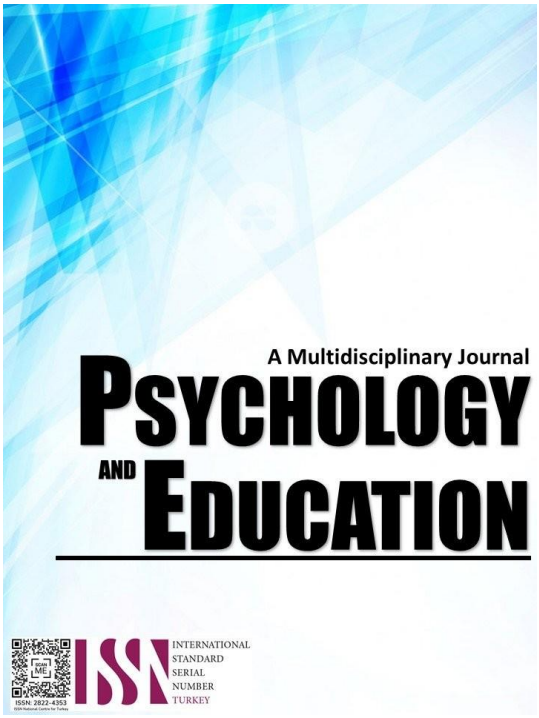
DIGITAL MODULAR DISTANCE LEARNING AND THE LEARNERS' ACADEMIC PERFORMANCE IN MATHEMATICS



PSYCHOLOGY AND EDUCATION: A MULTIDISCIPLINARY JOURNAL

Volume: 22
Issue 8
Pages: 964-974
Document ID: 2024PEMJ2113
DOI: 10.5281/zenodo.13125398
Manuscript Accepted: 03-25-2024

Psych Educ, 2024, **22**(8): 964-974, Document ID:2024PEMJ2113, doi:10.5281/zenodo.13125398, ISSN 2822-4353

Research Article

Digital Modular Distance Learning and the Learners' Academic Performance in Mathematics

Gedelyn T. Guillermo*, Teresita B. Sambo
For affiliations and correspondence, see the last page.

Abstract

This study aimed to analyze the Grade 9 learners' perspectives on digital modular distance learning in terms of module quality, facilitation of digital modular distance learning and learning experience, and their academic performance in Mathematics. It also analyzed the link between the learners' perspectives on digital modular distance learning and their socio-economic profile. Descriptive-correlational research was employed in this study. A total of 129 learners in Grade 9 in Marcela T. Mabanta National High School were the respondents of this study. The results of the study revealed that the socio-economic profile of the learners did not affect their perspectives in digital modular distance learning. It further revealed that the academic performance of the Grade 9 learners was affected by their perspectives in regards to digital modular distance learning in terms of the module quality and the facilitation of digital modular distance learning. Meanwhile, their learning experiences did not affect their academic performance in Mathematics. An intervention plan on Mathematics in digital modular distance learning was crafted. Future researchers who would conduct research related to "Digital Modular Distance Learning" should also consider the findings of this study in drafting their related concepts.

Keywords: *digital modular distance learning, learners' academic performance, mathematics*

Introduction

The COVID-19 pandemic, which started in China has become a major threat worldwide. It has caused alarming public health challenges as the fatality rate continues to rise in most countries including the Philippines. It has brought intense and devastating impact. It has resulted in nationwide school and university closures and no one knows when it will end. As the most viable response to curtail the virus, the Department of Education (DepEd) has ventured into exploring varied remote learning modalities which greatly distresses the educational milestone of the most vulnerable individuals— the learners. It put them into a serious and challenging situation with the Volatility, Uncertainty, Complexity, and Ambiguity (VUCA) of the situation. As reported by UNESCO (2020), there are over 28 million Filipino learners across academic levels who have to stay at home and comply with the Philippine government's quarantine measures.

In response to these situations, the Department of Education (DepEd) institutionalized educational measures through the issuance of DepEd Order No. 12, s.2020, entitled "Adoption of the Basic Education Learning Continuity Plan (BE-LCP) for the School Year 2020-2021 in Light of the COVID-19 Public Health Emergency." The BE-LCP aimed to ensure learning continuity through K-12 curriculum adjustments, alignment of learning materials, deployment of multiple learners' delivery modalities, and proper orientation of parents or guardians of learners.

Distance learning is referred to a modality where instructions were given by teachers to learners in a geographically remote setting. The said modality has three types, namely: Modular Distance Learning (MDL), Online Distance Learning (ODL), and Television/Radio-Based Instruction (TRBI) (Quinones, 2020). Among the types of modality, 8.8 million out of the 22.2 million enrollees (39.6% of the total respondents) preferred MDL based on the data gathered via DepEd's National Learner Enrolment and Survey Forms (LESFs) (FlipScience, 2020). This modality used Self-Learning Modules (SLMs) based on the Most Essential Learning Competencies (MELCS) provided by DepEd. As technology and internet connectivity remained a problem for most students, MDL-printed was commonly utilized by most schools.

In the context of Marcela T. Mabanta National High School (MTMNHS), Division of Lanao del Norte, learners were privileged to become beneficiaries of the tablets provided by the Local Government Unit (LGU) of the Municipality of Kauswagan. Hence, the school employed the Digital Modular Distance Learning (DMDL) where teachers were tasked to upload the self-learning modules and other instructional materials in the tablet given to the learners every week through their parents/guardians. Teachers facilitated learning and monitored the progress of the learners through giving assistance and remediation. They were using different platforms like messenger, call, text, zoom among others. They as well conducting home visitation to learners needing special attention following the health protocols.

However, despite the effort and support provided, it was evident that the abrupt transition possibly exacerbated the existing disparities within the education system. In fact, among all the learning areas, it was found out that Mathematics obtained the lowest mean percentage score (MPS) of 64.5% in the first grading period and 69.7% in the second grading respectively. According to Nyaumwe (2013), Mathematics was considered as a fundamental part of human thought and logic in his pursuit to understand the world in which he lives. This concurred with Skemp (2008) who posited that Mathematics had provided an effective way of building mental discipline and fostered logical reasoning as it prepared one for the future world.

On the aforementioned observations and contentions, the researcher examined the factors and perspectives that cause the low performance in Mathematics of the Grade 9 learners of MTMNHS. Specifically, the study investigated learners' perspectives on DMDL in terms of module quality, facilitation, and learning experiences and how these affected their academic performance in Mathematics in the third grading period of the school year 2020-2021. This also determined to bridge the gap and provide appropriate interventions and evidence-based decisions on how to uplift the present status. Likewise, as a facilitator of learning, the result of the study personally served as a guide for the researcher who is a public junior high school teacher for eight years in the school.

Moreover, this would be a great help in enhancing the school learning continuity plan as it hopes to help teachers to be more innovative and resilient in providing quality education in secondary education in this time of the pandemic.

Research Questions

This study investigated the learners' perspectives on digital modular distance learning and their academic performance in Mathematics. Specifically, it sought to answer the following questions.

1. What is the socio-economic profile of the respondents in terms of:
    1.1. age,
    1.2. parents' highest educational attainment,
    1.3. family monthly income,
    1.4. learner' status, and
    1.5. number school-aged siblings?
2. What is the level of respondents' perspectives on digital modular distance learning in terms of:
    2.1. module quality,
    2.2. facilitation of digital modular distance learning, and
    2.3. learning experience?
3. What is the respondents' academic performance in Mathematics?
4. Is there a significant relationship between the socio-economic profile of the respondents and their perspectives on digital modular distance learning?
5. Is there a significant relationship between the level of respondents' perspectives on digital modular distance learning and their academic performance in Mathematics?
6. What intervention plan can be designed based on the results and findings of the study?

Methodology

Research Design

Descriptive-correlational research was employed in this study. Descriptive-correlational studies described the variables and the relationship that occurred naturally between and among them (Sousa et al., 2007). Descriptive design was used to determine the socio-economic profile of the respondents as well as their level of perspectives on digital modular distance learning and their academic performance in Mathematics. Likewise, the correlation was used to determine the relationship between the respondents' socio-economic profile and respondents' perspectives on digital modular distance learning as well as the significant relationship between the respondents' level of perspectives on digital modular distance learning and academic performance in Mathematics.

Respondents

The respondents of the study were the one hundred twenty-nine (129) Grade 9 learners of Marcela T. Mabanta National High School from the two hundred fifty-eight (258) total population of Grade 9 learners for the school year 2020-2021. The third grading average in Mathematics as reflected in their school card was the basis of the academic performance of the learners. In getting the total number of respondents, the researcher got the fifty percent (50%) population in each section. Simple random sampling was utilized to determine the respondents for each section. Even-numbered learners in the class record were taken as respondents in this study. Table 1 showed the distribution of respondents.

Table 1. *Distribution of Respondents per Section*

Section	*Population*	*Percent*	*Total*
Garnet	52	50	26
Jade	52	50	26
Opal	56	50	28
Pearl	52	50	26
Zircon	46	50	23
Total	258	100	129

Instruments

A researcher-made questionnaire was used to gather data on the digital modular distance learning perspectives of the learners who

participated in the study. The questionnaire was pilot tested to the 50% of the grade 9 learners who were not included as participants of the study of the same school. The results of the pilot testing were submitted to the adviser for suggestions and comments before it was finalized. The reliability coefficient of the questionnaire was 0.848 in terms of module quality, 0.888 for the facilitation of digital modular distance learning, and 0.755 for learning experiences which meant the questionnaire was acceptable to be utilized in the study. The researcher reproduced the final copies for the junior high school students after the approval and validation of the instruments.

The instrument had two parts. Part 1 dealt with the socio-economic profile of the respondents in terms of age, parents' highest educational background, family monthly income, learners' status, and a number school-aged siblings. On the other hand, Part 2 of the instrument measured the respondents' level of perspectives on digital modular distance learning which had three (3) subscales namely, module quality, facilitation, and learning experiences. The respondents checked the appropriate column when responding to the questions. It utilized a Likert Scale with the following points for scoring purposes: 4 points for Strongly agree, 3 points for Agree, 2 points for Strongly Disagree, and 1 point for Disagree. Statements in the questionnaire were translated in Filipino to address the varied culture and to provide a better understanding and gathering of reliable responses from the respondents.

Procedure

In gathering the data, the researcher requested permission from the Schools' Division Superintendent to formally conduct the study. With the approval of the Division Superintendent, the researcher proceeded to the District Supervisor, School Head, and Parents through a letter signed by the Dean of St. Peter's College Graduate Studies before the administration of the survey questionnaire.

The researcher personally administered the distribution and retrieval of questionnaires with the coordination of the respective advisers. Parents/guardians were the ones oriented as to how to answer the questionnaire since they were present during the distribution of self-learning modules and answer sheets. The learners who were the respondents of the study were not allowed to enter the school campus due to the mandate of the Inter-Agency Task Force (IATF). The questionnaire was retrieved after one week. After that, the results were consolidated, organized, tallied, and tabulated for analysis. Confidentiality of their answers was assured by the researcher. During the distribution and retrieval of questionnaires, the researcher, advisers of the 5 sections involved in the study, school staff, and parents/guardians of the learners practiced health and safety protocol mandated by the Inter-Agency Task Force of the Department of Health at all times.

Data Analysis

The data was tabulated and interpreted to acquire the actual information needed. The following statistical tools were employed to arrive at an accurate analysis and interpretation of the data gathered.

For problem 1, frequency and percentage were used to determine the socio-demographic profile of the learners in terms of age, parents' highest educational attainment, family monthly income, learners' status, and a number of school-aged siblings and final grade in Mathematics for the third grading.

For problem 2, weighted mean was used to determine the respondents' level of perspectives on digital modular distance learning in terms of module quality, facilitation of digital modular distance learning, and learning experiences.

For problem 3, the mean percentage score in the new normal based on DepEd criteria was used to determine the academic performance of learner respondents in Mathematics.

For problems 4 and 5, Pearson product moment correlation was used to determine the significant relationship between the respondents' socio-economic profile and perspectives on digital modular distance learning as well as the significant relationship between the respondents' level of perspectives on the digital modular distance learning and academic performance in Mathematics.

All the computations were done manually with the statistics software of an accredited statistician.

Results and Discussion

This section discusses the data that are shown in the tables. The data were analyzed, interpreted, and supported by related literature or studies.

Problem 1. What is the socio-economic profile of the respondents in terms of age, parent's highest educational attainment, family monthly income, student status, and a number of school-aged siblings?

Table 2. *Respondents' Age*

Age	*Frequency*	*Percentage*
13-14 years old	15	12.00
15-16 years old	89	69.00
17-18 years old	19	15.00
19 years old & above	6	4.00
Total	129	100.00

Table 2 illustrates the profile of learners in terms of age. The data indicated that the highest number of respondents in terms of age was 15 to 16 years old and the lowest number of respondents was 19 years old and above. The ages of the respondents were appropriate for junior high school. Under the K to 12 program learners in secondary education were generally from 12-17 years old (DEPED, 2019).

Table 3. *Parent's Highest Educational Attainment*

Educational Attainment	*Frequency*	*Percentage*
Elementary Level	21	16.00
Elementary Graduate	28	22.00
Secondary Level	30	23.00
Secondary Graduate	34	26.00
College Level	6	5.00
College Graduate	5	4.00
Vocational	5	4.00
Total	129	100.00

Table 3 illustrates the distribution of the respondents according to their parents' highest educational attainment. According to the report, secondary graduates made up the majority of the respondents. Since most parents did not finish their studies, they may not be familiar with the lesson, so it becomes difficult for them to guide and assist their children in answering the task in the modules. Higher educated parents were more inclined to support their children's education, according to Velleymalay (2012). In contrast to parents with low levels of knowledge, they can also establish learning patterns for their kids.

Furthermore, the study conducted by Dangle and Sumaoang (2020) identified the primary obstacles that arose in the learners' learning experience, such as difficulty completing assignments on their modules and parents' lack of academic skills to mentor their children.

Table 4. *Respondents' Family Monthly Income*

Family Monthly Income	*Frequency*	*Percentage*
Below 5,000.00	93	72.00
5,000.00-10,000.00	25	19.00
10,000.00-15,000.00	6	5.00
15,000.00 above	5	4.00
Total	129	100.00

Table 4 shows the distribution of the respondents according to their monthly family income. The data revealed that the majority of the respondents' parents had below 5,000.00 families' monthly income. The majority of respondents, according to the results, had low monthly incomes. With the prices of commodities rising due to the current epidemic, an income below 10,000 would not be adequate. Bhat et al. (2016) cited that a family with a high income could provide the necessary skills, knowledge, tools, and instruments that were needed by the learners. Furthermore, Loken (2010) highlighted the significant detrimental effects that income has on children from low-income households' IQ and education. Higher-income families experienced a significant drop in those effects, nevertheless.

Table 5. *Learners' Status*

Learners' Status	*Frequency*	*Percentage*
Full-time Student	106	82.00
Working Student	23	18.00
Total	129	100.00

The distribution of respondents by learners' status is displayed in Table 5. Of the respondents, 82% were full-time students and only 18% were students who were also employed. The majority of responders were full-time students, according to the results, suggesting that most of them had enough time to complete their programs. Muluk (2017), on the other hand, found that students were still above average even after working a part-time job. Nonetheless, in several instances, the duration needed to complete their coursework exceeded that of individuals without part-time jobs.

Table 6. *Respondents' Number of School-aged Siblings*

School-Aged Siblings	*Frequency*	*Percentage*
0	8	6.00
1	18	14.00
2	40	31.00
3	33	26.00
4	18	14.00
5	8	6.00
6 and above	4	3.00
Total	129	100.00

The distribution of respondents by number of siblings in school is displayed in Table 6 (Figure 7). It was shown that the majority of responders had two or more siblings who were in school. According to Korir's (2017) study, having several siblings had no bearing on

a student's academic achievement.

Problem 2. What are the level of respondents' perspectives on digital modular distance learning in terms of module quality, facilitation of digital modular distance learning, and learning experience?

Table 7. *The Level of Respondents' Perspectives on the Digital Modular Distance Learning in Terms of Module Quality*

Modular Quality	*Weighted Mean*	*Remarks*
MQ1: The way the module materials are presented helped to maintain my interest.	3.15	Agree
MQ2: The instruction on how to complete the tasks are easy to follow.	2.96	Agree
MQ3: Resources from the modules are easy to access and help me understand the core concept of the module.	3.00	Agree
MQ4: The activities of the modules give me the opportunity to interact with my peers when learning.	3.00	Agree
MQ5: The modules are crafted according to my level of understanding and font size, font style and illustration are clear and visible.	3.07	Agree
MQ6: I am satisfied with the quality of the modules.	3.04	Agree
	Average 3.04	Agree

Note: 1.00-1.79 Strongly Disagree; 1.80-2.59 Disagree; 2.60-3.39 Agree; 3.40-4.00 Strongly Agree

The degree of respondents' opinions regarding the quality of digital modules for distant learning is shown in Table 7. The results indicated that the respondents agreed with the points made and the perspectives surrounding digital modular distance learning, with a weighted mean average of 3.04 and a description of "agree." With a mean of 3.15, the perspective with the highest mean was the one that said how the module materials were presented had helped to keep their interest. The statement with the lowest mean, which had a mean of 2.96, was that it was simple to follow the instructions on how to perform the tasks.

These results aligned with Lockwood (1998) as he emphasized the difference between the characteristic of textbooks and modules and pointed out the advantages of the latter, to wit: modules aroused interest, written for learners' use, gave an estimate of study time, were designed for a particular audience, always gave aims and objectives, and may have many ways through it. Additionally, these were designed with the needs of the students in mind, placed a strong emphasis on self-evaluation, could identify possible problems, consistently provided summaries, had a more casual tone, unpacked the content, had a more open layout, consistently assessed students, gave advice on study techniques, demanded an active response, and had the goal of effective teaching.

Similarly, Charles's (n.d.) research found that students could effectively acquire mathematics by using the modular approach to the subject. He also stressed that using modules which were self-contained packages dealing with one specific lesson convenient form, so that learner can identify the objectives and evaluate his accomplishments. This enabled the learners to have control over their learning and accept responsibility for learning. In addition, Tan-Espinar and Ballado (2017) validated a module in mathematics that had boosted the learners' independent learningThey emphasized once more how a module's contents had to be legitimate and acceptable. Jayaram and Dorababu (2020) stated that the success and effectiveness of distance learning depended on the study materials provided to the learners.

Table 8. *The Level of Respondents' Perspectives on the Digital Modular Distance Learning in Terms of Facilitation of Digital Modular Distance Learning*

Facilitation of Digital Modular Distance Learning	*Weighted Mean*	*Remarks*
FDMDL1: I could ask my teacher questions and receive a quick response when necessary.	2.89	Agree
FDMDL2: My teacher encourages me in my studies.	3.07	Agree
FDMDL3: My teacher provide feedback on my progress both in written and performance tasks and explained the mark that I received.	3.07	Agree
FDMDL4: My teacher uses a friendly/personal tone in giving feedback.	2.70	Agree
FDMDL5: My teacher conducts home visitation to follow up and monitor my performance.	3.15	Agree
FDMDL6: I am satisfied with the support provided by my parents/guardians on my modules.	2.96	Agree
	Average 2.97	Agree

Note: 1.00-1.79 Strongly Disagree; 1.80-2.59 Disagree; 2.60-3.39 Agree; 3.40-4.00 Strongly Agree

Table 8 below illustrates the level of respondents' perspectives on the digital modular distance learning in terms of facilitation of digital modular distance learning. According to the data, there was agreement with the weighted mean average of 2.97. It indicated that the respondents agreed with every statement made by the researcher earlier. The respondents seemed happy with the way the lecturers led the digital modular distance learning based on their comments.

Students who were taught using a modular approach scored higher in the study conducted by Khalil and Yousuf (2020), which was published in their paper on the impact of modular approach instruction on secondary school mathematics students' achievement. In digital modular distance learning, students can contact the instructor via phone, text message, instant messaging, email, and other means. Teachers should be involved most of the time, according to Dangle and Sumaoang (2020), so that they can respond to the concerns of both parents and students. Additionally, if a student needs remediation or support, the instructor should make house calls (Llego, 2020).

Table 9. *The Level of Respondents' Perspectives on the Digital Modular Distance Learning in Terms of Learning Experience*

Learning Experience	*Weighted Mean*	*Remarks*
LE1: I found difficulty in coping with digital modular distance learning because I am a working student.	2.56	Disagree
LE2: I have difficulty in answering the modules.	2.74	Agree
LE3: I can answer all activities on my own.	3.22	Agree
LE4: I prioritize the completion of my modules than being hooked to online games and social media.	3.15	Agree
LE5: I can manage my study time effectively and easily to complete assignments on time.	2.56	Disagree
LE6: I have difficulty complying with my modules on time because I also assist my younger sibling/s in answering their modules.	2.75	Agree
	Average 2.83	Agree

Note: 1.00-1.79 Strongly Disagree; 1.80-2.59 Disagree; 2.60-3.39 Agree; 3.40-4.00 Strongly Agree

The level of respondents' opinions on the digital modular distance learning in terms of the learning experience is displayed in Table 9. A weighted mean average of 2.83 indicated agree, implying that the respondents agreed with the assertions provided. The following statements were confirmed by the respondents: I struggle to complete my modules; I can do all activities by myself; I put finishing my modules ahead of playing online games and using social media; I struggle to complete my modules on time because I also help my younger siblings with their modules. However, because they were working students and could easily manage their study time to finish assignments on time, the respondents disagreed with the comments that students found it difficult to adjust to digital modular distance learning. Trovela (2021) cited in her study that "intrinsic motivation" in the learners had driven them to finish different tasks on the module, it showed that they set their minds to finish the task even if it was hard because eventually, they would be able to finish it.

Problem 3. What is the academic performance of the respondents in Mathematics?

Table 10. *Respondents' Academic Performance in Mathematics*

Grade Range	*Performance Category*	*Performance in Mathematics*	
		F	*%*
90-100	Outstanding	3	2.00
85-89	Very Satisfactory	44	34.00
80-84	Satisfactory	59	46.00
75-79	Fairly Satisfactory	23	18.00
74 and below	Did not meet the expectation	0	0.00
	Total	129	100.00

Table 10 (Figure 11) presents the respondents' academic performance in Mathematics. According to the data, most of the respondents received grades in the 80s to 84s. This suggested that the respondents' academic achievement in mathematics was adequate. It also implied that amidst the pandemic, the learnings of the respondents were not restricted under a new normal class setting in this case using digital modular distance learning. As the study of Khan et al. (2020) revealed positive perspectives towards e-learning. This led to the acceptance of the new educational approach, where respondents' grades were clearly satisfactory.

Problem 4. Is there a significant relationship between the level of respondents' perspective on digital modular distance learning and their socio-demographic profile in terms of age, parent's highest educational attainment, family monthly income, learners' status, and a number of school-aged siblings?

Table 11. *Correlation Between the Level of Respondents' Perspective on Digital Modular Distance Learning and Their Socio-economic Profile in Terms of Age*

Perspective on Digital Modular Distance Learning	*Age*		*Remarks*
Module Quality	Pearson Correlation	.032	Not Significant
	Sig. (2-tailed)	.727	
	N	129	
Facilitation of Digital Modular Distance Learning	Pearson Correlation	-.134	Not Significant
	Sig. (2-tailed)	.131	
	N	129	
Learning Experience	Pearson Correlation	.026	Not Significant
	Sig. (2-tailed)	.773	
	N	129	

**Correlation is significant at the 0.05 level (2-tailed)*
***Correlation is highly significant at the 0.01 level (2-tailed)*

The relationship between the respondents' opinions on digital modular distance learning and their age-specific socioeconomic profile is shown in Table 11. The study demonstrated that, with regard to module quality at 0.727, digital modular distance learning facilitation at 0.131, and learning experience at 0.773 level of significance, there was no significant correlation between the respondents' ages and

their opinions on the subject. Since the outcome was greater than the 0.05 level, the null hypothesis was accepted. The results of the present investigation aligned with the findings of Ebenuwa-Okoh's (2010) study, which found no discernible variation in respondents' viewpoints according to age.

Table 12. *Correlation Between the Level of Respondents' Perspective on Digital Modular Distance Learning and Their Socio-Economic Profile in Terms of Parents' Highest Educational Attainment*

Perspective on Digital Modular Distance Learning	*Parents' Highest Educational Attainment*		*Remarks*
Module Quality	Pearson Correlation	-.045	Not Significant
	Sig. (2-tailed)	.615	
	N	129	
Facilitation of Digital Modular Distance Learning	Pearson Correlation	.019	Not Significant
	Sig. (2-tailed)	.833	
	N	129	
Learning Experience	Pearson Correlation	-.063	Not Significant
	Sig. (2-tailed)	.478	
	N	129	

**Correlation is significant at the 0.05 level (2-tailed)*
***Correlation is highly significant at the 0.01 level (2-tailed)*

The relationship between the respondents' opinions on digital modular distance learning and their socioeconomic status as indicated by their parents' greatest level of education is displayed in Table 12. The study demonstrated that, in terms of module quality at 0.615, digital modular distance learning facilitation at 0.833, and learning experience at 0.478 level of significance—all of which were higher than the 0.05 level of significance—there was no significant relationship between the respondents' parents' highest educational attainment and their perspectives on digital modular distance learning. Consequently, the null hypothesis was not rejected. According to Watkin's (1997) research, children's views on academic achievement were not influenced by their parents' educational attainment. Teachers had to encourage parents to get involved in their children's education, regardless of their educational background.

Table 13. *Correlation Between the Level of Respondents' Perspective on Digital Modular Distance Learning and Their Socio-Economic Profile in Terms of Family Monthly Income*

Perspective on Digital Modular Distance Learning	*Family Monthly Income*		*Remarks*
Module Quality	Pearson Correlation	.061	Not Significant
	Sig. (2-tailed)	.489	
	N	129	
Facilitation of Digital Modular Distance Learning	Pearson Correlation	-.008	Not Significant
	Sig. (2-tailed)	.930	
	N	129	
Learning Experience	Pearson Correlation	.085	Not Significant
	Sig. (2-tailed)	.336	
	N	129	

**Correlation is significant at the 0.05 level (2-tailed)*
***Correlation is highly significant at the 0.01 level (2-tailed)*

Table 13 presents the correlation between the respondents' perspectives on digital modular distance learning and their socio-economic profile in terms of family monthly incomeThe study found no evidence of a significant relationship between the respondents' family income and their perceptions of the quality of the modules, the facilitation of digital modular distance learning, and the learning experience (all at 0.489, 0.930, and 0.336 levels of significance, respectively). Since these results were greater than the 0.05 level of significance, the null hypothesis was not rejected. According to Ezegbe et al. (2017), parents' participation in school activities has a greater impact on elevating learners' attitudes in education than their financial situation. In addition, they also emphasized that parents' encouragement and moral support helped learners to have confidence in their academic pursuit to achieve excellence.

Table 14. *Correlation Between the Level of Respondents' Perspective on Digital Modular Distance Learning and Their Socio-Economic Profile in Terms of Learners' Status*

Perspective on Digital Modular Distance Learning	*Learners' Status*		*Remarks*
Module Quality	Pearson Correlation	-.085	Not Significant
	Sig. (2-tailed)	.337	
	N	129	
Facilitation of Digital Modular Distance Learning	Pearson Correlation	.039	Not Significant
	Sig. (2-tailed)	.658	
	N	129	
Learning Experience	Pearson Correlation	-.075	Not Significant
	Sig. (2-tailed)	.401	
	N	129	

Table 14 displays the correlation between the respondents' perspectives on digital modular distance learning and their socio-economic profile in terms of students' status. The study provided evidence that there was no significant correlation between the respondents' views on digital modular distance learning and their status as full-time or working students in terms of module quality (0.337), facilitation (0.658), and learning experience (0.401). Since these levels of significance were higher than the 0.05 level, the null hypothesis was not rejected. The results of the present investigation aligned with Muluk's (2017) study, which showed that students' academic performance remained satisfactory even after doing a part-time job.

Table 15. *Correlation Between the Level of Respondents' Perspective on Digital Modular Distance Learning and Their Socio-economic Profile in Terms of Number of School-Aged Siblings*

Perspective on Digital Modular Distance Learning	*Number of School-aged Siblings*		*Remarks*
Module Quality	Pearson Correlation	-.058	Not Significant
	Sig. (2-tailed)	.517	
	N	129	
Facilitation of Digital Modular Distance Learning	Pearson Correlation	.064	Not Significant
	Sig. (2-tailed)	.473	
	N	129	
Learning Experience	Pearson Correlation	.019	Not Significant
	Sig. (2-tailed)	.833	
	N	129	

**Correlation is significant at the 0.05 level (2-tailed)*
***Correlation is highly significant at the 0.01 level (2-tailed)*

Table 15 presents the correlation between the respondents' perspectives on digital modular distance learning and their socio-economic profile in terms of their number of school of school-aged siblings. The study exemplified that there was no significant relationship between the respondents' number of school of school-aged siblings and their perspectives on digital modular distance learning in terms of module quality at 0.517, facilitation of digital modular distance learning at 0.473, and learning experience at 0.833 level of significance, which was higher than the 0.05 level thus, the null hypothesis was not rejected. Similarly, the study of Shukla et al. (2016) depicted that there was no significant association between the number of siblings and learners' perspectives in education.

Problem 5. Is there a significant relationship between the level of respondents' perspective on digital modular distance learning and their academic performance in Mathematics?

Table 16. *Correlation Between the Level of Respondents' Perspective on Digital Modular Distance Learning and Their Academic Performance in Mathematics*

Perspective on Digital Modular Distance Learning	*Academic Performance In Mathematics*		*Remarks*
Module Quality	Pearson Correlation	.632	Significant
	Sig. (2-tailed)	.000	
	N	129	
Facilitation of Digital Modular Distance Learning	Pearson Correlation	.472	Significant
	Sig. (2-tailed)	.013	
	N	129	
Learning Experience	Pearson Correlation	-.083	Not Significant
	Sig. (2-tailed)	.682	
	N	129	

**Correlation is significant at the 0.05 level (2-tailed)*
***Correlation is highly significant at the 0.01 level (2-tailed)*

Table 16 displays the correlation between the respondents' academic performance in Mathematics and the level of respondents' perspective on digital modular distance learning. The study demonstrated that, at the 0.000 level of significance, which was less than the 0.05 level, there was a significant correlation between the respondents' perceptions of the quality of the digital modules they were learning and their academic performance in mathematics. As a result, the null hypothesis was rejected. The result supported the study of Selga (2013) wherein the modular-based work text was effective in helping learners improve academic achievements in Science. Accordingly, the module led to the accomplishments of the subject's basic goals, allowed for the development of higher cognitive skills, was well-organized and well-designed, and was appropriate for the student's vocabulary level and performance.

The results also showed that, at the 0.013 level of significance—which is lower than the 0.05 level—there was a significant correlation between the respondents' views on the facilitation of digital modular distance learning and their academic performance in mathematics. As a result, the null hypothesis was rejected. Padsing (2021) stated that the use of modules in Math specifically word problem solving, was an effective teaching approach. Effective in the sense that it helped learners to study and learn the concepts in mathematics without cramming in keeping up with the pacing of the teacher. The teachers' role was to guide and assist the learners in answering the modules. Teachers should give technical assistance to the learner in using the tablets provided to the learners.

Additionally, at the 0.682 level of significance—which was higher than the 0.05 level—the study showed no significant correlation

between the respondents' perceptions of the digital modular distance learning experience and their academic performance in mathematics. As a result, the null hypothesis was not rejected. The result showed that the learning experience of the respondents did not affect their academic performance in Mathematics. Learning experiences that a learner can have in a face-to-face class setup will be experienced by the learners in the digital modular distance learning with the prepared digital SLMs and video lessons. The SLMs prepared and encouraged autonomous/self-directed learning as well as the collaborative performance with the help of technology (Malipot, 2020).

Conclusions

In this study, the academic grades in Mathematics for the third grading period of the Grade 9 learners treated by digital modular distance learning achieved a satisfactory grade in the school year 2020-2021. The study revealed that the socio-economic profile in terms of the respondents' age, parents' highest educational attainment and family monthly, learners' status, and a number of school-aged siblings did not have a significant relationship in their perspectives in digital modular distance learning in terms of the module quality, facilitation of digital modular distance learning, and learning experiences. The learners agreed to the cited perspectives on digital modular distance learning in terms of module quality, facilitation of digital modular distance learning, and learning experiences.

The result further revealed that there was a significant relationship between the learners' academic performance in Mathematics and the level of learners' perspectives in terms of the module quality and the facilitation of digital modular distance learning thus the null hypotheses were rejected. Hence, these were the factors on the learners' perspectives towards academic performance using the digital modular distance learning. On the other hand, the study also revealed that there was no significant relationship of the learners' perspectives regarding digital modular distance learning in terms of their learning experiences to academic performance in Mathematics. Therefore, the academic performance of the Grade 9 learners was affected by their perspectives in regards to digital modular distance learning in terms of the module quality and the facilitation of digital modular distance learning while their learning experiences did not affect their academic performance in Mathematics. The study revealed the effectiveness of the digital modular distance learning approach in learning Mathematics despite the new learning experiences amidst the COVID-19 pandemic.

Based on the results of this study, the researcher recommended the following.

It is highly recommended to use modules during instructions for the learners to read in advance about a specific topic in Mathematics. Since it proved that digital modular distance learning improved the mathematical understanding of the learners.

The administration should give attention to prepare modules to be given to the learners. Modules that are easy to understand and answerable by the learners.

The school principal should formulate a policy in making learning activity sheets (LAS) for their respective teachers and should create a committee in checking the quality of the learning activity sheets.

The school principal should conduct training, workshops, and seminars for the teachers to improve themselves in the use of digital modular distance learning.

Teachers should regularly attend webinars/workshops to keep updated with the latest trends in education. They must be exposed to new strategies in teaching Mathematics with ICT integration.

The intervention plan should be implemented.

Future researchers should enhance the current study by incorporating other variables not investigated in this study.

References

Basilaia, G., & Kvavadze, D. (2020). Transition to online education in schools during a SARS-COV-2 Coronavirus (COVID-19) pandemic in Georgia. Pedagogical Research. https://doi.org/10.29333/pr/7937

Bhamani, S., Makhdoom, A. Z., Bharuchi, V., Ali, N., Kaleem, S., & Ahmed, D. (2020). Home learning in times of COVID: Experiences of parents. Journal of Education and Educational Development. https://doi.org/1022555/joeed.v7i1.3260.

Bhat, M. A., Joshi, J., & Wani, I. A. (2016). Effects of socioeconomic status on academic performance of secondary school students. The International Journal of Indian Psychology. https://doi.org/10.25215/0304.004.

Charles, A. (n.d.). The modular approach of teaching mathematics for selected topics at plus one level. https://www.academia.edu/5343291/.

Dangle, Y. R., & Sumaoang, J.D. (2020). The implementation of modular distance learning in the Philippines secondary public schools. 3rd International Conference on Advanced Research in Teaching and Education. https://doi.org/10.33422/3rd.icate.2020.11.132.

DepEd. (2020, June 25). Guidelines on the required health standards in basic education offices and schools. https:www.deped.gov.ph/wp-content/uploads/2020/06/DO_s2020_014.pdf.

DO 012 s. (2020). Adoption of the basic education learning continuity plan for the school year 2020-2021 in light of the covid-19 public health emergency.

Ebenuwa-Okoh, E. (2010). Influence of age, financial status, and gender on academic performance among undergraduates. Journal of Psychology. https://doi.org/10.1080/09764224,2010.11885451.

Ezegbe, B. N., Machebe, C. H., & Onuoba, J. (2017). The impact of parental level of income on students' academic performance in high school in Japan. Universal Journal of Education Research. https://files.eric.ed.gov/fulltext/EJ1170144.pdf.

Flipscience. (2020, October 5). 'Tagapagdaloy': How Filipino parents can help ensure successful modular distance learning. FlipScience-Top Philippine Science News and Features for the Inquisitive Filipino. https://www.flipscience.ph/news/features-news/tagapagdaloy-modular-distance-learning/.

Ibyatova, L., Oparina, K., & Rakova, E. (2018). A modular approach to teaching and learning English grammar in a technical university. Society Integration Education Journal. https://doi.org/10.17770/sie2018vol1.3229.

Jayaram, K., & Dorababu, K.K. (2020). Self-learning materials in the distance education system. International Journal of Current Research. https://www.journalcra.com/article/self-learning-materials-distance-education-system

Karadut, A.P. (2012). Effects of E. L. Thorndike's theory of connectionism rudiments. Procedia- Social and Behavioral Science. https://doi.org/1016/j.sbspro.2012.11.413.

Khalil, U, & Yousuf, M. I. (2020). Effect modular approach teaching on achievement of secondary school mathematics students. Journal of Science Education. http://journal.aiou.edu.pk/journal1/index.php/jse/article/view/156.

Khan, M.A., Nabi, M. K., Khojah, M., & Tahir, M. (2020). Students' perception in India: An empirical study. MDPI Publication. https://www.mdpi.com/2071-1050/13/1/57.

Korir, W. (2017). Influence of a number of siblings and learning resources at home on students' academic performance. SABINET working Journals. https://journals.co.za/doi/10.10520/EJC-e5fa7daa8.

Kumar, S. (2017). Use of mathematics in daily life. World Wide Journal of Multidisciplinary Research and Development. http://wwjmrd.com/upload/-use-of-mathematics-in-daily-life.pdf.

Llego, M. A. (2020). DepEd learning delivery modalities for the school year 2020-2021. TeacherPH. https://www.teacherph.com/deped-story-books-writing-big-books-and-small-books-standards/.

Lockwood, F. (1998). The design and production of self-instructional materials. Psychology Press.

Loken, K. (2010). Family income and children's education: using the Norwegian oil boom as a natural experiment. Econ Papers. https://econpapers.repec.org/article/eeelabeco/v_3a17_3ay_3a2010_3ai_3a1_3ap_3a118-129.htm.

Maglangit, P., Paglumotan, A. M., & Sapera, S. C. (2020). Superchanging Filipino parents is key for successful modular distance learning. FlipScience. https://www.flipscience.ph/news/features-news/tagapagdaloy-modular-distance-learning/.

Malik, S. K. (2012). Effect of modular and traditional approaches on students' general comprehension. Elixir International Journal. https://www.elixirpublisher's.com/articles/1350285080-42%20(2012) %206228-6231.pdf.

Malipot, M. H. (2020). DepEd expands online learning platforms for out-of-school learners. https://news.mb.com.ph.

Mcleod, S. (2020, December 07). Piaget's theory and stages of cognitive development. Simply Psychology.

Merriam-Webster. (n.d.). A dictionary by Merriam-Webster: America's most-trusted online dictionary. https://www.meeriam-webster.com/.

Mocon-Ciriaco, C. (2019, December 06). DepEd vows to improve the quality of education after PISA results. Business Mirror. https://businessmirror.com.ph/2019/12/06/deped-vows-to-improve-quality-of-education-after-pisa-showing/.

Muluk, S. (2017). Part-time job and student's academic achievement. Journal Ilmiah Peuradeun. https://doi.org/10.26811/peuradeun.v5i3.154.

Nyaumwe, L. J. (2013). Developing a cognitive theory from student teachers' post-lesson reflective dialogues on secondary school mathematics. South African Journal of Education. https://org/10.15700/saje.v31n1a406.

Padsing, R. C. (2021). Effectiveness of modularized instruction in teaching a literature review paper. Global Scientific Journals. https://www.globalscientificjournal.com/researchpaper/Effectiveness_of_Modularized_Instruction_in_Teaching.pdf.

Quinones, M. T. (2020, July 3). DepEd clarifies blended, distance learning modalities for 2020-2021. Philippine Information Agency. https://www.congress.gov.ph/legisdocs/basic_18/HB07306.pdf.

Selga, M.C. (2013). Instructional materials development: A worktext in science, technology, and society. LCCB Development Education Journal of Multidisciplinary Research. https://ejournals.ph/article.php?id=6629.

Shukla, N., Rai, K., & Kaur, D. (2016). To study the association between a number of siblings and academic achievement.

Skemp, R.R. (2008). The psychology of learning mathematics. Laurance Erlbaum.

Sousa, V. D., Driessnack, M., & Costa Mendes, I. (2007). An overview of research designs relevant to nursing: Part 1: A quantitative approach. Rev. Latino-Am.Enfermagem. https://pubmed.ncbi.nlm.nih.gov/17653437/.

Susilo, A. (2016). Development of a scientific learning-based module for improving students creating ability in the accounting learning process. Journal Pendidikan llmu Social. https://journals.ums.ac.id/index.php/jpis/article/view/212.

Tan-Espinar, M. J. F., & Ballado, R. S. (2017). Content validity and acceptability of a developed worktext in basic mathematics 2. Asia Pacific Journal of Multidisciplinary Research. http://www.apjmr.com/wp-content/uploads/2016/12/APJMR-2017.5.1.10.pdf.

Toquero, C. M. (2020). Challenges and opportunities for higher education amid the COVID-19 pandemic: The Philippine context. ERIC Institute of Education Sciences. https://eric.ed.gov/?id=EJ1263557.

Trovela, E. S. (2021). Perceptions of parents and learners to modular distance learning as a contemporary teaching strategy. EPRA International Journal of Research and Development. https://doi.org/10.36713/erpa7330.

UNESCO (2020). Education: From disruption to recovery. Paris; UNESCO. https://en.unesco.org/covid19/educationresponse.

Weiner, B. (1986). An attributional theory of motivation and emotion. Springer-Verlag New York Inc.

Vellymalay, S. N. (2012). Parental involvement at home: Analyzing the influence of parents' socioeconomic status. Studies in Sociology of Science. http://www.cscanada.net/index.php/sss/article/view/j.sss.1923018420120301.2048.

Watkins, T. J. (1997). Teacher communications, child achievement, and parent traits in parent involvement models. Journal of Educational Research. https://www.jstor.org/stable/27542123.

Yeh, C. Y., Cheng, H.N., Chen, Z.-H., Liao, C.C., & Chan, T.W. (2019). Enhancing achievement and interest in mathematics learning through math-island. Research and Practice in Technology Enhanced Learning. https://telrp.springeropen.com/articles/10.1186/s41039-019-0100-9.

Affiliations and Corresponding Information

Gedelyn T. Guillermo
St. Peter's College – Philippines

Teresita B. Sambo, PhD
St. Peter's College – Philippines