

MATHEMATICAL DISPOSITION IN DOING HOME-TASKS

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ABSTRACT : The study was aimed to determine the mathematical disposition of students in doing home-tasks particularly the junior high school students in Botolan, Zambales, S.Y. 2020-2021, and descriptive-survey method was utilized.

Based on the summary of the investigations conducted, the student-respondents were typical female coming from grade 7 and 10 and were classified in their Adolescence period. The student-respondents disagree on distraction, home enjoyment and parent positive and negative attitude towards mathematical dispositions of students in doing home-tasks, while agree on self-efficacy and perseverance. There is significant difference on the mathematical disposition of the students in doing home-tasks with regard to the five factor variables. And there is significant difference on the mathematical disposition of the students in doing home-tasks with regard to age profile, and no significant difference on the mathematical disposition of the students in doing home-tasks with regard to grade level and sex profile variable. The respondents strongly agree on evaluated Mathematics program in terms of content, structure and usefulness.

Based on the summary of findings and conclusions, the researcher recommended that the students need to move to an area where they can focus and set themselves up for success. Parents should encourage their children to practice mindfulness which focus awareness on the present moment while acknowledging thought and feelings towards mathematical learnings. Parents and teachers must share a responsibility to help their children learn and meet educational goals. The teachers are encouraged to develop, enhance and improve learning materials in Mathematics Home Based-Tasks.

KEYWORDS: *Mathematics, disposition, home-tasks, distraction, home enjoyment, perseverance, self-efficacy*

I. INTRODUCTION

Disposition towards Mathematics is certainly considered one among numerous factors that influence and impact students learning in mathematics. According to [1] dispositions are the beliefs or tendencies to exhibit a frequent, conscious and voluntary behavior directed towards learning a subject. In the book *Adding It Up: Helping Children Learn Mathematics*, the [2] define a productive disposition as a “habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one’s own efficacy”.

The Chinese authorities identified a new type of coronavirus on January 7, 2020. By mid of this month, 282 confirmed cases of 2019-nCoV have been reported from four countries including China, Thailand, Japan and the Republic of Korea (WHO, 2020a). In the Philippines, the first recorded case was on February 2020. As the coronavirus disease continue to spread, the World Health Organization (WHO) declared COVID-19 as a pandemic on March 2020 (WHO, 2020b) causing various responses and measures from several governments such as school closings, travel restrictions, bans on public gatherings, emergency investments in healthcare facilities, new forms of social welfare provisions and many others [3].

The present COVID-19 pandemic created challenges and has affected the field of education [4]. In addressing the coronavirus disease 2019 pandemic, 107 countries had decided national school closures by March 18, 2020 [5]. Philippines as the third world country, responded to this alarming situation by the adaption of the basic education-learning continuity plan (BE-LCP) for the current school year (DepEd, 2020a). This includes K-12 curriculum adjustments, alignment of learning materials, implementation of various learning modalities, provisions of corresponding training for teachers and school leaders, and proper orientation of parents and guardian of learners. Along with this order, the Department of Education (DepEd) put an emphasis on multiple learning modalities such as distance learning, blended learning and homeschooling to replace face-to-face learning [6]. With the school closures in the Philippines, the department remains committed that learning

must continue by adapting modified enrollment guidelines and policies in line with minimum health and safety standards. The Learner Enrollment and Survey Form (LESF) was used to register learners and gather information on household capacity to facilitate the administration of various learning modes.

Under COVID-19 pandemic, both teachers and students are expected to communicate with each other [7] in any of the learning modalities prescribed by the department. However, this implementation would pose such problems on students who have no gadgets, limited internet access and belong to the lower class of society [4]. Changing from traditional class to distance learning, most schools from kindergarten to grade 12 in the Philippines adapted the distance learning, it can be an online distance learning, printed modular learning, radio-based instruction and television-based instruction or a combination of any of these type of distance learning modality. During this implementation, stakeholders faced many obstacles [7], much more with the students who study at home independently with limited guidance of teachers. When students undergo homeschooling, many factors occur that interfere with students' study such as emotions, motivation, thoughts, and beliefs [8]. With the above mentioned factors, blended learning or even distance learning can affect not only cognitive aspects but also affective aspects of the student, one of which is mathematical disposition [9].

In this period of Covid-19 pandemic, it is necessary to understand the mathematical dispositions of students in doing home tasks. Knowing their perception, attitudes, emotions, motivations, goal orientation of mathematics will assist parents, teachers and other stakeholders in coping up for remote learning, enhancing the teaching-learning process and addressing the needs and interests of students as bases in selecting appropriate teaching strategies, style and techniques in improving their dispositions. More so, learning mathematics in the home has received little research attention [10]. Indeed, the intent of this study is to document and understand the mathematical dispositions of junior high school students particularly in doing home tasks which in turn become the basis for school mathematics program.

FIGURES AND TABLES

Table 1 : Mean Rating on the Mathematical Dispositions of Students in Doing Home – Tasks in terms of Distraction

Distractions	Mean	Descriptive Rating	Rank
1. I get bored while learning mathematics at home.	2.33	Disagree	3
2. I get distracted and sometimes loose concentration while learning mathematics at home.	2.71	Agree	1
3. Learning mathematics at home is a waste of time.	1.98	Disagree	5
4. Running errands for my parents do not allow me to concentrate on learning mathematics at home.	2.23	Disagree	4
5. My siblings interfere with my learning of mathematics at home.	2.43	Disagree	2
Overall Weighted Mean	2.34	Disagree	

Table 1 shows the Mean Rating on the Mathematical Dispositions of Students in Doing Home – Tasks in terms of Distraction.

The respondents "Agree" on getting distracted and sometimes loose concentration while learning mathematics at home manifested on the high mean value of 2.71 (ranked 1st) followed by the least rank with "Disagree" on learning mathematics at home is a waste of time with mean of 1.98. The computed overall weighted mean on the mathematical dispositions of students in doing home – tasks in terms of distraction was 2.34 with descriptive rating of "Disagree". This implied that the junior high school focusing on learning math at home even though they learn at different aspect and behavior. Related to the study of [11] students' distraction in math were negatively related to four student variables like homework effort, homework environment, learning-oriented reasons, and value belief. Mathematical disposition greatly to the success of learning mathematics. Students need to confront the problem of mathematical disposition, foster responsibility in learning, and develop good work habits in mathematics. This is very important characteristics of the students. Students will not necessarily use all the material they have learned, but it is certain that they require a positive disposition to deal with a variety of mathematical problems in their lives. By directing students to qualify disposition of mathematics, the mathematics can instill motivation, appreciation, contributions, interests, beliefs, confidence, and perseverance. Such things have been lost in the implementation of mathematics learning in the classroom [12].

1.1. Home Enjoyment

Table 2
Mean Rating on the Mathematical Dispositions of Students in Doing Home – Tasks in terms of Home Enjoyment

Home Enjoyment	Mean	Descriptive Rating	Rank
1. I enjoy learning mathematics at home than in the school.	2.14	Disagree	3
2. Mathematics is better taught at home than in the school.	1.99	Disagree	5
3. I like being at home to learn mathematics.	2.14	Disagree	3
4. I am more relaxed learning mathematics alone at home.	2.36	Disagree	1
5. I learn mathematics at my own pace at home than at school.	2.15	Disagree	2
Overall Weighted Mean	2.16	Disagree	

Table 2 shows the Mean Rating on the Mathematical Dispositions of Students in Doing Home – Tasks in terms of Home Enjoyment.

The respondents “Disagree” on more relaxed learning mathematics alone at home manifested on the high mean value of 2.36 (ranked 1st) followed by the least rank with “Disagree” on mathematics is better taught at home than in the school with mean of 1.99. The computed overall weighted mean on the mathematical dispositions of students in doing home – tasks in terms of home enjoyment was 2.16 with descriptive rating of “Disagree”. This implied that the junior high school respondents do not appreciate the enjoyment of learning mathematics at home, it means that they prefer learning math at school. Learning mathematics at school has specific attention to classroom instruction, that is why students are tend to go to school rather staying at home. According to [13], teachers help students to engage with, explore and make connections between their mathematical knowledge, skills and understandings with other learning areas and the world around them. The students' attitudes toward mathematics is a vital concept in the learning process of mathematics and how much students enjoy learning mathematics.

1.2. Self-Efficacy

Table 3
Mean Rating on the Mathematical Dispositions of Students in Doing Home – Tasks in terms of Self - Efficacy

Self-Efficacy	Mean	Descriptive Rating	Rank
1. I am confident I can learn the basic concepts taught in Math at home.	2.55	Agree	3
2. I believe I can complete all the tasks in mathematics at home.	2.49	Disagree	4
3. I believe I am type of person who can do well in mathematics at home.	2.42	Disagree	5
4. I can get good grades in mathematics even at home.	2.59	Agree	2
5. I believe I can do well on a mathematics test at home.	2.61	Agree	1
Overall Weighted Mean	2.53	Agree	

Table 3 shows the Mean Rating on the Mathematical Dispositions of Students in Doing Home – Tasks in terms of Self - Efficacy.

The respondents “Agree” on believe I can do well on a mathematics test at home manifested on the high mean value of 2.61 (ranked 1st) followed by the least rank with “Disagree” on believe I am type of person who can do well in mathematics at home with mean of 2.42. The computed overall weighted mean on the mathematical dispositions of students in doing home – tasks in terms of self - efficacy was 2.53 with descriptive rating of “Agree”. This implied that the junior high school respondents have high self –efficacy in performing well in mathematics which is similar to the research study of [14] findings that the students’ mathematics performance and self-efficacy beliefs in a rich assessment task environment in Central Mindanao University Laboratory High School. Self-efficacy constitutes a key component in Bandura’s Social Cognitive Theory [15]. A person’s belief, concerning his/her ability is one of the indicator to successfully perform a given task or behavior. It was found that self-efficacy is a major determinant of the choices that individuals make, the effort they expend, the perseverance they exert in the face of difficulties, and the thought patterns and emotional reactions they experience. It is included in the study to check the level of self-efficacy beliefs of the students. Because if they are confident to do the given tasks to them, they can achieve properly the set goals designed for them.

1.3. Perseverance

Table 4 shows the Mean Rating on the Mathematical Dispositions of Students in Doing Home – Tasks in terms of Perseverance.

Table 4
Mean Rating on the Mathematical Dispositions of Students in Doing Home – Tasks in terms of Perseverance

Perseverance	Mean	Descriptive Rating	Rank
1. The COVID-19 pandemic did not stop me from studying mathematics even at home.	3.06	Agree	2
2. Although studying at home during pandemic is very difficult, I still try to continue studying.	3.18	Agree	1
3. Working hard in math at home can improve one's ability in mathematics.	2.82	Agree	4
4. At home, I can get smarter in math if I try hard.	2.76	Agree	5
5. Even if I don't go to school, I always study at home	2.92	Agree	3
Overall Weighted Mean	2.95	Agree	

The respondents “Agree” on studying at home during pandemic is very difficult, I still try to continue studying manifested on the high mean value of 3.18 (ranked 1st) followed by the least rank with “Agree” on At home, I can get smarter in math if I try hard with mean of 2.76. The computed overall weighted mean on the mathematical dispositions of students in doing home – tasks in terms of perseverance was 2.95 with descriptive rating of “Agree”. This implied that the junior high school respondents’ have high perseverance in mathematical disposition in doing home tasks in times of pandemic despite of school lockdowns that started last March of 2020 which reduced instructional and learning time, which are known to impede student performance, with distinct effects on different groups of students. In the study of [16] a student with high perseverance is someone who consistently chooses to exert high effort, stays focused on challenging tasks, works hard, and does not give up. Perseverance should be sensitive to beliefs about the payoff of effort. Learning mathematics with understanding should be seeking to uncover the nuanced ways learners use both cognitive and non-cognitive skills to make meaning of important mathematical ideas [17]. Research emphasizing dispositional constructs like perseverance provides insight into students’ engagement with mathematics learning.

1.4. Parent Positive and Negative Attitude

Table 5
Mean Rating on the Mathematical Dispositions of Students in Doing Home – Tasks in terms of Parents’ Positive and Negative Attitude

Parent Positive and Negative Attitude	Mean	Descriptive Rating	Rank
1. My parents hire a mathematics teacher to teach me at home.	1.94	Disagree	3
2. I like to learn mathematics from my parents at home.	2.62	Agree	1
3. My parents are less concerned with my learning mathematics at home.	2.26	Disagree	2
4. My parents do not encourage me to learn mathematics at home.	1.87	Disagree	4
Overall Weighted Mean	2.17	Disagree	

Table 5 shows the Mean Rating on the Mathematical Dispositions of Students in Doing Home – Tasks in terms of Parents’ Positive and Negative Attitude.

The respondents “Agree” on I like to learn mathematics from my parents at home manifested on the high mean value of 2.62 (ranked 1st) followed by the least rank with “Disagree” on My parents do not encourage me to learn mathematics at home with mean of 1.87. The computed overall weighted mean on the mathematical dispositions of students in doing home – tasks in terms of parents’ positive and negative attitude was 2.17 with descriptive rating of “Disagree”. This implied that the junior high school respondents demonstrate on the disagreement to the negative statement that parent do not encourage their children to learn mathematics at home, it seems that their parents has a positive attitude towards mathematical disposition of their children in doing home-tasks. Parents’ attitude towards child's education is important in determining academic achievement of the child. Parents’ attitude has always been an essential component of every teacher-student school academic endeavor. Parents’ have been considered as one of the stakeholders of the school community and play tremendous roles in the child’s educational and environmental transformation to the students. Parents’

involvement in their children's learning not only improves a child's morale, attitude, and academic achievement across all subject areas, but it also promotes better behavior and social adjustment [18] as similar to the findings of the study of [19] shows that parental attitude towards education affects academic performance of day secondary school students in UasinGishu.

Summary of the Mathematical Dispositions of Students in Doing Home – Tasks

2. Significant Difference on the Mathematical Dispositions of Students in Doing Home – Tasks with Regards to the Five Factor Variables.

Table 6
Test of Significant Difference on the Mathematical Dispositions of Students in Doing Home – Tasks with Regards to the Five Factor Variables

<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>
Distraction	283	661.40	2.34	0.22
Home Enjoyment	283	610.00	2.16	0.29
Self-Efficacy	283	716.20	2.53	0.26
Perseverance	283	834.20	2.95	0.25
Parents' Positive & Negative Attitude	283	615.50	2.17	0.20

<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>	<i>Decision/ Interpretation</i>
Between Groups	120.90	4	30.23	123.52	0.00	2.38	Reject Ho Significant
Within Groups	345.03	1410	0.24				
Total	465.93	1414					

Table 6 shows Test of Significant Difference on the Mathematical Dispositions of Students in Doing Home – Tasks with Regards to the Five Factor Variables.

The computed test difference in mathematical dispositions of students in doing home – tasks with regards to the five factor variables was 0.00 respectively which all are lower than ($<$) Alpha Level of Significance value of 0.05, therefore the null hypothesis is rejected, hence there is a significant difference on the five factors variables towards the mathematical dispositions of students in doing home – tasks. The five factors and mathematical disposition demonstrate a consistent between a student's positive self –concept of ability in learning mathematics in doing home-tasks.[20] recognized such studies as essential in understanding the development of a student's positive mathematical disposition. A student's self-concept of ability in mathematics has a stronger correlation to math achievement.

3. Significant difference on the mathematical dispositions of students in doing home-tasks when grouped according to profile variables.

Grade Level Profile Variable

Table 7 shows Test of Significant Difference on the Mathematical Dispositions of Students in Doing Home – Tasks When Grouped According to Grade Level Profile Variable.

The computed P-values of distraction 0.58, home enjoyment 0.08, self-efficacy 0.52, perseverance 0.12 and parents' positive and negative attitude 0.37 which all are

Table 7
Test of Significant Difference on the Mathematical Dispositions of Students in Doing Home – Tasks When Grouped According to Grade Level Profile Variable

<i>Source of Variations</i>		<i>df</i>	<i>F</i>	<i>Sig.</i>	<i>Decision/ Interpretation</i>
Distraction	Between Groups	3.00	0.66	0.58	Accept Ho Not Significant
	Within Groups	279.00			
	Total	282.00			
Home Enjoyment	Between Groups	3.00	2.26	0.08	Accept Ho Not Significant
	Within Groups	279.00			
	Total	282.00			
Self-Efficacy	Between Groups	3.00	0.75	0.52	Accept Ho Not Significant
	Within Groups	279.00			

	Total	282.00			
Perseverance	Between Groups	3.00	1.97	0.12	Accept Ho Not Significant
	Within Groups	279.00			
	Total	282.00			
Parents Positive & Negative Attitude	Between Groups	3.00	1.04	0.37	Accept Ho Not Significant
	Within Groups	279.00			
	Total	282.00			

higher than ($>$) Alpha Level of Significance 0.05 value, therefore the Null Hypothesis is Accepted, hence there is no significant difference on the mathematical dispositions of students in doing home – tasks when grouped according to grade level profile variable. The data provide sufficient evidence to conclude that the grade level profile has no relation on the five factors towards mathematical dispositions of students in doing home – tasks, therefore, mathematical disposition of students is the implementation of their self-concept of ability in math. According to the study of [21] the students' self-concept of ability in mathematics would support specific self-concept on teacher/classroom interventions to be put into place to support the development of students' positive self-concept in mathematics and support the area of academic press, feedback and reinforcement, social supports, and modifications to the learning environment, it is also suggested that the students' self-concept of ability in mathematics be assessed regularly and frequently to determine the overall effectiveness of the changes on each student.

Table 8

Test of Significant Difference on the Mathematical Dispositions of Students in Doing Home – Tasks When Grouped According to Age Profile Variable

Source of Variations		df	F	Sig.	Decision/ Interpretation
Distraction	Between Groups	2	0.51	0.60	Accept Ho Not Significant
	Within Groups	280			
	Total	282			
Home Enjoyment	Between Groups	2	10.03	0.00	Reject Ho Significant
	Within Groups	280			
	Total	282			
Self-Efficacy	Between Groups	2	1.26	0.29	Accept Ho Not Significant
	Within Groups	280			
	Total	282			
Perseverance	Between Groups	2	0.08	0.92	Accept Ho Not Significant
	Within Groups	280			
	Total	282			
Parents Positive & Negative Attitude	Between Groups	2	4.98	0.01	Reject Ho Significant
	Within Groups	280			
	Total	282			

Table 8 shows Test of Significant Difference on the Mathematical Dispositions of Students in Doing Home – Tasks When Grouped According to Age Profile Variable.

The computed P-values of distraction is 0.60, Self-Efficacy 0.29, and Perseverance 0.92 which all are higher than ($>$) Alpha Level of Significance 0.05 value, therefore the Null Hypothesis is Accepted, hence there is no significant difference on the mathematical dispositions of students in doing home – tasks when grouped according to age profile variable. The data provide sufficient evidence to conclude that the age profile has no relation on the three factors: distraction, self-efficacy and perseverance towards mathematical dispositions of students in doing home – tasks.

Meanwhile the computed P-value of home enjoyment is 0.00 and parents' positive & negative attitude is 0.01 which all are lower than ($<$) Alpha Level of Significance 0.05 value, therefore the Null Hypothesis is rejected, hence there is significant difference on the mathematical dispositions of students in doing home – tasks when grouped according to age profile variable. The data provide sufficient evidence to conclude that the age profile variables has relation on the two factor: home enjoyment and parents' positive & negative attitude towards mathematical dispositions of students in doing home – tasks.

Home enjoyment and parents' positive & negative attitude establishes reasons in promoting higher self - esteem for students in their mathematics education at home. School closures due to corona virus have put parents in the challenging position of home-schooling their children. Traditional modes of instruction have

emphasized that math is best learned through studying and memorizing alone, with the teacher demonstrating procedures and then checking students' answers. If parents grew up with this style of instruction, their ideal home-math classroom might look like strict scheduling, workbooks, a child working alone in silence and parents telling children how to solve problems. But if parents enforce this approach, there could be conflicts and maybe even some crying [22]. In the study of [23] parents' attitude significantly predicted students' attitudes toward mathematics, by understanding the influence of parents' attitudes on students' attitudes toward mathematics, school efforts can be geared toward fostering favorable attitudes toward mathematics among parents.

Table 9
Test of Significant Difference on the Mathematical Dispositions of Students in Doing Home – Tasks When Grouped According to Sex Profile Variable

Source of Variations		df	F	Sig.	Decision/ Interpretation
Distraction	Between Groups	1	0.03	0.87	Accept Ho Not Significant
	Within Groups	281			
	Total	282			
Home Enjoyment	Between Groups	1	0.66	0.42	Accept Ho Not Significant
	Within Groups	281			
	Total	282			
Self-Efficacy	Between Groups	1	0.12	0.72	Accept Ho Not Significant
	Within Groups	281			
	Total	282			
Perseverance	Between Groups	1	1.28	0.26	Accept Ho Not Significant
	Within Groups	281			
	Total	282			
Parents Positive & Negative Attitude	Between Groups	1	0.35	0.55	Accept Ho Not Significant
	Within Groups	281			
	Total	282			

Table 9 shows Test of Significant Difference on the Mathematical Dispositions of Students in Doing Home – Tasks When Grouped According to Sex Profile Variable.

The computed P-values of distraction is 0.87, home enjoyment 0.42, self-efficacy 0.72, perseverance 0.26 and parents positive and negative attitude is 0.55 which all are higher than ($>$) Alpha Level of Significance 0.05 value, therefore the Null Hypothesis is Accepted, hence there is no significant difference on the mathematical dispositions of students in doing home – tasks when grouped according to age profile variable. The data provide sufficient evidence to conclude that the sex profile has no relation on the five factors. It shows that the student has a dispositional indicators or mathematical mindset regarding their sex profile, similar to the study of [24], shows that no evidence that gender or race corresponded to students' level of appreciation math. In order to positively impact student attitudes towards mathematics, it is important to understand factors that may influence secondary students' relationship with the discipline. This poster presents findings from an exploratory study of student disposition toward mathematics.

CONCLUSION

The student-respondents disagree on distraction, home enjoyment and parent positive and negative attitude towards mathematical dispositions of students in doing home-tasks, while agree on self-efficacy and perseverance. There is significant difference on the mathematical disposition of the students in doing home-tasks with regard to the five factor variables. There is significant difference on the mathematical disposition of the students in doing home-tasks with regard to age profile, and no significance difference on the mathematical disposition of the students in doing home-tasks with regard to grade level and sex profile variable. The respondents strongly agree on evaluated Mathematics program in terms of content, structure and usefulness.

Students need to move to an area where they can focus and set themselves up for success. Parents encourage their children to practice mindfulness which focus awareness on the present moment while acknowledging thought and feelings towards mathematical learning. Parents and teachers must share a responsibility to help their children learn and meet educational goals. The teachers are encouraged to develop, enhance and improve learning materials in Mathematics Home Based-Task.

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