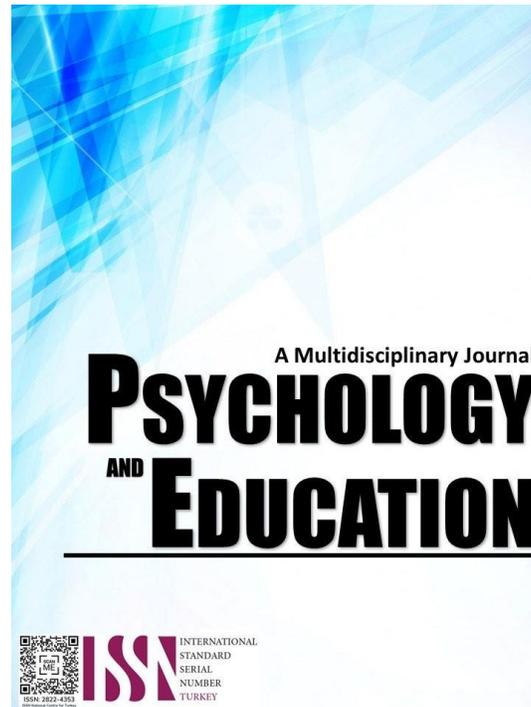


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Academic Stress and Coping Strategies of Learning Mathematics Through Modular Instruction

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Abstract

The Department of Education introduced various learning delivery modalities to ensure the continuity of learning in this time of pandemic. Distance learning was one of them. Learning mathematics posed several concerns with this implementation. Distance education learners were faced with answering assignments and modules, preparing for summative tests and doing performance tasks on their own without the usual classroom set-up. Also, meeting deadlines for task submission and other social demands, necessitates a great deal of effort to balance these various roles. According to (oxfordlearning.com, 2018), heavy workloads and new routines can be stressful to learners and take time to adapt to. This study was conducted to Candijay Municipal High School students in the school year 2020-2021. The main objective of this study was to determine the different causes of stresses among modular distance learners in learning mathematics, their coping mechanisms and its relationship to their academic performance. The data was generated using researcher-modified questionnaire, then were analyzed and interpreted. The results of this study will serve as a springboard to extend assistance to struggling learners especially in coping with the different stresses they encountered in the new paradigm of learning that has an effect to their academic performance in mathematics.

Keywords: *academic expectation, academic performance, academic self-perceptions, academic stress, active coping, coping strategies, difference, learners*

Introduction

The Department of Education has implemented various learning delivery modalities, including Distance Learning, to ensure continued education amid the challenges of the COVID-19 pandemic. Modular Distance Learning (MDL), Online Distance Learning (ODL), and TV/Radio-Based Instruction are the three forms of this modality. The majority of parents, as revealed by the Learner Enrolment Survey Form (LESF), preferred modular instruction for the school year 2020-2021. Consequently, Self-Learning Modules (SLMs) have been distributed in print or digital form, with an integration of alternative learning modalities to provide quality education.

Learning mathematics in the context of distance education poses challenges. While radio or audio lessons are accessible, learners may struggle to visualize figures or examples without a visual aid. TV or video lessons are more effective, but comprehension may still be a challenge. The limitations of self-learning modules, textbooks, or learning activity sheets in explaining underlying processes for understanding concepts in math are highlighted. The traditional use of chalk and board in teaching math is considered indispensable. Distance education learners face the pressure of meeting assignment deadlines, preparing for tests, and handling performance tasks. Balancing these tasks and adapting to new routines can be stressful, requiring effort and time for adjustment. The study acknowledges that students may employ various coping mechanisms, either focusing on achieving optimal outcomes through hard work and seeking support or resorting to self-defense techniques like self-handicapping and avoiding public exposure.

Research Questions

The main objective of this study will be to determine the different causes of stresses among modular distance learners in learning mathematics, their coping mechanisms and its relationship to their academic performance.

Specifically, this study will seek to answer the following:

1. What is the respondent's profile in the aspects of:
 - 1.1. Sex?
 - 1.2. Grade Level?
2. What is the academic performance of learners in mathematics?
3. What are the causes of academic stress among students?
4. What are the coping strategies that students used to deal with academic stress?
5. Is there a significant difference between the students' academic stress and coping strategies when grouped according to their demographic profile?
6. Is there a significant relationship between the level of academic stress and coping strategies experienced by the learners and their academic performance in mathematics?
7. What plan of action could be proposed based on the findings of the study?

Literature Review

The research is rooted in the "Transactional Model of Stress and Coping" by Lazarus and Folkman (1987) and the "Self Determination Theory" by Edward Deci and Richard Ryan (1985). Lazarus and Folkman's model defines stress as the relationship between an individual and the environment, emphasizing the importance of perception and coping resources in determining stress levels. Coping is described as involving cognitive and behavioral responses, categorized into problem-focused and emotion-focused strategies. The study aims to explore how learners cope with the stressors of learning mathematics in the context of the new educational system, influenced by the shift to Distance Learning Delivery Modalities (DLDM) due to the COVID-19 pandemic.

The Philippine Basic Education Learning Continuity Plan (BE-LCP) provides the framework for the study, responding to the challenges posed by COVID-19. Different stressors for learners, such as academic expectations, workload, and examination pressures, are discussed, and the study references the "Perception of Academic Stress Scale" (PAS) questionnaire by Bedelwey and Gabriel (2015) to assess academic stress. The literature highlights various stressors faced by students in the new educational paradigm, including high academic workload, financial and family issues, and psychosocial concerns.

The relationship between academic stress and performance is explored, referencing studies that indicate a correlation between higher stress levels and lower academic performance. Coping strategies are discussed, categorized as positive or negative, and the importance of encouraging positive coping skills in math-anxious students is emphasized. Lazarus's coping mechanisms, such as active coping and passive coping, are explained, and the Brief COPE questionnaire is mentioned to analyze how students cope with stress. Gender differences in coping strategies are noted, and the connection between coping strategies and academic success is explored, though conflicting findings are acknowledged.

In summary, the study aims to build on established psychological theories and literature to identify stressors and coping strategies among learners in the context of learning mathematics during the COVID-19 pandemic. The significance of understanding these factors lies in their potential impact on academic performance, with the ultimate goal of contributing to the development of effective coping mechanisms for students facing academic stress.

Methodology

This study employs a descriptive-correlational research design, utilizing questionnaires as the primary data-gathering tool. The main objective is to establish significant relationships among variables, including students' academic stress, coping strategies, and academic performance. The research aims to discern differences in academic stress, coping strategies, and academic performance based on factors such as gender and grade level. The study is conducted at Candijay Municipal High School in Bohol, focusing on the challenges posed by the school's curriculum and additional workloads. The entire population of 107 students for the school year 2020-2021 is included, but only 95 students consented to participate.

The questionnaire used is a modified version of the Perception of Academic Stress Scale (PAS) and the COPE and Brief Cope questionnaires. The researcher sought permission from the authors of the original tools, and while approval was received from Dr. Wijayati, the author of PAS Scale, obtaining permission from Dr. Carver for COPE and Brief Cope was not possible due to his passing. The research tool assesses academic stress levels, coping strategies, and additional factors like teaching effectiveness, learning materials, and home environment. The Likert scale is employed for rating, and reliability tests indicate acceptable internal consistency.

Ethical considerations, including clearance from the Ethics Review Board, approval from the DepEd Superintendent, and parental consent, were diligently followed. Data collection involved distributing questionnaires along with self-learning modules, ensuring the anonymity of respondents and assuring them that responses won't affect their grades. The study also sought permission to access students' final grades in Mathematics for the relevant school year. Overall, the research process adheres to ethical standards and systematic procedures, ensuring a comprehensive exploration of stress factors, coping strategies, and their impact on academic performance.

Results And Discussions

The findings derived from the data acquired on academic stress and coping strategies of learning mathematics through modular instruction. The data were tallied, tabulated and treated statistically. The results were then analyzed and interpreted which formed the foundations of the findings and conclusions.

Table 1. Profile of Respondents in terms of Grade Level and Gender

Grade Level	Male	Female	Total
7	19	27	46
8	19	30	49
Total	38	57	95

Table 1 shows the profile of respondents according to grade level and sex. It shows that the number of female respondents is higher than male respondents. Also, the number of Grade 8 respondents is greater compared to Grade 7 respondents. Looking at the numbers, there is a notable difference in number between male and female respondents. However, the number of respondents in between the two grade levels is nearly the same.

Table 2. Academic Performance of Learners in Mathematics

Descriptor	Grading Scale	Frequency		Total	Percent %
		Grade 7	Grade 8		
Outstanding	90-100	30	41	71	75
Very Satisfactory	85-89	14	8	22	23
Satisfactory	80-84	2	-	2	2
Fairly Satisfactory	75-79	-	-	-	-
Did Not Meet Expectation	Below 75	-	-	-	-
Total		46	49	95	100

Table 2 shows the final grades of respondents in mathematics for the school year 2020-2021. Based on the 2019 DepEd K to 12 Grading System, the highest number of respondents comprising 75 percent of the whole have outstanding grades in Mathematics. Twenty-two out of ninety-five or 23 percent of the respondents got very satisfactory grades and only two got satisfactory grades. This shows that all respondents passed in Mathematics and got satisfactory to outstanding academic performance in the said subject.

Table 3. Factors of Academic Stress

Factor	Mean	Description	Rank
Academic expectation	3.43	High Stress	1 st
Academic work and examinations	3.14	Average Stress	2 nd
Student's academic self-perceptions	2.94	Average Stress	3 rd
Learning materials used in modular learning	2.60	Low Stress	6 th
Teaching effectiveness of Math Teacher in facilitating modular learning	1.58	No Stress	7 th
Learning environment	2.76	Average Stress	5 th
Classmates' attitude towards oneself in learning Mathematics	2.78	Average Stress	4 th
Grand Mean	2.75	Average Stress	

Legend: 4.21 – 5.0 – Very High Stress ; 3.41 – 4.20 – High Stress; 2.61 – 3.40 – Average Stress
1.81 – 2.60 – Low Stress ; 1.0 – 1.80 – No Stress

Table 3 shows the mean of the different factors of academic stress. Among all the factors, stresses related to academic expectation got the highest mean of 3.43 which is found to cause high stress to the respondents. This is also the only factor that was being associated to high stress by respondents. The other factors namely: stresses relating to academic work and examination with a mean of 3.14 ranked second; stresses related to student's academic perception with a mean of 2.94 ranked third; stresses related to classmates' attitude towards oneself in learning Mathematics got the fourth rank with a mean of 2.78; and stresses related to learning environment at home with a mean of 2.76 ranked fifth, mentioned factors gained "average stress" response implying that the respondents found these factors to be stressful at average level. This indicates that the said factors can cause tolerable stress among learners. This means that the respondents can bear the pressure caused by these factors. Stresses related to learning materials used in modular learning got a mean of 2.60 which shows that the respondents have "low stress" on the said factor indicating a negligible level of strains felt. Lastly, the factor that ranked seventh is related to the teaching effectiveness of Math Teacher in facilitating modular learning with a mean of 1.58 showing a "no stress" response from the respondents. This implies that the respondents did not feel any stress or pressure due to their

teacher's way of facilitating modular learning.

Table 3 supports the idea that immense expectations, placed on learners by the people surrounding them, causes increasing stress and worry among them. In the study about Academic Expectations as Sources of Stress in Asian Students, it has been mentioned that parents', teachers' and students' own expectations of academic excellence can be a cause of tremendous stress for many learners (Tan & Yates, 2011). The students of Candijay Municipal High School, a school following science curriculum, were regarded as beyond average learners as they passed the requirements in the screening process to be enrolled in the said institution. The result shows that students felt the pressure to perform and achieve amidst the competitive environment they were in. This leads to their agreement on academic expectation having high contributing factor to their academic stress.

Table 4. *Coping Strategies Used by Students in Dealing with Academic Stress Caused by Academic Expectations*

<i>Coping Strategies</i>	<i>Mean</i>	<i>Description</i>	<i>Rank</i>
Active Coping	2.90	Doing the coping strategy in a medium amount	5 th
Planning	3.03	Doing the coping strategy in a medium amount	4 th
Positive Reinterpretation and Growth	3.26	Doing the coping strategy a lot	2 nd
Acceptance	3.20	Doing the coping strategy in a medium amount	3 rd
Humor	2.10	Doing the coping strategy a little bit	13 th
Religious Coping	3.74	Doing the coping strategy a lot	1 st
Use of Emotional Social Support	2.81	Doing the coping strategy in a medium amount	7 th
Use of Instrumental Social Support	2.69	Doing the coping strategy in a medium amount	10 th
Suppression of Competing Activities	2.85	Doing the coping strategy in a medium amount	6 th
Mental Disengagement	2.55	Doing the coping strategy in a medium amount	11 th
Denial	2.02	Doing the coping strategy a little bit	14 th
Focus on and Venting of Emotions	2.74	Doing the coping strategy in a medium amount	8 th
Behavioral Disengagement	2.16	Doing the coping strategy a little bit	12 th
Self-blame	2.71	Doing the coping strategy in a medium amount	9 th
Grand Mean	2.77	Doing the coping strategies in a medium amount	

Legend: 3.26 – 4.0 - Doing the coping strategy a lot; 2.51 – 3.25 - Doing the coping strategy in a medium amount
1.76 – 2.50 - Doing the coping strategy a little bit; 1.0 – 1.75 - Not doing the coping strategy at all

Table 4 shows the different coping strategies used by respondents in dealing with academic stress related to academic expectations. These coping strategies are divided into two; the first nine coping strategies are positive or problem-focused coping and the succeeding five are the negative coping strategies or emotion-focused coping. Among them, religious coping got the highest mean of 3.26 which means that the respondents do the coping strategy a lot by using prayers and other spiritual activities in dealing with their academic stress related to academic expectation. It is followed by positive reinterpretation and growth which also gained “doing the coping strategy a lot” response with a mean of 3.26 implying that respondents tend to grow as learners amidst the new demands of learning as they try to see the positive side of meeting the academic expectations using modular instruction and grow from the new experience. The following coping strategies got the subsequent ranks and were marked to be done in a medium amount by respondents in dealing with the said academic fret: acceptance with a mean of 3.20, planning with a mean of 3.03, active coping with a mean of 2.90, suppression of competing activities with a mean of 2.85, use of emotional social support with a mean of 2.81, focus on venting of emotions with a mean of 2.74, self-blame with a mean of 2.71, use of instrumental social support with a mean of 2.69, mental disengagement with a mean of 2.55. Among the mentioned coping strategies that were used in a medium amount by respondents, three of them namely venting of emotions, self-blame, and mental disengagement are considered as negative or emotion-focused coping strategy and got the lower ranks among others. Behavioral disengagement with a mean of 2.16, humor with a mean of 2.10 and denial with the lowest mean of 2.02 got the 12th, 13th and 14th ranks respectively with a “doing the coping strategy a little bit” rating from the respondents. Having denial as the least favored coping strategy supports the result for the second and third most commonly used coping strategies namely, positive reinterpretation and growth, and acceptance by which respondents showed that they embraced the

changing demands of learning as well as the pressing academic expectations felt and strived to get through them. The grand mean is 2.77 which reveals that the respondents moderately use the different coping mechanisms in dealing with their academic strain particularly in meeting academic expectations.

The result shows that respondents tend to use positive or problem-focused strategies in dealing with their academic frets particularly in meeting academic expectations. Negative coping or emotion-focused coping got the least favored responses from learners in dealing with the pressing academic demands of the new normal. Table 4 supports the study of Ader and Erktin which claims that given the contrast between positive and negative coping strategies, math-anxious students should be motivated to learn and practice positive coping skills in order to handle and minimize academic anxiety while reducing nonproductive avoidance strategies.

Table 5. *The Difference between the Students' Academic Stress and Coping Strategies when Grouped According to Sex*

Variable	Sex	N	Mean	Std. Deviation	Mean Difference	t-value	p-value	Decision
Academic Stress	Male	38	110.8947	12.77834	5.52632	1.724	0.088	Accept Ho
	Female	57	105.3684	16.76373				
Coping Strategies	Male	38	152.3158	13.11303	-0.71930	-0.224	0.823	Accept Ho
	Female	57	153.0351	16.66151				

Table 5 shows the difference between students' academic stress and coping strategies when grouped according to sex. The table displays that at 0.05 level of significance the generated p-values are greater than the set level of significance. Thus, the researcher fails to reject the null hypotheses.

This shows that the level of academic stress and the coping strategies used by students does not differ according to their sex. Both male and female respondents have relatively similar level of academic stress and coping strategies used in dealing with it.

The result, however, shows contradiction on some research works which may be attributed to the present situation of Covid-19 pandemic, by which both male and female students are faced with the same new adjustments in distance learning particularly in learning mathematics through modular instruction causing them to have similar level of stress and type of coping mechanism being used. The contradiction includes the claim of (Hareth, 2019) stating that female students experience higher level of stress as compared to males. This also contradicts the claims that revealed men tend to use more problem focused or instrumental methods (active coping, planning, positive reinterpretation and growth, acceptance, suppression of competing activities and use of instrumental support) of handling stressful experiences whereas women use coping strategies that changes their emotional responses (humor, religious coping, use of emotional social support, mental disengagement, denial, venting of emotions, behavioral disengagement, self-blame) to a stressful situation (Kelly, Tyrka, & Carpenter, 2015).

The itemized measure of difference between the subcategories of coping strategies versus sex is presented in Appendix I.

Table 6. *The Difference between the Students' Academic Stress and Coping Strategies when Grouped According to Grade Level*

Variable	Level	N	Mean	Std. Deviation	Mean Difference	t-value	p-value	Decision
Academic Stress	Grade 7	46	107.2174	16.33934	-0.70098	-0.220	0.827	Accept Ho
	Grade 8	49	107.9184	14.75471				
Coping Strategies	Grade 7	46	152.6739	14.68643	-0.14241	-0.045	0.964	Accept Ho
	Grade 8	49	152.8163	15.95132				

Table 6 shows the difference between students' academic stress and coping strategies when grouped according to grade level. The table displays that the p-value for academic stress among grade 7 and grade 8 students which is 0.827 and the p-value for coping strategies among them which is 0.964 are both greater than 0.05, the set level of significance. With this, the researcher fails to reject the null hypotheses.

This posits the idea that the level of academic stress and the coping strategies used by students does not differ according to their Grade Level. All students of Candijay Municipal High School for school year 2020-2021 have relatively similar level of academic stress and coping strategies used in dealing with it.

This result once again contradicts to some findings of research works by which the researcher acknowledged to be associated to the new paradigm of learning by which all grade levels have undergone the same experiences in meeting the new demands of learning and were all faced with similar issues in adapting to modular instruction. As mentioned, it contradicts the findings in the study of (Chen, Peng, Xu, & O'Brien, 2017) which says that older respondents or those belonging to higher levels were less likely than younger respondents to use problem-focused coping strategies and were more likely to use emotion-focused coping. Further, it opposes the statement of Global Journals Inc. (2019) stating that freshmen or first level students indicated the highest level of stress and that the new adjustment problems they faced is most likely to be associated with it.

Table 7. *The Relationship between the Level of Academic Stress and Coping Strategies Experienced by the Learners and their Academic Performance in Mathematics*

	Mean	Std. Deviation	R-value	Interpretation	p-value	Decision
Grade	91.8526	3.84810	-0.129	Very Weak Correlation (Insignificant)	0.211	Accept Ho
Academic Stress	107.5789	15.46278				
Grade	91.8526	3.84810	-0.056	Very Weak Correlation (Insignificant)	0.587	Accept Ho
Coping Strategies	152.7474	15.27059				
Academic Stress	107.5789	15.46278	0.241	Weak Correlation (Significant)	0.019	Reject Ho
Coping Strategies	152.7474	15.27059				

Table 7 shows that the researcher fails to reject the null hypothesis that there is no significant relationship between the level of academic stress and academic performance of the respondents in Mathematics.

The table reveals that academic performance was not altered by the level of stress experienced by the respondents and they are vastly independent to each other. The final grades of the respondents in Mathematics is not associated with their level of academic stress and vice versa. The researcher acknowledges the possibility that there might be other factors not included in this study that may be associated to academic performance or academic stress.

This supports the study of undergraduate researchers of HNU on the academic stress of senior high students (Asa, Bag-o, Torraja, Gallano, & Nabor, 2018) by which a no significant relationship between the level of academic stress and academic performance was also found.

Further, the same also occurred between the coping strategies and the academic performance of respondents where there is no significant relationship found. This shows that whatever the coping strategies used by the students; it will not affect their academic performance in mathematics. The final grades of the respondents in Mathematics is not associated with the coping strategies used and vice versa. The researcher acknowledges the possibility that there might be other factors not included in this study that may be associated to academic performance or coping strategies.

This backs the discovery of Khan (2013) in his paper that there was no clear correlation between stress management skills and Grade Point Average (GPA). The result is on contrary to the findings of (Kadhiravan & Kumar, 2012), which found that coping strategies would aid students in improving their academic performance.

The table, however, shows a weak positive correlation in between the level of academic stress and use of coping strategies. This implies that there is a small possibility that as the level of academic stress goes up, the use of coping strategies will also heighten and vice versa. Further, there is a slight possibility that if the level of academic stress decreases, the level of using the different coping strategies will also decrease.

This supports the observation of (Joseph, Nallapati, & Sinha, 2020) in their study on the assessment of academic stress and its coping mechanisms by which the level of academic stress and level of coping with stress among 95% of their respondents were both found to be in average level.

Conclusion

As shown in the findings, the researcher concluded that academic stress and coping strategies are not mainly associated with academic performance of students in learning mathematics through modular instruction. With this, it can be implied that the increase or decrease on the level of stress and usage of the different coping strategies do not necessarily increase or decrease the academic performance of

learners and vice versa.

Based on the findings and conclusions of the study, the following recommendations are given: (1) It has been found out that respondents were stressed by the academic expectation of people surrounding them. Conducting or attending seminars and other information drives in setting healthy expectations, standards and aspirations to learners both in learning and in life must be taken by parents and teachers. (2) Religious coping was found to be the most used coping strategy by learners in dealing with their academic frets, with this, conducting spiritual and religious activities must be strengthened in schools. (3) Further studies may be conducted including other factors which are beyond the scope of this study that may be associated to academic performance of students in learning mathematics through modular instruction. In doing so, the questionnaire herein must be revised to specify items.

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