partners were all prepared by informational campaigns that urged local communities to support their students.

Packaging, Distribution, and Retrieval of Modules

In Negros Oriental, schools switched to the printed modular learning modality because access to the internet had been a significant barrier to online learning. It is important to note that although technology significantly contributed to faster communication, the nation still encountered constraints, according to Huawei's 2020 Global Connectivity Index. Due to the possibility of incomplete assignments, Labrado et al. (2020) emphasized that students should refer to the weekly home learning plan, which also requires accountability. The teacher implemented interventions as necessary, using a personal learning monitoring plan. The community and other interested parties helped with the use of regional resources. The moduleswere easier to understand than printed books because they covered the essential information.

The modules were easier to understand than printed books because they covered the essential information. Parents and guardians could spend less on transportation than on in-person classes held duringthe week. The significance of presentable modules being tidy, practical, and durable when carried to the completion of learning tasks supported related DepEd findings. The module's texts needed to be visible to encourage students to submit their answers on time. Flexibility on the part of a teacher was essential when students had good reasons for not receiving or returning the modules on time. The distribution and retrieval of modules and the facilitation of learning at home without official classroom interaction went to parents, guardians, and older siblings. They were promised technical support during orientation.

Additionally, parents learned about the teaching and learning process in the new normal, their duties as the home's new learning managers and facilitators, how teachers should compute grades, and the distribution and retrieval schedule for self-learning modules (SLMs).

Concerning the use of technology in teaching, DepEd was able to develop online training programs in early 2020. Some high school vocational tracks needed to demand hands-on to allay parents' worries about technology. Through delivery modalities, DepEd increased the accessibility of technology-based education and facilitated the use of technology by educators and parents. The National Educators' Academy of the Philippines hosted workshops and seminars for the department.

Learning Activities

For students to better understand mathematical concepts, teachers should encourage concrete examples, and parents should provide them at home (Khirwadkar et al., 2020). Things that fall under household goods can be used (Skarky, 2020). Teachers must create modified learning interventions to accommodate students who have trouble following instructions. The activities should align with the students' learning goals, so they can finish without worrying about where to look for the answers. It might be fun to teach mathematics using books and real-world examples (Sanchal & Sharma, 2017). The government has proposed creating textbooks rather than modules. According to Gueta and Janer (2020),the modules could extend over a period. Additionally, they emphasized the need for adequate time for assessment and monitoring of students' progress and safety supplies. Modules must also be simplified and should only contain the needed activities. These callfor more examples and explanations with fewer pointless exercises and activities. Teachers and parentscould use social media platforms to communicate.

A 2021 study was carried out in the Magallanes South District during the academic year 2020–2021 toexamine teachers' proficiency in the delivery of learning and multimodal approaches in the context of the new normal. One hundred fifteen 115 teachers and twelve (12) school administrators responded to the survey. The study found that teachers think they are highly competent in delivering multimodal learning. It was determined based on interactions between teachersand students, subject-matter expertise, active and personalized teaching-learning, and inclusion. Teachers are among the best at instruction and learning

assessment. Administrators at the schools claim that every subject, except active and individualized learning, is taught by outstanding teachers. Various learning modalities are affected by poor internet connectivity and a lack of training. Teachers should therefore continue to receive training on how to use multimodal learning. A strategy for efficient communication through meetings and dialogue between educators is a need. A workable scheme is possible. Problems should be brought to a higher official for a solution and future funding, according to Herrera and Janer (2021).

Learning Assessment

In the school year 2020-2021, DepEd introduced the learning activity sheets (LAS) based on the central office's most essential learning competencies (MELCs). More specifically, grade-level assessments and assignments involved learning exercises, guide questions, and a rubric for scoring (DepEd, 2020).

According to Olivo (2021), when the teacher chooses a learning assessment achievable in a specific amount of time, the teacher must alter learning tasks to meet the location and present needs of the learners. Self- learning assessments should provide meaning to students through accurate discussion representation in the given module. When students had fun and demonstrated engagement, their assessment results reflected better performance. According to DepEd Order No. 25, series of 2016, it is expected that teachers have a deep understanding of learner-centered assessment policies for the K to 12 Curriculum. Lessons and discussions must promote how to assessin a productive way that improves the following lessons. Assessment outcomes should help teachers use comprehensive assessment processes or revise assessments to suit learners' capacity.

DepEd also encouraged teachers to develop 21st-century skills and information and communications technology (ICT) integration during instruction and assessment. Implementing strategies is necessary to enhance courses that use ICT and consider the students' state and condition. Due to the variability of learning, educators must consider how to accommodate individual differences in lesson planning and application. Connecting lessons to familiar experiences of students would make lessons meaningful to them. Acknowledging unique contexts in a locality would deepen lesson discussion. Indigenization of assessment lessons could be effective when discussion promotes local culture (Inocian et al., 2019).

Health Safety

DepEd stressed that the local inter-agency task force (IATF) was a straightforward guide for each school to what type of health protocols and interventions local schools would have to employ. The school needed to follow health protocol by providing the availability of a thermal scanner, recording, alcohol dispenser, and disinfecting mats. Physical distancing through signages and posted reminders on campus should encourage less contact. Inside the classroom of local schools, by practice, provided boxes for distribution and retrieval of modules for order and avoidance of crowding.

Face masks and face shields became vital requirements when entering school. In order to improve accessibility, DepEd modified its Learning Resource Portal, DepEd Commons, and other learning resource portals and resources. To assist students in vulnerable circumstances, teachers underwent training. The said conditions were namely victims or at risk of child abuse and bullying, children in conflict-afflicted areas, children in disaster-prone areas, gifted children, and learners at risk of learning discontinuity due to the pandemic.

Students' Performance in Mathematics

According to Mazana et al. (2019), the learning and performance of students in mathematics could be affected by several factors: "students' attitude towards the subject, teachers' instructional practices, and school environment." Regarding effective schools with students consistently achieving, various studies also found that schools with strong and positive school-home relationships were effective despite the low social and economic neighborhoods (UNESCO, 2017). Students viewed success or failure could translate into the amount of effort in accomplishing the activity. The determinant of success or failure could be affected by ability, task difficulty, effort, and luck (Berglund, 2013). There is a shared responsibility of parents and teachers for a successful education (UNESCO, 2020). Engagement of both should be mutual in the form of school meetings or activities that may require parents to volunteer and support their children both at home and school. Thus, commitment is necessary for both parties so that students become motivated on which Delgado (2017) repeated that family support wouldlead to their children's educational success.

The United Nations (2015) emphasized that education should still be accessible even during times of war and crisis. Studies in 2020 also stressed that curriculum

planners should focus on exploring alternatives anchored on the depths of education for all.

Methodology

This study used mixed-method that explored a quantitative side of a particular condition with additional support on the qualitative side of establishing apparent features of the respondents through the conduct of Key Informant Interviews (KII). This study also investigated the nature and degree of associations or links between variables ofthis research (Quaranta, 2017).

Participants

Parents of senior high school students assessed the teachers' mathematics education during the 2020-2021 school year. Meanwhile, their kids took a 24-item test on General Mathematics, a core subject in senior high school to determine students' performance. The study also supported Key Informant Interviews (KII) for its qualitative side.

Instruments of the Study

This study utilized two instruments: a researcher-made questionnaire and a students' mathematics test. The survey questionnaire had four (4) parts described as follows:
Part 1 – Collected the basic information of the participants: sex, highest educational attainment, and occupation.
Part 2 – Assessed the parents' perception of the instructional delivery of mathematics by the teachers during the pandemic
Part 3 – Assessed the parents' perception of the teacher's involvement and difficulties teachers have faced in delivering mathematics instruction during the pandemic.
Part 4 - Collected the parents' observations/recommendations to improve the delivery of mathematics instruction during the pandemic. Key informants were also interviewed to get deeper understanding on the variables in question.

Meanwhile, to determine the level of students' performance, the researcher crafted a 24-item test in General Mathematics, which the thirty-one (31) students took as a subject in 2020-2021. This study used DepEd's Table of Specifications (TOS) to assure the test's validity, reliability, and equitable distributionof test items. The Essential Learning Competencies (MELCs) in General Mathematics served as the basis for the content. Additionally, key informants responded. They had a variety of experiences, viewpoints, and open opinions about the study's contributing variables (UCLA Center for Health Policy Research, 2020).

This study used face validity, which refers to a comprehensive questionnaire's appearance in practicability, readability, consistency of style and formatting, and clarity of the language used (Oluwatayo, 2012). Three jurors who were experts in the field of study validated the instrument using the criteria set by Good and Scates (1972) and was found to be acceptable. It had a good internal consistency using Cronbach's Alpha (0.798). Meanwhile, this research used a test-retest to examine whether the tools accurately captured the concept or domain under investigation and whether they reproduced the same outcome (Hobbs, 2016).

Procedures

Before the conduct, the researcher sought a letter of permission to conduct research from the school principal, district supervisor, and the schools division superintendent. With the approval, the researcher sought consent for willing parents, who were informed of the research goals and the scope of their participation and their rights to privacy. The students were also informed before they took the mathematics test. After distributing and retrieving the questionnaire during the distribution and retrieval of modules, gathered data were logged in, ordered, analyzed, and interpreted accordingly using Statistical Package forthe Social Sciences (SPSS) software. Additionally, the gathered data underwent data processing and validation by the Central Philippines State University Graduate School Research Center.

Results

This part discusses the results and findings of the study. These data were presented, analyzed, interpreted, and discussed according to the statements of the problem set in this study.

Profile of the Respondents

Table 1 shows the profile of the respondents using mean and percentage frequency. Regarding sex, using frequency count and percentage distribution, there were 9 (or 29.0) males and 22(or 71.0) females. It indicates more female parents who responded in the study. In terms of highest educational qualification, 11

(or 35.5) respondents studied elementary, which was the highest frequency, and 3 (or 9.7) finished highschool, which was the lowest. It implies that few respondents have degrees that may be beneficial inassisting their children with their education at home. Majority were 14 (or 45.2) housewives, indicating that their husbands must work to provide for them during the pandemic.

Table 1. *Profile of the Respondents*

		Frequency Count	*Percentage Distribution*
Sex	Male	9	29.0
	Female	22	71.0
Highest educational attainment	Elementary	11	35.5
	Elementary Graduate	6	19.4
	High School	6	19.4
	High School Graduate	3	9.7
	College Graduate	5	16.1
Occupation	Housewife	14	45.2
	Farmer	6	19.4
	Business Owner	1	3.2
	Employed	7	22.6
	Unemployed	1	3.2
	Retired	2	6.5
Total		31.0	100.0

The extent of Teachers' Delivery of Mathematics Instruction in terms of Packaging, Distribution, and Retrieval of Modules

Table 2 presents the extent of teachers' delivery of mathematics instruction as perceived by parents in terms of the packaging, distribution, and retrieval of modules. The highest mean (3.52) came from the indicator about the modules being clean, handy, and durable when carried. It means that parents saw the characteristics of cleanliness and durability of self-learning modules for their children. However, regarding the overall appearance of the module, parents viewed this as the lowest in its mean (3.13). This implies that the interchange of modules from one student to another affected the overall presentation of each module. For example, modules came back dirtier than before as they were passed from one home to another. In the actual practice of delivering mathematics instruction, more parents agreed that textsin the module were visible to read, the module cameon a regular schedule for their learners, and the distribution and retrieval time of modules was reasonable and sometimes flexible. Relative to the packaging of the module, ample practice and prompt feedback are required for a better chance of learning (Bringula et al., 2021). While self-efficacy is crucial for task completion, students' self-concept contributes to working out specific solutions for learning tasks and assessment (Agarin et al., 2020).

Table 2. *Mean of the Indicators in the Packaging, Distribution, and Retrieval of Self-learning Modules*

Indicators	*Mean*	*SD*	*Interpretation*
Modules are clean, handy and durable when carried.	3.52	.570	Very High Extent
The texts in the module are visible to read.	3.42	.620	High Extent
The overall appearance of module motivates my learner to answer on time.	3.13	.806	High Extent
Module comes on expected schedule of my learner.	3.48	.508	High Extent
Distribution and retrieval time of modules is reasonable, and sometimes flexible when students have valid reasons not to get it on time.	3.42	.672	High Extent
Total	3.39	.452	High Extent

The Extent of Teachers' Delivery of Mathematics Instruction in terms of Learning Activities

Table 3 presents the extent of teachers' delivery of mathematics instruction in terms of learning activities. The highest mean (3.52) was when the teacher provided a weekly home learning plan for the student to follow. It implies that the parents saw the learning plan as a guide for their children in achieving the tasks at home without teachers. Parents strongly agreed that the functions given followed competencies, with the teacher being able to modify interventions to cater to students who struggled in complying, so the student found them achievable. When it comes to students concerned about where to get answers to the exercises, this was the lowest mean score (3.13). It implies that parents saw struggle from their learners looking for answers, although activities were modified to cater to them. Word problems can be complex for most students, especially those who are struggling. Students enjoy solving word problems when they identify types of word problems than when they learn to only identify keywords (Williams, 2019).

Table 3. *Mean of the Indicators in the Learning Activities*

Indicators	*Mean*	*SD*	*Interpretation*
The teacher provides weekly home learning plan for the student to follow.	3.74	.444	Very High Extent
The tasks given are aligned with the learning competencies.	3.65	.486	Very High Extent
The student can answer the tasks without having to worry where to get answers.	3.13	.718	High Extent
The student finds the activities achievable.	3.26	.575	High Extent
The teacher creates modified learning interventions to cater students who have struggled in complying.	3.26	.446	High Extent
Total	3.41	.446	High Extent

The Extent of Teachers' Delivery of Mathematics Instruction in terms of Learning Assessment

Table 4 presents the extent of teachers' delivery of mathematics instruction as perceived by parents in terms of learning assessment. The highest mean (3.48) was about the learning assessments being meaningful and accurate. Parents agreed that the teacher had selected learning assessments achievable in time. It implies that because the learning tasks suited students' locality, the assessments in the learning modules became not only fun and appealing but also meaningful. However, parents viewed the lowest (3.19) when the assessments were enough to allowlearners to have the expected competencies. This implies that some parents believed the standard competencies as exceeding. That is why their students sometimes produce low scores during assessments. Meanwhile, assessment must be viewed as a process toall phases of teaching, including planning, classroom interactions and instruction, communication with parents, and self-reflection. Teachers can help students think about the relationships between specific pieces of evidence and draw inferences from that information by engaging them (Skarky, 2020).

Table 4. *Mean of the Indicators in Learning Assessment*

Indicators	*Mean*	*SD*	*Interpretation*
The teacher selects learning assessment that can be accomplished in a given time.	3.45	.568	High Extent
The teacher modifies learning tasks that suit the students' locality and current need.	3.39	.558	High Extent
Learning assessments are meaningful and accurate.	3.48	.626	High Extent
The assessments in the learning modules are fun and engaging.	3.23	.805	High Extent
The assessments are enough to allow learners to have the expected competencies.	3.19	.703	High Extent
Total	3.35	.521	High Extent

The extent of Teachers' Delivery of Mathematics Instruction in terms of Health Safety

Table 5 presents the extent of instructional delivery in terms of health safety. The highest mean (3.84) went to the distribution and retrieval of modules with boxes inside the classroom. This implies that parents saw the teachers following health protocol through organized distribution and retrieval, with wearing face masks mandatory. However, when it comes to the school strictly following physical distancing through signages and posted reminders on campus, parents viewed this as the lowest in its mean (3.55). It implies that parents saw instances of no observance of social distancing during distribution and retrieval despite signages. Vulnerable students may have limited access to protection and require additional attention and support. Teachers should develop specific initiatives to address their challenges, such as providing equitable and access to other learning resources in safe learning environments, ensuring socio-emotional students' needs are met. Protecting vulnerable students' education may be difficult for teachers, but it is also rewarding and provides them with an opportunity to learn in their way (UNESCO, 2020).

Table 5. *Mean of the Indicators in Health Safety*

Indicators	*Mean*	*SD*	*Interpretation*
School follows health protocol through thermal scanner, recording, alcohol dispenser, and disinfecting mats.	3.55	.624	Very High Extent
School strictly follows physical distancing through signages and posted reminders on campus.	3.45	.850	High Extent
Boxes are provided for distribution and retrieval of modules inside the classroom.	3.84	.374	Very High Extent
School updates their schedule for distribution/retrieval based on advice from Inter-Agency Task Force (IATF).	3.81	.402	Very High Extent
Wearing of face masks and/or face shields are mandatory while in school.	3.65	.551	Very High Extent
Total	3.66	.454	Very High Extent

Summary Results on the Extent of Teachers' Delivery of Mathematics Instruction during the Pandemic

Table 6 presents the summary of the teachers' delivery of mathematics instruction as perceived by parents. Using mean, the packaging, distribution, and retrieval of the self-learning module, learning activities, and learning assessment resulted significantly. With the highest mean on health safety (3.66), the learning assessment came the lowest (3.34). It suggests that parents recognized the efforts of teachers in delivering instruction in all four areas. Agarin (2021) confirmed this in his study that mathematics experts and teacher participants designed the modules in line with all the most critical learning competencies needed. It also contains a basic instructional design that can help to achieve the learning objectives, and the coherence and clarity of the presentations were noticeable. Well-prepared and structured modules affect learners in completing the required tasks, which is why modules should promote independent learning, cater to a wide range of learners, and their complexity level

corresponds to the students' level. Numerous studies also discovered that schools with strong and supportive school-home interactions thrive despite having low social and economic surroundings regarding productive schools with students achieving (UNESCO, 2017). On the other hand, health safety resulted very high. This result indicates that even though teachers were highly engaged in the first three areas, they were cautious when emphasizing health safety. Lanchico (2020) supported this claim by describing how senior high school teachers modified their strategies and adapted in response to the pandemic. Discipline-specific knowledge that is inflexible or limited can affect instructional delivery. So, it could be challenging to provide adequate instructive explanations when teachers with solid content backgrounds find it difficult to elaborate and dissect their disciplinary arguments and knowledge in understandable ways for students (Bailey et al., 2013).

Table 6. *Extent of teachers' delivery of mathematics instruction*

Teachers' Delivery	*Mean*	*SD*	*Interpretation*
Packaging, Distribution and Retrieval of Self Learning Module	3.39	.452	High Extent
Learning Activities	3.41	.446	High Extent
Learning Assessment	3.34	.521	High Extent
Health Safety	3.66	.454	Very High Extent

The Level of Students' Performance in terms of Mathematics Test Score

Table 7 shows students' performance in terms of mathematics test scores using mean. The mean percentage rating for the students' performance on the mathematics exam was 66.26. It did not meet the expectation. This implies that the majority of the senior high school students struggled with performing numeracy examinations in the course of the modular type of instructional delivery, which is also similar to the findings of Bringula et al. (2021). Moreover, Labrado et al. (2020) pointed out the sense of responsibility that students must have. Reaching out to those who can guide them to finish their tasks through concrete examples, according to Khirwadkar et al. (2020), can help students understand better. Support from parents and other stakeholders should also make learners find their tasks more manageable and create better performance (Herrera & Janer, 2021). It is important to note that mathematics education in grades K-12 is constantly evolving due to changes in the content and how teachers teach (Braza & Supapo, 2014). Performance challenges should consider each learner's unique learning styles, which is why it is important to give concrete examples. For instance, general teaching mathematics in senior high school requires more time since students frequently ask clarification questions once they understand how to answer a particular issue (DepEd, 2021). However, it is vital to recognize that several variables, including students' attitudes toward the subject, teachers' teaching strategies, and the school environment, impact students' mathematics performance (Mazana et al., 2019). Because when teachers became hesitant to evaluate and reflect on their work, they could also struggle with the instructional delivery.

Table 7. *Mean Score of Students' Performance*

Mathematics Test Score	*SD*	*Mean*	*Interpretation*
Students' performance	18.489	66.26	Did not meet expectation

The Significant Difference in the Extent of Teachers' Delivery of Mathematics Instruction

Table 8 to 8.2 show the extent of extent of teachers' delivery of mathematics instruction as perceived by parents when grouped according to parents' sex, highest educational attainment, and occupation. Using Mann-Whitney U and Wilcoxon W in terms of parents' sex, the health safety had the lowest mean (0.292) while learning and activities and assessment tied for the highest (0.848). All areas were considered insignificant because all p-values were above 0.05. This means that teachers' delivery does not vary per view of most parents in the instructional delivery. Similarly, Calimlim et al. (2021) pointed out that there was a uniformed engagement of teachers when a healthy home relationship supported the students' academic performance. Remote learning impact teenagers' learning, so there should be a more active parental role during a time of need (UNESCO, 2015).

Table 8. *Test of Significant Difference on the extent of teachers' delivery of mathematics instruction as perceived by parents when grouped according to sex*

Teachers' Delivery of Mathematics Instruction	*Sex*		
	p-value	*Decision*	*Interpretation*
Packaging, Distribution and Retrieval of Modules	0.535	Failed to reject HO	Not Significant
Learning Activities	0.848	Failed to reject HO	Not Significant
Learning Assessments	0.848	Failed to reject HO	Not Significant
Health Safety	0.292	Failed to reject HO	Not Significant

Using Kruskal Wallis Test and Chi-Square in terms of the highest educational attainment, only the learning activities(p-value=0.04) had a p-value lower than 0.05, thus rejecting the null hypothesis and finding it significant among the rest of the areas of instructional delivery. This means that the view of the parents in terms of teachers' delivery of mathematics instruction in the learning activities differed. According to DepEd Order No. 25, series of 2016, it is expected that teachers may modify their instructional delivery based on the K to 12 Curriculum assessment policies.

Table 8.1. *Test of Significant Difference on the extent of teachers' delivery of mathematics instruction as perceived by parents when grouped according to highest educational attainment*

Teachers' Delivery of Mathematics Instruction	*Highest Educational Attainment*		
	p-value	*Decision*	*Interpretation*
Packaging, Distribution and Retrieval of Modules	0.206	Failed to reject HO	Not Significant
Learning Activities	0.040	Reject Ho	Significant
Learning Assessments	0.555	Failed to reject HO	Not Significant
Health Safety	0.165	Failed to reject HO	Not Significant

Meanwhile, using Kruskal Wallis Test and Chi-Square, all instructional delivery areas were insignificant when referring to the parents' views when grouped according to occupation. This suggests that parents viewed the teachers' delivery of mathematics instruction the same among them. Relative to that, Zaccoletti et al. (2021) pointed out that teachers have embraced novel approaches like distance learning programs and available educational tools and platforms to minimize interruption. Parents were ensured that their students get instruction remotely during school closures. In this sense, parental assistance became common, particularly for struggling students who were less capable of independently managing the allotted learning activities. However, per interviews from parents, these methods prompted questions because not all parents could work alongside their kids, nor did every home have the necessary technology, such as laptops with wi-fi.

Table 8.2. *Test of Significant Difference on the extent of teachers' delivery of mathematics instruction as perceived by parents when grouped according to occupation*

Teachers' Delivery of Mathematics Instruction	*Occupation*		
	p-value	*Decision*	*Interpretation*
Packaging, Distribution and Retrieval of Modules	0.173	Failed to reject HO	Not Significant
Learning Activities	0.159	Failed to reject HO	Not Significant
Learning Assessments	0.250	Failed to reject HO	Not Significant
Health Safety	0.440	Failed to reject HO	Not Significant

The Significant Difference in the Extent of Students' Performance when grouped according to parents' profile

Table 9 to 9.2 show students' performance in terms of their mean percentage score in mathematics tests when grouped according to parents' sex, highest educational attainment, and occupation. Using Mann-Whitney U and Wilcoxon W in terms of parents' sex, μ was equal to 0.431 and p-value was equal to 0.453, thus failing to reject the null hypothesis and interpreting it not significant. It means that no variation of students' performance when their parents were grouped into sex. During modular instruction, mothers who were staying at home usually assisted their kids because their husband had to work every day, and they spoke of their struggles shifting obligations, student motivation, accessibility, and learning results (Garbe et al., 2020). Meanwhile, students were likely the same in performance because grade-level assessments and assignments were uniformed and contextualized (DepEd, 2020). Because contextualized delivery helps students connect abstract and concrete topics by employing reasoning as analogies to the actual world, constructivist education is beneficial for teaching mathematics during remote learning (Edweek, 2020).

Table 9. *Test of Significant Difference on the extent of students' performance in terms of their mean percentage score in Mathematics Test*

Mathematics Test Score	*Sex*			
	μ	*p-value*	*Decision*	*Interpretation*
Students' performance	0.431	0.453	Failed to Reject Ho	Not Significant

Using the Kruskal Wallis Test with a chi-square regarding the highest educational attainment, only the learning activities had a significant interpretation. Students' performance differed because of their parents' knowledge in helping them interpret how teachers devised and improvised examples to help students learn mathematical concepts (Khirwadkar et al., 2020). Result also suggests that parents' highest educational attainment affected how students performed in a customized learning intervention at home, where problems with following instructions could exist. The student must follow the teacher's weekly timetable for home learning. Still, sometimes the given tasks could not be the level of students' understanding, and they need more knowledgeable people to assist them. When completing the lessons, the learner does not have to worry about where to look for the answers. The student thinks he can complete the assignments when someone knowledgeable is nearby.

Table 9.1. *Test of Significant Difference on the extent of students' performance in terms highest educational attainment*

Mathematics Test Score	*Highest Educational Attainment*			
	μ	*p-value*	*Decision*	*Interpretation*
Students' performance	2.373	0.668	Failed to Reject Ho	Not Significant

Regarding occupation, using Kruskal Wallis Test with a chi-square, the students' performance had a p-value equal to 0.482. It was higher than the significant level of 0.050, thus failing to reject the null hypothesis and finding no significant difference in performance produced by students when their parents are grouped by occupation. When parents worked, extended family and neighbors supported them by assisting students in terms of giving students clarification about the learning activities and assessment. It also calls for teachers to have enough time, safety equipment, and space to assess and monitor teenagers' development when this happens to ensure that students are doing their job (Toquero, 2020). According to Landicho (2021), while educational institutions struggle to reduce the danger of the virus spreading, teachers should continue reviewing and reworking outmoded traditions to meet the demands for a decent education.

Table 9.2. *Test of Significant Difference on the extent of students' performance in terms of Occupation*

Mathematics Test Score	*Occupation*			
	μ	*p-value*	*Decision*	*Interpretation*
Students' performance	4.487	0.482	Failed to Reject Ho	Not Significant

Relationship between the Extent of Instructional Delivery of Mathematics Teachers and the Students' Performance

Table 10 shows the relationship between the extent of teachers' delivery of mathematics instruction as perceived by parents and the students' performance in terms of mathematics test scores in modular learning. Grouping based on negative ranks, the Wilcoxon Signed Ranks Test resulted in p-values equal to 0 in terms of the instructional and students' performance. The null hypothesis stating no significant relationship between teachers' delivery of mathematics instruction, as perceived by parents, and students' performance, was rejected. Similarly, the teachers' delivery of mathematics instruction affected students' performance. Results suggest that parents have observed the efforts exerted by teachers in the course of instructional delivery in terms of how they planned, prepared, and distributed modules, monitored students' progress, examined and assessed outputs, and commented on students' performance. It also points toward how teachers used time management and flexible teaching systems as adaptations to the changes brought about by the new average trend in education. Traits and acts such as flexibility, offering alternative plans, optimism, patience, and equipping oneself with the necessary skills for the new typical ways of education were all factors that strengthened teachers' coping mechanisms (Castroverde & Acala, 2021). Meanwhile, questioning the high extent of teachers' delivery of mathematics instruction to the students'low performance of students in terms of test results could suggest that there was a struggle that senior high school students faced with their retention in the printedmodular modality. Solving numeracy problems could have been affected by the struggle, thus lowering the chance for students to perform better. Mazana et al. (2020) pointed out that mathematical performance is affected mainly by students' attitudes toward the subject and other environmental factors (Chand et al., 2021) in the absence of teachers guiding them.

Meanwhile, schools with students steadily achieving, UNESCO (2017) found that they are schools with strong and positive school-home relationships despite financial struggles. Delgado (2017) added that family support enhances success in education despite difficulties.

Table 10. *Test of Relationship Between the Extent of Instructional Delivery of Mathematics Teachers during the Pandemic as perceived by Parents and students' performance in terms of Mathematics test score*

Students' performance vs	*Z-value*	*p-value*	*Decision*	*Interpretation*
Packaging, Distribution &Retrieval of Modules	-4.860	.000	Reject Ho	Significant
Learning Activities	-4.861	.000	Reject Ho	Significant
Learning Assessments	-4.861	.000	Reject Ho	Significant
Health Safety	-4.762	.000	Reject Ho	Significant

Difficulties of Teachers' Delivery of Mathematics Instruction during the Pandemic as perceived by Parents

Table 11 shows the difficulties faced by teachers in managing students' performance, according to parents. Through key informant interviews (KII) and thematic analysis, this study discovered the main challenges teachers faced. These were weak cellphone signals that delayed student inquiries, the distance between students' homes and schools, and parent's ability to help their children with further explanations of the module's activities. Parents observed that teachers performed well their duties and functions in the delivery of instruction despite limitations in the challenges of finding phone signals and the distance between the homes of their students and the school, which Guiamalon et al. (2021) supported byexamining the technical aspects of teachers and the school where they teach.

Theme 1: Weak Signal obstructing Querying Process. Manang saw difficulties, including a weak signal in their area that prevented the querying procedure for Self-Learning Modules (SLMs) at home. Eugenio concurred that students needed to rely on teachers to use the materials. However, cellphone use ended up being the primary cause of tasks in the module not being completed because of unanswered questions that teachers could likely address. When more queries came up as a result of the students completing the activities, Jimmy pointed out that the inquiring process would become quite challenging because teachers could not immediately respond to queries from students and vice versa. Meanwhile, Primo argued that in the event of a pandemic in learning continuity, teachers and parents must help children accept the new norm by making the required preparations for listening to and taking down instructions from teachers to avoid inquiries while they are not in class. Although cellphone signals prevented clear communication, Felipe said that teachers might nevertheless consider students who were unable to complete work because of uncertainty and provide them enough time to finish on their terms.

Theme 2: School being far from home. Jimmy said that the distance between the house and the school made it hard for students to learn, even with trained teachers. As Manang pointed out, the distance betweenthe school and the student's homes meant that they were unable to ask their questions to the teachers in person. Primo also discovered the challenges faced by both parties due to the distance between their homes and schools. Primo learned that teachers had to overcome challenges to provide adequate follow-upfor students who were not meeting their academic potential. In the meantime, Felipe and Eutemio agreed in that they believed that the bewilderment of the new situation also became a considerable problem when learners were not around teachers who could have shed light on the matter of understanding the modern educational system.

Theme 3: Capacity of Parents to assist their students. As honest parents, Eutemio and Mameng admitted that they struggled to help their children succeed because they lacked the same level of education as their high school students. Because of their educational constraints, Jimmy and Felipe were also eager to seek advice from nearby neighbors and relatives who had completed more academic work. Primo noted an uptick in educational delivery as aresult of teachers receiving pandemic-appropriate training and professional development but said thatchallenges were typical in the instructional delivery as a whole because, like him, parents had this setup forthe first time in many years. Primo and Jimmy advocated for ongoing professional development in the delivery of multimodal learning approaches for educators, as well as a strategy for open communication between educators and school administrators through regular face-to-face meetings and two-way interaction. Manang and Eutemio also suggested reaching out to higher-ranking officials for help in solving problems and securing adequate funds in the future.

Table 11. *The rank of Difficulties in Instructional Delivery of Mathematics Teachers during the Pandemic as perceived by Parents*

Teachers' Challenges	*Rank*
Weak Cellphone Signal	1
School Distance from Students' House	2
Capacity of Parents to Assist Students	3

Discussion

This study mainly investigated the delivery of mathematics instruction amid the pandemic being a basis for an enhanced development plan. Similarly, it sought the relationship between teachers' delivery of mathematics instruction as perceived by parents and the students' performance in a mathematics test. In terms of the distribution of respondents, females had a wide margin of number compared to males. Most of the respondents did not obtain a college degree. Respondents were primarily housewives and farmers. The teachers' involvement in the instructional deliveries as perceived by parents resulted in a high extent relative to the packaging, distribution, and retrieval of self-learning modules, learning activities, and learning assessment while a very great extent in terms of health safety. In terms of students' performance, the mathematics test resulted to having not meeting expectation, suggesting the majority of senior high school students struggles in carrying out numeracy examination in the modular type of instructional delivery. Teachers' extent of involvement in all areas identified, according to the parents' view by profiles (sex, highest educational attainment, occupation), exposed significant results regarding students' performance in the mathematics test result. Similarly, the packaging, distribution, and retrieval of self-learning modules, learning activities, and learning assessments had a significant relationship with students' performance. Parents indicated in Key Informant Interviews (KII) that the most difficult challenges faced by teachers were weak cellphone signals that delayed answering students' questions, distance from students' homes to school, parents and ability to assist their children in explaining further the activities in the module. Despite the difficulties in finding phone signals and the distance between their students' homes and schools, parents observed that teachers were willing to carry out their duties and functions in the instructional delivery.

Conclusion

Based on the results and findings, this study concluded the following: Respondents were predominantly females, had no college education, and were mostly housewives. Parents' perception of the teachers' delivery of mathematics instruction led to a significant degree in the packaging, distribution, and retrieval of self-learning modules, learning activities, and learning assessment, but a very significant degree in health safety. Classifying parents by sex, highest educational attainment, and occupation revealed significant disparities in teachers' engagement and students' performance. However, the mathematics test result fell short of expectations in students' performance, indicating that most senior high school students have difficulty completing numeracy exams when instruction is delivered in modules. It is consistentwith the study of Labrado et al. (2020) and Khirwadkar et al. (2020) that pointed out the sense of responsibility of students through practice and support from people closer to home (Herrera & Janer, 2021) in the process of individual learning (Feidakis, 2016; Cabual, 2021; Cox, 2021). Moreover, students' performance is also affected by the parents who cited their educational attainment and occupation as causes of their minimal ability to assist their children at home. Throughout the pandemic, teachers exhausted their teaching means to deliver a good education, per key informants. Thus, despite the other factors affecting students' performance, there was still a considerable correlation between teachers' delivery of mathematics instruction and students' performance. Parents indicated in Key Informant Interviews (KII) that teachers faced difficulties because of weak cellphone signals for teacher-student communication, the home-school distance, and parents' ability to assist their children in explaining the module's activities further. Despite the difficulties in finding phone signals and the distance between their children's homes and schools, parents indicated that teachers were eager to fulfill their commitments and roles in the instructional delivery.

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