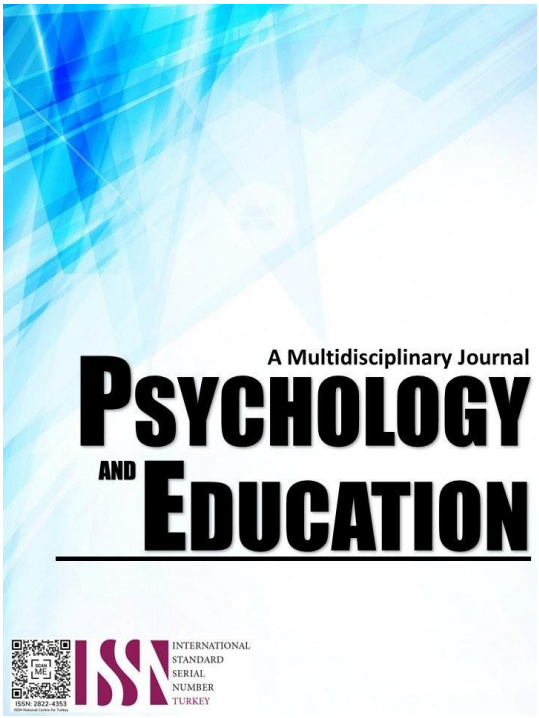
PARENTAL INVOLVEMENT IN LEARNING MATHEMATICS OF STUDENTS IN RELATION TO ATTITUDE AND ACADEMIC PERFORMANCE



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Research Article

Parental Involvement in Learning Mathematics of Students in Relation to Attitude and Academic Performance

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Abstract

This study investigated the parental involvement in learning Mathematics of students in relation to attitude and academic performance. The respondents of this study were the three-hundred fifty-six grade 9 students at 9 secondary schools in the Division of Bago City. Results showed that most of the respondents were female, belonged to income range Php 12,082 and below, their parents attained high school level, and had other works aside from being mentioned in the option of occupation. Level of parental involvement when taken as a whole was moderate; in terms of its areas, motivator and nature of Mathematics were interpreted as high and resource provider, monitor, Mathematics content advisor, and Mathematics learning counselor were all interpreted as moderate; level of attitude of students towards Mathematics was moderate; academic performance of students was very satisfactory; there existed significant difference on the parental involvement in learning Mathematics in terms of six areas. Results also revealed that there was a significant relationship between parental involvement in learning Mathematics and attitude of students; significant relationship also existed between parental involvement in learning Mathematics and academic performance; significant relationship was also noted between attitude of students and academic performance. Intervention plan/program was also provided based on the results of the study.

Keywords: *parental involvement in learning mathematics, attitude towards mathematics, academic performance*

Introduction

There is Mathematics everywhere. Mathematics is used in a variety of situations, including purchasing, money management, sports comprehension, performing some simple housework, and working. These highlight the value of learning Mathematics from an early age through college (Naungayan, 2022). Furthermore, Mathematics is essential for resolving issues in a variety of fields, including physics, statistics, commerce, computer science, economics, navigation, and astronomy (Andamon & Tan, 2018).

Despite the significance of Mathematics in everyday existence, there are several factors that have an impact on student's capability for understanding and applying Mathematics concepts. Parental involvement in the educational process of their children and how it affects attitudes and academic achievement, particularly in the field of Mathematics, is one of these aspects.

The focus of parental involvement was frequently on how parents might satisfy the requirements of the school and help their children's education. For instance, parents helped their children do their homework, attended parent-teacher conferences, and even volunteered in their child's school. (Liu et al., 2020). Many studies have begun to concentrate on the involvement of parents in school events or classroom activities (Reinke et al., 2019; Smith & Sheridan, 2019). These studies have suggested that strategies to support parental involvement are necessary because parental involvement has an impact on children's performance and achievement (Grace & Gerdes, 2019; Tan et al., 2019).

Students' attitudes about Mathematics are one of the reasons they did badly in the subject. One of the elements that affects how well children learn Mathematics is their attitude (Capuno et al., 2019). A student who approaches Mathematics with confidence will pay more attention to it than to other disciplines (Makur, Prahmana, & Gunur, 2019). It's also a widely held belief that a student's performance in Mathematics is largely determined by their attitude toward the subject. In another context, a positive outlook leads to high performance in the study of Mathematics. Success and perseverance in the study of Mathematics are influenced by attitudes (Cerbito, 2020).

Students' poor performance in Mathematics, as seen by quarterly examination scores, is a major source of concern in Bago City Division. This could be due to several causes, including parents' limited involvement in their children's Mathematics study or children's negative perspectives toward Mathematics, both of which have a significant effect on their learning.

In this regard, the researcher chose to carry out this study to determine the parental involvement in learning Mathematics of students in relation to attitude and academic performance.

Research Questions

This study determined the parental involvement in learning Mathematics of Grade 9 students in relation to attitude and academic performance at 9 public secondary schools in the Division of Bago City during the School Year 2022-2023. Specifically, this study sought to answer the following questions:

1. What is the profile of the Grade 9 Students in terms of the following variables:
    1.1. Sex;

1.2. family monthly income;
1.3. educational attainment of parents; and
1.4. occupation of parents?

2. What is the level of parental involvement in learning Mathematics of Grade 9 students in terms of the following variables:
   2.1. sex;
   2.2. family monthly income;
   2.3. educational attainment of parents; and
   2.4. occupation of parents?
3. What is the level of parental involvement in learning Mathematics of Grade 9 students when taken as a whole and in terms of the following areas:
   3.1. motivator;
   3.2. resource provider;
   3.3. monitor;
   3.4. mathematics content advisor;
   3.5. mathematics learning counselor; and
   3.6. nature of mathematics?
4. What is the level of attitude of Grade 9 students towards Mathematics when taken as a whole and in terms of the following variables:
   4.1. sex;
   4.2. family monthly income;
   4.3. educational attainment of parents; and
   4.4. occupation of parents?
5. What is the academic performance of Grade 9 students in Mathematics when taken as a whole and in terms of the following variables:
   5.1. sex;
   5.2. family monthly income;
   5.3. educational attainment of parents; and
   5.4. occupation of parents?
6. Is there a significant difference on the parental involvement in learning Mathematics of Grade 9 students in terms of the following areas:
   6.1. motivator;
   6.2. resource provider;
   6.3. monitor;
   6.4. mathematics content advisor;
   6.5. mathematics learning counselor; and
   6.6. nature of mathematics?
7. Is there a significant relationship between the level of parental involvement in learning Mathematics and the level of attitude of Grade 9 students towards Mathematics?
8. Is there a significant relationship between the level of parental involvement in learning Mathematics and academic performance of Grade 9 students?
9. Is there a significant relationship between the level of attitude towards Mathematics and the academic performance of Grade 9 students?
10. What intervention/s or program/s can be proposed based on the results of this study?

Methodology

Research Design

This research utilized the descriptive correlational research design. Descriptive correlational research is a type of research design that tries to explain the relationship between two or more variables without making any claims about cause and effect. It includes collecting and analyzing data on at least two variables to see if there is a link between them (https://www.questionpro.com/blog/descriptive-research-vs-correlational-research/).Moreover, this study sought to find out parental involvement to learning Mathematics in relation to students' attitude and academic performance, a situation existing at the time of the study.

Respondents

The subject and respondents of this study were the Grade 9 students at 9 public secondary Schools in the Division of Bago City, School Year 2022-2023.

The researcher used the stratified random sampling technique first to determine the number of respondents per school. Then, simple random sampling technique through lottery method was used to identify the respondents of the study.

Table 1. *Distribution of the Respondents per School*

Schools	*No. of Enrollees*	*Sample*
A	1,445	163
B	169	19
C	286	32
D	158	18
E	151	17
F	281	32
G	455	51
H	146	16
I	71	8
Total	3162	356

Instruments

The researcher adopted the instrument of parental involvement to learning Mathematics from Cai et al. (1999) from their research study entitled "Parental Roles in Students' Learning of Mathematics: An Exploratory Study". The attitude of students' instrument was adopted from Attitude towards Mathematics Inventory (ATMI) of Tapia (1996). The instrument has two parts: Part I which is for profiling that consists of respondents' name, socio-economic status, and household heads' educational attainment. Part II is the questionnaire: Parental Involvement has a total item of 32 and divided into six areas: Motivator having 5 items, resource provider having 5 items, Monitor having 6 items, Mathematics Content Advisor having 5 items, Mathematics Learning Counselor having 5 items, and Nature of Math having 6 items. The attitude towards Mathematics has 40 items. The respondents ticked a mark in the column indicating how they agreed or disagreed with each of the given statement. For all the positive statements, if a respondent chose "strongly agree", the response was scored 5 for the item. If a respondent chose "agree", the response was scored 4 for the item. If a respondent chose moderate, the response was scored 3 for the item. If a respondent chose "disagree", the response was scored 2 for the item. If a respondent chose "strongly disagree", the response was scored 1 for the item. However, for the all the negative statements, if a respondent chose "strongly agree", the response was scored 1 for the item. If a respondent chose "agree", the response was scored 2 for the item. If a respondent chose moderate, the response was scored 3 for the item. If a respondent chose "disagree", the response was scored 4 for the item. If a respondent chose "strongly disagree", the response was scored 5 for the item.

Validity and Reliability of the Research Instrument

The questionnaire of parental involvement was adopted from the study of Cai et. al (1999). The researcher modified the items and was tested for reliability and had a Cronbach's Alpha of 0.913 which indicates that the instrument was acceptable. The instrument of attitude towards Mathematics was adopted from Attitude towards Mathematics Inventory (ATMI) of Tapia (1996), since the instrument is already standardized, validity and reliability were not employed.

Procedure

The researcher sent a letter to the Division Superintendent and different Principals of Public Secondary Schools in the Division of Bago City to ask permission that a study on "Parental Involvement in Learning Mathematics in Relation to Students' Attitude and Academic Performance" will be conducted.

As soon as the Superintendent and Principals approved the letter, the researcher sent a letter to the Grade 9 Class Advisers of different Public Secondary Schools to ask permission that this study be conducted to Grade 9 Students. After the approval, the researcher implored a schedule from the Grade 9 Class Advisers on the availability of the respondents to answer the survey questionnaires.

Data Analysis

The data were retrieved, encoded, and processed using the Statistical Software. The statistical tools that the researcher used were:

For problem 1, which sought to determine the profile of the Grade 9 Students in terms of sex, family monthly income, educational attainment and occupation of parents, the frequency and percentage were used.

For problem 2, which sought determine the level parental involvement in learning Mathematics of Grade 9 students in terms of sex, family monthly income, educational attainment and occupation of parent, mean was used.

For problem 3, which sought to determine the level of parental involvement in learning Mathematics when taken as a whole and in terms of motivator, resource provider, monitor, Mathematics content advisor and Mathematics learning counselor, mean was used.

For problem 4, which sought to determine the level of attitude of Grade 9 students towards Mathematics when taken as a whole and in terms of sex, family monthly income, educational attainment and occupation of parents, mean was used.

For problem 5, which sought to determine the academic performance of Grade 9 students in Mathematics when taken as whole and in terms of sex, family monthly income, educational attainment and occupation of parents, mean was used.

For problem 6, which sought to determine if there is a significant difference on the parental involvement in learning Mathematics of Grade 9 students in terms of: motivator, resource provider, monitor, Mathematics content advisor, Mathematics learning counselor, the F-test or One -Way Analysis of Variance (ANOVA) was used. The Post- hoc Analysis specifically the Scheffe test was also used to determine if the means were statistically different.

For problem 7, 8 and 9 which sought determine the significant relationships between level of parental involvement in learning Mathematics and the level of Attitude of Grade 9 students, parental involvement in learning Mathematics and the academic performance of Grade 9 students, level of attitude of Grade 9 students and academic performance in Mathematics, Spearman Rho was used.

Ethical Considerations

Observing ethical standards in research is essential. At the core, this helped shape the true aims of the study, such as knowledge, truth, and avoidance of error and promoted values essential to collaborative work, such as trust, accountability, mutual respect, and fairness. The learners' identities and welfare were always protected. Throughout the whole study, the research data remained confidential.

Results and Discussion

Profile of Grade 9 Students in the Division of Bago City

The table below presents the profile of Grade 9 students at 9 secondary schools in the Division of Bago City for School Year 2022-2023.

Table 2. *Profile of Grade 9 Students in the Division of Bago City, School Year 2022-2023*

Profile	*Groupings*	*f*	*%*
Sex	Male	151	42.42
	Female	205	57.58
	Total	356	100
Family Monthly Income	12,082 and below	154	43.26
	between 12, 082 and 24,164	132	37.08
	between 24,164 and 48,328	45	12.64
	between 48,328 and 84, 754	25	7.02
	Between 84,574 and144,984	0	0
	Total	356	100
Father's Educational Attainment	Elementary	41	11.52
	High School	138	38.76
	Technical	21	5.90
	College	131	36.80
	Post Graduate	25	7.02
	Total	356	100
Mother's Educational Attainment	Elementary	16	4.49
	High School	161	45.22
	Technical	11	3.09
	College	130	36.52
	Post Graduate	38	10.67
	Total	356	100
Father's Occupation	Professional/Technical	54	15.17
	Administrative/Managerial	8	2.25
	Sales/Service	19	5.34
	Housemaker	18	5.06
	Retired	19	5.34
	Self-Employed	49	13.76
	Other	189	53.09
	Total	356	100
Mother's Occupation	Professional/Technical	27	7.58
	Administrative/Managerial	4	1.12
	Sales/Service	29	8.15
	Housemaker	80	22.47
	Retired	10	2.81
	Self-Employed	29	8.15
	Other	177	49.72
	Total	356	100

Table 2 shows that in terms of sex, 151 students or 42.42 percent are males, and 205 students or 57.58 percent are females.

In terms of family monthly income, 154 students or 43.26 percent have a family income range of Php 12, 082 and below, 132 students or 37.08 percent have a family income range between Php 12,082 and Php 24, 164, 45 students or 12.64 percent have a family income range between Php 24, 164 and Php 48, 328, 25 students or 7.02 percent have a family income range between Php 48, 328 and Php 84, 754, and none of the students have a family income range between Php 84, 574 and Php 144, 984.

In terms of father's educational attainment, fathers of 41 students or 11.52 percent attained elementary level, fathers of 138 students or 38.76 percent attained high school level, fathers of 21 students or 5.90 percent attained technical vocational level, fathers of 131 students or 36.80 percent attained college level, and fathers of 25 students or 7.02 percent attained post graduate studies level. In terms of mother's educational attainment, mothers of 16 students or 4.49 percent attained elementary level, mothers of 161 students or 45.44 percent attained high school level, mothers of 11 students or 3.09 percent attained technical vocational level, mothers of 130 students or 36.52 percent attained college level, and mother of 38 students or 10.67 percent attained post graduate studies level.

In terms of father's occupation, fathers of 54 students or 15.17 percent work as professionals/technical, fathers of 8 students or 2.25 percent work as administrative/managerial, fathers of 19 students or 5.34 percent work in sales/service, fathers of 18 students or 5.06 percent are housemakers, fathers of 19 students or 5.34 percent are retired, fathers of 49 students or 13. 76 percent are self-employed, and fathers of 189 students or 53.09 percent belong to other occupations. In terms of mother's occupation, mothers of 27 students or 7.58 percent work as professionals/technical, mothers of 4 students or 1.12 percent work as administrative/managerial, mothers of 29 students or 8.15 percent work in sales/service, mothers of 80 students or 22.47 percent are housemakers, mothers of 10 students or 2.81 percent are retired, mothers of 29 students or 8.15 percent are self-employed, and mothers of 177 students or 49.72 belong to other occupations.

This implies that in terms of students' profile, female students were more than male students. Most of the students belonged to family income range of Php 12, 082 and below, students' parents attained high school education and students' parents had other works aside from being mentioned.

Parental Involvement in Learning Mathematics in terms of Profile

The table below presents the level of parental involvement of Grade 9 students when grouped according to profile in the Division of Bago City for School Year 2022-2023.

Table 3. *Level of Parental Involvement in Learning Mathematics in terms of Profile*

Profile	*Groupings*	*f*	*Mean*	*Interpretation*
Sex	Male	151	3.20	Moderate
	Female	205	3.10	Moderate
Family Monthly Income	12,082 and below	154	3.04	Moderate
	between 12, 082 and 24,164	132	3.26	Moderate
	between 24,164 and 48,328	45	3.16	Moderate
	between 48,328 and 84, 754	25	3.11	Moderate
	between 84,574 and 144,984	0	0	
Father's Educational Attainment	Elementary	41	3.13	Moderate
	High School	138	3.08	Moderate
	Technical	21	3.26	Moderate
	College	131	3.12	Moderate
	Post Graduate	25	3.46	High
Mother's Educational Attainment	Elementary	16	2.82	Moderate
	High School	161	3.10	Moderate
	Technical	11	3.21	Moderate
	College	130	3.10	Moderate
	Post Graduate	38	3.55	High
Father's Occupation	Professional/Technical	54	3.26	Moderate
	Administrative/Managerial	8	3.50	High
	Sales/Service	19	2.97	Moderate
	Housemaker	18	3.07	Moderate
	Retired	19	3.45	High
	Self-Employed	49	3.08	Moderate
	Other	189	3.09	Moderate
Mother's Occupation	Professional/Technical	27	3.35	Moderate
	Administrative/Managerial	4	3.15	Moderate
	Sales/Service	29	3.16	Moderate
	Housemaker	80	3.11	Moderate

Retired	10	3.38	Moderate
Self-Employed	29	3.12	Moderate
Other	177	3.10	Moderate

Table 3 shows that male students have a mean of 3.26 and female students have a mean of 3.23, both of which are interpreted as moderate. This implies that although female students had a mean bit higher than male students, but still they had a nearly equal parental involvement in their Mathematics learning. Such results confirm with the study of Batool and Riaz (2019) that found gender differences exist and parents of girls are more aware of their extracurricular and curriculum-related activities.

In terms of family monthly income, students who have a family income range of Php 12, 082 and below obtain a mean of 3.13, students who have a family income range between Php 12, 082 and Php 24, 164 obtain a mean of 3.35, students who have a family income range between Php 24, 164 and Php 48, 328 obtain a mean of 3.30, and students who have a family income range between Php 48, 328 and Php 84, 754 obtain a mean of 3.26. All of which are interpreted as moderate. It further indicates that parental involvement in their children's Mathematics education was roughly the same for students from diverse household income groups. Although the results displayed moderate parental involvement in learning Mathematics regardless of family monthly income, this is consonance with the study of Al-Matalka's (2018) stating that parental involvement at home exists independent of parental economic level.

In terms of parent's educational attainment, students whose fathers attained elementary level have a mean of 3.22 interpreted as moderate, students whose fathers attained high school level have a mean of 3.18 interpreted as moderate, students whose fathers attained technical level have a mean of 3.30 interpreted as moderate, students whose father attained college level have a mean of 3.26 interpreted as moderate and students whose fathers attained post graduate studies level have a mean of 3.56 interpreted as high. This implies that students whose fathers attained elementary level, high school level, technical level, and college level had a moderate and almost the same parental involvement in Mathematics. Students whose fathers attained post graduate studies level had a high level of parental involvement which means that their fathers were highly involved and gave all their needs to have meaningful learning in Mathematics. Students whose mothers attained elementary level have a mean of 2.89 interpreted as moderate, students whose mothers attained high school level have a mean of 3.20 interpreted as moderate, students whose mothers attained technical level have a mean of 3.28 interpreted as moderate, students whose mothers attained college level have a mean of 3.22 interpreted as moderate, and students whose mothers attained post graduate studies level have a mean of 3.68 interpreted as high. This suggests that students whose mothers completed grades in elementary school, high school, technical school, and college had parental involvement in Mathematics that was moderate and roughly equal across all these levels. Mothers who had post graduate degrees were active with their children and provided for all their requirements so they could have good performance in Mathematics. This finding is in consonance with the study of Tan et al. (2020) who found that parents with higher educational attainment are more likely to actively encourage their children's academic achievement, which in turn impacts the children's Mathematics performance.

In terms of parent's occupation, students whose fathers have a work of being professional/technical obtain a mean of 3.37 interpreted as moderate, students whose fathers have a work of being administrative/managerial obtain a mean of 3.70 interpreted as high, students whose fathers have a work in sales/service obtain a mean of 3.11 interpreted as moderate, students whose fathers are housemakers obtain a mean of 3.19 interpreted as moderate, students whose fathers are retired obtain a mean of 3.54 interpreted as high, students whose fathers are self-employed obtain a mean of 3.15 interpreted as moderate, and students whose fathers have other occupations obtain a mean of 3.21 interpreted as moderate. This implies that students whose fathers having an occupation of professional/technical, sales/service, housemaker, self-employed, and other occupation had a moderate and almost the same parental involvement in learning Mathematics. Students whose fathers having an occupation of administrative/managerial and those who are retired showed high involvement, which implies that they were actively involved with their children's Mathematics learning. Students whose mothers have a work of being a professional/technical obtain a mean of 3.51 interpreted as high, students whose mother have a work of being administrative/managerial obtain a mean of 3.28 interpreted as moderate, students whose mothers are in sales/service obtain a mean of 3.27 interpreted as moderate, students whose mothers are housemakers obtain a mean of 3.24 interpreted as moderate, students whose mothers are retired obtain a mean of 3.47 interpreted as high, students whose mothers are self-employed obtain a mean of 3.20 interpreted as moderate, students whose mother have other occupations obtain a mean of 3.20 interpreted as moderate. This implies that students whose mothers were professional/technical and those who were retired had a high parental involvement in learning Mathematics. Students whose mothers having an occupation of administrative/managerial, sales/service, housemaker, self-employed and other occupation had a moderate and almost the same parental involvement in learning Mathematics. The said result is conformity with the study Kunwar's (2020) which states that students' success in Mathematics is positively impacted by their parents' work. In another context, it is evident that parents' occupations had a big impact on their children's Mathematics achievement.

Parental Involvement in Learning Mathematics when taken as a Whole and in terms of its Area

The table below shows the level of parental involvement in learning Mathematics of Grade 9 students when taken as a whole and in terms of its area in the Division of Bago City for School Year 2022-2023.

Table 4. *Parental Involvement in Learning Mathematics when taken as a Whole and in terms of its Area*

Parental Involvement in Learning Mathematics	*Mean*	*Interpretation*
Motivator		
1. When I am having trouble learning Mathematics, my parents tell me not to worry about it because everybody has problems with Mathematics.	3.74	High
2. At home, my parents encourage me to work hard on Mathematics problems even though the problems are difficult.	3.33	Moderate
3. My parents motivate me to learn Mathematics well.	3.83	High
4. My parents believe that Mathematics plays an important role in my life.	3.75	High
5. My parents don't know how to motivate me to do a good job in Mathematics assignment.	3.83	High
Over-all	3.70	High
Resource Provider		
6. My parents try hard to have a nice learning environment at home for me to do Mathematics.	3.57	High
7. My parents often take me to the public library.	2.31	Low
8. My parents often buy me Mathematics-related books.	2.23	Low
9. At our house, my parents have a variety of games and puzzles that encourage my development in Mathematics.	2.85	Moderate
10. At home, my parents provide Mathematics tools such as calculators and rulers.	3.80	High
Over-all	2.95	Moderate
Monitor		
11. My parents check my homework regularly.	3.04	Moderate
12. My parents seldom spend time talking with me about my progress in Mathematics.	2.92	Moderate
13. My parents require me to show my results in all Mathematics assignment.	2.87	Moderate
14. At home, it is important for my parents that I keep a balance between Mathematics and other subjects.	3.77	High
15. My parents always try to monitor the amount of time I spend on Mathematics at home.	2.57	Low
16. My parents are always aware of my Mathematics requirements by checking notebooks, using learning line, or through phone calls to schools.	2.62	Moderate
Over-all	2.96	Moderate
Mathematics Content Advisor		
17. My parents feel that they can help me solve problems from my Mathematics class.	3.13	Moderate
18. My parents think that they know enough to help me about Algebra.	2.82	Moderate
19. My parents often discuss with me how Math is used in our everyday life.	3.04	Moderate
20. My parents try to understand the Mathematics I am studying.	3.30	Moderate
21. My parents often help me to do Mathematics homework.	2.97	Moderate
Over-all	3.05	Moderate
Mathematics Learning Counselor		
22. My parents don't know strategies in helping me to overcome my weakness in Mathematics.	3.44	High
23. My parents are aware of the approaches used to teach Mathematics at my school.	3.12	Moderate
24. My parents always try to figure out good approaches in helping me learn different Mathematics topics.	3.16	Moderate
25. My parents understand my strengths and weaknesses in learning Mathematics.	3.57	High
26. My parents try to match their expectation with my potential.	3.28	Moderate
Over-all	3.31	Moderate
Nature of Math		
27. My parents feel that learning Mathematics is mostly memorizing.	3.23	Moderate
28. My parents believe that exploring patterns plays no part in learning Mathematics.	3.44	High
29. My parents believe that Mathematics uses symbols rather than ideas and understanding.	2.89	Moderate
30. My parents believe that knowing why an answer is correct is as important as getting the answer.	3.54	High
31. My parents believe that Mathematics problems can be solved in different ways.	3.88	High
32. My parents believe that there is always a rule to follow in solving a Math problem.	3.99	High
Over-all	3.50	High
As a whole	3.25	Moderate

Table 4 shows that in terms of motivator, the highest mean is 3.83 interpreted as high level in the items "My parents motivate me to learn Mathematics well" and "My parents don't know how to motivate me to do a good job in Mathematics assignment. Meanwhile, the lowest mean is 3. 33 interpreted as moderate level in the item "At home, my parents encourage me to work hard on Mathematics problems even though the problems are difficult". The overall mean for motivator is 3.70 interpreted as high level. This implies that parents were highly involved in motivating their child's learning in Mathematics. Although based on the result that parents don't know how to motivate their child to do well in Mathematics assignment, they still managed to motivate their children in some aspects. Such results confirm with the study of Kastner (2020) which states that a motivator's job is crucial to ensure that a person gets dedicated and has a sense of belonging to produce better outcomes more quickly. As a result, the parents in this research are excellent motivators for their children because they provide an environment that encourages critical thinking and problem-solving, which are the primary

objectives of math instruction.

In terms of resource provider, the highest mean is 3.80 interpreted as high level in the item "At home, my parents provide Mathematics tools such as calculators and rulers". Meanwhile, the lowest mean is 2.23 interpreted as low level in the item "My parents often buy me Mathematics related books". As resource providers for their children, the overall mean is 2.95 interpreted as moderate level. This implies that parents still needed to find ways to provide tools and learning materials for their children in Mathematics to achieve meaningful learning and desirable performance in the said subject. The said result is in conformity with the study of Jay et al. (2018) stating that the provision of learning resources and activities at home, for example, books, music, and discussion of everyday facts, is associated with improvement in children's mathematics achievement.

In terms of monitor, the highest mean is 3.77 interpreted as high level in the item "At home, it is important for my parents that I keep a balance between Mathematics and other subjects". Meanwhile, the lowest mean is 2.57 interpreted as low level in the item "My parents always try to monitor the amount of time I spend on Mathematics at home". The overall mean for monitor is 2.96 interpreted as moderate level. This implies parents still need to exert effort to monitor their child's performance in Mathematics because this may impact their learning in the said subject and crucial to achieve meaningful learning and academic performance. Dela Cruz and Natividad (2020) also underscored that parents have a significant impact on their children's education. Parents' monitoring role ensures that their children follow moral and ethical guidelines as well as the essential steps to become math achievers, capable of using mathematical concepts and procedures to solve problems in real-world scenarios.

In terms of Mathematics content advisor, the highest mean is 3.30 interpreted as moderate level in the item "My parents try to understand the Mathematics I am studying". Meanwhile, the lowest mean is 2.82 interpreted as moderate level in the item "My parents think that they know enough to help me about Algebra". The overall mean for Mathematics content advisor is 3.05 interpreted as moderate level. This implies that students had a moderate parental involvement in learning Mathematics on this area and parents need to augment their skill and understanding to help their children's endeavor in the said subject. Jay et al. (2018) confirms that parents who actively participate in their children' homework may have a good impact on their academic performance.

In terms of Mathematics learning Counselor, the highest mean is 3.57 interpreted as high level in the item "My parents understand my strengths and weaknesses in learning Mathematics". Meanwhile, the lowest mean is 3.12 interpreted as moderate level in the item "My parents are aware of the approaches used to teach Mathematics at my school". The overall mean for Mathematics learning counselor is 3.31 interpreted as moderate level. This implies that students had a moderate level of parental involvement in learning Mathematics and parents still need to make ways and consideration to understand their children's take in the said subject. Based on Furner (2017), students who have a positive attitude toward mathematics are better able to make professional decisions.

In terms of nature of Mathematics, the highest mean is 3.99 interpreted as high level in the item "My parents believe that there is always a rule to follow in solving Math problems". Meanwhile, the lowest mean is 2.89 interpreted as low level in the item "My parents believe that Mathematics uses symbols rather than ideas and understanding". The overall mean for nature of Mathematics is 3.50 interpreted as high level. This implies parents really understand the nature of Mathematics and its importance to their children's life.

When taken as whole, the mean is 3.25 interpreted as moderate level of parental involvement in learning Mathematics. This means that parents need to augment their involvement in their children's education most especially in Mathematics. By doing so, their children will develop positive outlook in the said subject and achieve good or even outstanding performance in the said subject. This finding supports the argument that the attitude of parents regarding their children as learners of Mathematics is a significant predictor of Mathematics achievement (Pedersen, Elmore, & Bleyer, 1986 as cited in the study of Cai, Moyer & Wang, 1999). Cai, Moyer & Wang, (1999) further explained in his study that of all the parental roles, however, the indirect assistance roles of parents as Motivators, Resource Providers, and Monitors seem to be the most important predictors of students' mathematics proficiency and performance. The direct assistance roles of parents as Content Advisors and Learning Counselors are less important predictors.

Attitude of Students towards Mathematics when taken as a Whole and in terms of Profile

The table below presents the level of attitude of Grade 9 students towards Mathematics when taken as a whole and grouped according to profile in the Division of Bago City for School Year 2022-2023.

Table 5 shows that in terms of sex, male students have a mean of 3.45 interpreted as positive and female students have a mean of 3.24 interpreted as moderate. This suggests that male students had a favorable attitude toward Mathematics compared to female students. The said result is in contrary with the study of Thapa and Paudel (2020) which revealed that both boys and girls have good perceived self-efficacy in mathematics and positive attitude towards mathematics. Perceived self-efficacy and attitude towards mathematics are less likely to be influenced by gender of students.

In terms of family monthly income, students who have a family income range of Php 12, 082 and below obtain a mean of 3.21 in interpreted as moderate, students who have a family income range between Php 12, 082 and Php 24 164 obtain a mean of 3.46 interpreted as positive, students who have a family income range between Php 24, 164 and Php 48, 328 obtain a mean of 3.32 interpreted as moderate, and students who have a family income range between Php 48, 328 and Php 84, 754 obtain a mean of 3.31 interpreted as moderate. This implies that students' attitudes towards Mathematics were similar, apart from those whose families earned between Php

12, 082 and Php 24, 164; these students showed a favorable attitude towards the subject. This result supports the study of Laranang and Bondoc (2020) which states the positive correlation that the high the monthly income, the better in valuing Mathematics. It implies that parents' monthly income was related to valuing Mathematics. Family income affects the students in valuing Mathematics because most of the respondents' parents were below the minimum income every month.

Table 5. *Attitude of Grade 9 Students towards Mathematics when taken as a Whole and in terms of Profile*

Profile	*Groupings*	*F*	*Mean*	*Interpretation*
Sex	Male	151	3.45	Positive
	Female	205	3.24	Moderate
Family Monthly Income	12,082 and below	154	3.21	Moderate
	between 12, 082 and 24,164	132	3.46	Positive
	between 24,164 and 48,328	45	3.32	Moderate
	between 48,328 and 84, 754	25	3.31	Moderate
	between 84,574 and 144,984	0	0	
Father's Educational Attainment	Elementary	41	3.44	Positive
	High School	138	3.3	Moderate
	Technical	21	3.72	Positive
	College	131	3.24	Moderate
	Postgraduate	25	3.39	Moderate
Mother's Educational Attainment	Elementary	16	3.20	Moderate
	High School	161	3.34	Moderate
	Technical	11	2.98	Moderate
	College	130	3.31	Moderate
	Postgraduate	38	3.44	Positive
Father's Occupation	Professional/Technical	54	3.37	Moderate
	Administrative/Managerial	8	3.55	Positive
	Sales/Service	19	3.05	Moderate
	Housemaker	18	3.52	Positive
	Retired	19	3.46	Positive
	Self-Employed	49	3.21	Moderate
	Other	189	3.33	Moderate
Mother's Occupation	Professional/Technical	27	3.45	Positive
	Administrative/Managerial	4	3.53	Positive
	Sales/Service	29	3.29	Moderate
	Housemaker	80	3.18	Moderate
	Retired	10	3.34	Moderate
	Self-Employed	29	3.46	Positive
	Other	177	3.35	Moderate
As a whole		356	3.33	Moderate

In terms of parent's educational attainment, students whose fathers attained elementary level obtain a mean of 3.44 interpreted as positive, students whose fathers attained high school level obtain a mean of 3.3 interpreted as moderate, students whose fathers attained technical level obtain a mean of 3.72 interpreted as positive, students whose fathers attained college level obtain a mean of 3.24 interpreted as moderate, and students whose fathers attained post graduate studies level obtain a mean of 3.39 interpreted as moderate. This means that students whose fathers completed high school, college, and postgraduate studies had a moderate and nearly same attitude toward Mathematics. Students whose fathers had achieved elementary and technical levels, on the other hand, had a positive mindset toward Mathematics. Students whose mothers attained elementary level obtain a mean of 3.20 interpreted as moderate, students whose mothers attained high school level obtain a mean of 3.34 interpreted as moderate, students whose mothers attained technical level obtain a mean of 2.98 interpreted as moderate, students whose mothers attained college level obtain a mean of 3.31 interpreted as moderate, and students whose attained mothers post graduate level obtain a mean of 3.44 interpreted as positive. It additionally demonstrates that students' attitudes about Mathematics were similar whether their mother had attained from elementary school, high school, technical school, or college. Students whose mothers had completed postgraduate degrees had a favorable attitude about the said subject. Kanwar (2020) revealed that students were found more positive towards Mathematics as they were from the higher educated family. Similarly, the mean score of the factor wise attitude level of the students towards Mathematics was also found comparatively higher from the students who were from higher educated parents. This indicates that the parents' education impacts their child's positive attitude towards Mathematics.

In terms of parent's occupation, students whose fathers have a work being professional/technical obtain a mean of 3.37 interpreted as moderate, students whose fathers have a work being administrative/managerial obtain a mean of 3.55 interpreted as positive, students

whose fathers have a work in sales/service obtain a mean of 3.05 interpreted as moderate, students whose fathers are housemakers obtain a mean of 3.52 interpreted as positive, students whose fathers are retired obtain a mean of 3.46 interpreted as positive, students whose fathers are self-employed obtain a mean of 3.21 interpreted as moderate, and students whose fathers have other occupations obtain a mean of 3.33 interpreted as moderate. This means that students whose fathers worked in professional/technical, sales/service, self-employment, or other occupations had a moderate and essentially comparable attitude toward Mathematics. Students with administrative/managerial fathers, housemakers, and those who were retired, on the other hand, had a positive attitude towards the said subject. Students whose mothers have a work of being professional/technical obtain a mean of 3.45 interpreted as positive, students whose mothers have a work of being administrative/managerial obtain a mean of 3.53 interpreted as positive, students whose mothers have a work in sales/service obtain a mean of 3.29 interpreted as moderate, students whose mothers are housemakers obtain a mean of 3.18 interpreted as moderate, students whose mothers are retired obtain a mean of 3.34 interpreted as moderate, students whose mothers are self-employed obtain a mean of 3.46 interpreted as positive, and students whose mothers have other occupation had a mean of 3.35 interpreted as moderate. This implies that students whose mothers were professional/technical, administrative/managerial, and self-employed displayed a positive attitude towards Mathematics. However, those students whose mothers were in sales/service, housemakers, retired, and other occupations displayed a moderate and had almost the same level of attitude towards the subject. Such results confirm with the study of Kanwar (2020) which states that the students' attitude towards Mathematics having parents with government jobs were found to be comparatively more positive than the other students having parents with other occupations.

The overall mean was 3.33 and interpreted as moderate. This suggests that students have a moderate attitude towards Mathematics. Furthermore, students must improve their attitude towards the subject by showing interest in it and by having teachers who are flexible and creative in delivering the lesson inside the classroom so that learning is relevant and meaningful. The said result is in consonance with the study of Capuno et al. (2019) which emphasized that attitudes of students towards Mathematics would affect how well they perform in the subject and how often they engage in the subject.

Academic Performance of Students when taken as a Whole and in terms of Profile

The table below presents the academic performance of Grade 9 students when taken as a whole and grouped according to profile in the Division of Bago City for School Year 2022-2023.

Table 6 shows that in terms of sex, male students have an academic performance of 88 interpreted as very satisfactory, and female students have an academic performance of 90 interpreted as outstanding. This implies that male students still needed to improve their academic performance in Mathematics whereas female students although displayed outstanding performance still needed to enrich their performance to maintain excellent standing in the said subject. The said outcome is consistent with research conducted by West et al. (2020) and Jameson (2020), which discovered that male students performed poorer in mathematics at the junior level than female students but better at the senior level. Some studies found that men perform better than women, particularly in Mathematics at the postsecondary level (Zhao & Perez-Felkner, 2022; Pollanen et al. 2018; Mozahem et al. 2021), while other studies showed a trend of women outperforming men in terms of their academic performances at the elementary and junior levels (Chow et al., 2023; Cabuquin, 2023).

In terms of family monthly income, students who have a family income range of Php 12, 082 and below obtain a mean of 88 interpreted as very satisfactory, students who have a family income range between Php 12, 082 and Php 24, 164 obtain a mean of 90 interpreted as outstanding, students who have a family income range between Php 24, 164 and Php 48, 328 obtain a mean of 92 interpreted as outstanding, and students who have a family income range between Php 48, 328 and Php 84, 754 obtain a mean of 91 interpreted as outstanding. This indicates students performed extremely well in Mathematics regardless of the family's monthly income, apart from those who came from families earning Php 12, 082 and below, who did very satisfactorily in the subject. Zhang et al. (2020) suggests that there is a pathway from family's monthly income to children's academic achievement through parental academic involvement and that this pathway is dependent on the level of parental subjective social mobility.

In terms of parent's educational attainment, students whose fathers attained elementary level have a mean of 87 interpreted as very satisfactory, students whose fathers attained high school level have a mean of 89 interpreted as very satisfactory, students whose fathers attained technical level have a mean of 90 interpreted as outstanding, students whose fathers attained college level have a mean of 91 interpreted as outstanding, and students whose fathers attained post graduate studies level have also a mean of 91 interpreted as outstanding. This suggests that all students, regardless of their fathers' educational attainment, fared exceptionally well in mathematics, apart from those who reached the primary and high school levels, where they showed very satisfactory academic performance in the subject. Students whose mothers attained elementary level have a mean of 88 interpreted as very satisfactory, students whose mothers attained high school level have a mean of 89 interpreted as very satisfactory, students whose mothers attained technical level have also a mean of 89 interpreted as very satisfactory, students whose mothers attained for college level have a mean of 91 interpreted as outstanding, and students whose mothers attained post graduate level have a mean of 90 interpreted as outstanding. This suggests that students whose mothers reached elementary, high school, and technical levels had very satisfactory academic performance in Mathematics and those who gained college and post graduate levels demonstrated an excellent academic performance in the said subject. Parental educational attainment had a significant relationship with the students' performance (Capuno, et al., 2019). Students with educated parents did better than those with less educated parents. Additionally, they emphasized how the mother's level of

education has a big impact on the student's performance, with the students whose mothers had greater academic performance (Capuno et al., 2019).

Table 6. *Academic Performance of Grade 9 students when taken as a Whole and in terms of Profile*

Profile	*Groupings*	*f*	*Mean*	*Interpretation*
Sex	Male	151	88	Very Satisfactory
	Female	205	90	Outstanding
Family Monthly Income	12,082 and below	154	88	Very Satisfactory
	Between 12, 082 and 24,164	132	90	Outstanding
	Between 24,164 and 48,328	45	92	Outstanding
	Between 48,328 and 84, 754	25	91	Outstanding
	Between 84,574 and 144,984	0	0	
Father's Educational Attainment	Elementary	41	87	Very Satisfactory
	High School	138	89	Very Satisfactory
	Technical	21	90	Outstanding
	College	131	91	Outstanding
	Postgraduate	25	91	Outstanding
Mother's Educational Attainment	Elementary	16	88	Very Satisfactory
	High School	161	89	Very Satisfactory
	Technical	11	89	Very Satisfactory
	College	130	91	Outstanding
	Postgraduate	38	90	Outstanding
Father's Occupation	Professional/Technical	54	91	Outstanding
	Administrative/Managerial	8	94	Outstanding
	Sales/Service	19	90	Outstanding
	Housemaker	18	88	Very Satisfactory
	Retired	19	87	Very Satisfactory
	Self-Employed	49	89	Very Satisfactory
	Other	189	89	Very Satisfactory
Mother's Occupation	Professional/Technical	27	91	Outstanding
	Administrative/Managerial	4	91	Outstanding
	Sales/Service	29	90	Outstanding
	Housemaker	80	90	Outstanding
	Retired	10	89	Very Satisfactory
	Self-Employed	29	90	Outstanding
	Other	177	89	Very Satisfactory
As a whole		356	89	Very Satisfactory

In terms of parent's occupation, students whose fathers have a work of being professional/technical obtain a mean of 91 interpreted as outstanding, students whose fathers have a work of administrative/managerial obtain a mean of 94 interpreted as outstanding, students whose fathers have a work in sales/service obtain a mean of 90 interpreted as outstanding, students whose fathers are housemakers obtain an mean of 88 interpreted as very satisfactory, students whose fathers are retired obtain a mean of 87 interpreted as very satisfactory, and students whose fathers are self-employed and have other occupations obtain a mean of 89 both are interpreted as very satisfactory. This implies that students whose fathers were professional/technical and administrative managerial displayed academic performance in Mathematics and those who were housemakers, retired, self-employed and had other occupations displayed very satisfactory performance in the said subject. Students whose mothers have a work of being professional/technical obtain a mean of 91 interpreted as outstanding, students whose mothers have a work of administrative/managerial obtain a mean of 91 interpreted as outstanding, students whose mothers have a work in sales/service obtain a mean of 90 interpreted as outstanding, students whose mothers are housemakers and self-employed obtain also a mean of 90 interpreted as outstanding, students whose mothers are retired and have other occupations obtain a mean of 89 interpreted as very satisfactory. This implies that students whose mothers' occupations were professional/technical, administrative/managerial, housemakers, and self- employed displayed outstanding academic performance in Mathematics, whereas those who were retired and had other occupations displayed a very satisfactory academic performance in Mathematics. The said finding is in consonance with the study of Kunwar (2020) which states that parent's occupation is directly related to their children's achievement in Mathematics.

When taken as a whole, the academic performance of students is 89 interpreted as very satisfactory. This implies that Grade 9 students at 9 secondary schools in the Division of Bago City have a very satisfactory performance in Mathematics and still needed to improve their performance in the said subject. The findings of this study corroborate those of Dela Cruz and Natividad's (2018) study, which found that pupils performed rather satisfactorily in Mathematics as well. This suggests even more that students have mastered the necessary information and the cognitive processes needed to carry out real-world mathematical learning activities.

Difference on Parental Involvement in Learning Mathematics In terms of its Area

The table on the next page presents the difference on the parental involvement in terms of its area in the Division of Bago City for School Year 2022-2023.

Table 7. *Difference on the Parental Involvement in terms of its area*

Parental Involvement	*N*	*Mean*
Motivator	356	3.70
Resource Provider	356	2.95
Monitor	356	2.96
Mathematics Content Advisor	356	3.05
Mathematics Learning Counselor	356	3.31
Nature of Mathematics	356	3.50

Computed Value (F), 66.99; p-value <0.001; Decision- Reject Ho; Interpretation- Significant at 0.05 level of significance

Table 7 shows that motivator has a mean of 3.70, 2.95 for resource provider, 2.96 for monitor, 3.05 for Mathematics content advisor, 3.31 for Mathematics learning counselor, and 3.50 for nature of Mathematics.

After computing the data using One-Way Anova, the f-computed value is 66.99 with a p-value of <0.001 which is less than 0.05 level of significance. Therefore, the null hypothesis is rejected, and this means that there is a significant difference on the level of parental involvement in learning Mathematics of students in terms of motivator, resource provider, monitor, Mathematics content advisor, Mathematics learning counselor, and nature of Mathematics. This implies that parents highly showed involvement on their children's Mathematics learning in areas such as motivator and nature Mathematics and showed moderate level of parental involvement for the rest of the areas. The findings support the study of Cai et. al (1999) which revealed that motivators, resource providers, and monitors are the most important predictors of students' Mathematical achievement has practical implications because the focus of the reform of Mathematics education is on communication, conceptual understanding, problem-solving, and reasoning. The mathematics taught in schools today may be very different from the mathematics taught to them by their parents.

Comparison between the Means of the areas of Parental Involvement

The table below shows the comparison between the means of the areas of parental involvement.

Table 7.1 *Comparison Between the Means of the areas of Parental Involvement*

Comparison	*Computed Value (F')*	*p-value*	*Interpretation*
Motivator vs. Resource Provider	14.0096	<0.001	Significant
Motivator vs. Monitor	13.8025	<0.001	Significant
Motivator vs. Mathematics Content Advisor	12.0867	<0.001	Significant
Motivator vs. Mathematics Learning Counselor	7.2372	<0.001	Significant
Motivator vs. Nature of Mathematics	3.7829	0.01396	Significant
Resource Provider vs. Monitor	0.2071	0.99998	Not Significant
Resource Provider vs. Mathematics Content Advisor	1.9229	0.59382	Not Significant
Resource Provider vs. Mathematics Learning Counselor	6.7724	<0.001	Significant
Resource Provider vs. Nature of Mathematics	10.2267	<0.001	Significant
Monitor vs. Mathematics Content Advisor	1.7158	0.70861	Not Significant
Monitor vs. Mathematics Learning Counselor	6.5653	<0.001	Significant
Monitor vs. Nature of Mathematics	10.0196	<0.001	Significant
Mathematics Content Adviser vs. Mathematics Learning Counselor	4.8495	<0.001	Significant
Mathematics Content Advisor vs Nature of Mathematics	8.3038	<0.001	Significant
Mathematics Learning Counselor vs. Nature of Mathematics	3.4543	0.03607	Significant

Table 7.1 shows the differences among the means of 6 areas of parental involvement in learning Mathematics. Motivator vs. resource provider has a p-value of <0.001, <0.001 for motivator vs. monitor, <0.001 for motivator vs. Mathematics content advisor, <0.001 for motivator vs. Mathematics learning counselor, 0.014 for motivator vs. nature of Mathematics, <0.001 for resource provider vs. Mathematics learning counselor, <0.001 for resource provider vs. nature of Mathematics, <0.001 for monitor vs. Mathematics learning counselor, <0.001 for monitor vs. nature of Mathematics, <0.001 for Mathematics content advisor vs. Mathematics learning counselor, <0.001 for Mathematics content advisor vs. nature of Mathematics, and 0.03607 for Mathematics learning counselor vs. nature of Mathematics. All of which have a p-value less than 0.05 which implies that their means were significantly different. This implies that students had a different level of parental involvement in learning Mathematics with respect to pairs of areas mentioned above.

Resource provider vs. monitor has a p-value of 0.99998, 0.59382 for resource provider vs. Mathematics learning counselor, and 0.70861 for monitor vs. Mathematics content adviser. All of which have a p-value greater than 0.05 which implies that their means were not significantly different. This further implies students in these pairs of areas had almost the same level of parental involvement in learning

Mathematics.

Relationship between Parental Involvement in Learning Mathematics and Attitude of Students

The table below presents the relationship between parental involvement in learning Mathematics and attitude of Grade 9 students in the Division of Bago City for School Year 2022-2023.

Table 8. *The Relationship between Parental Involvement in Learning Mathematics and Attitude of Students*

Variables	*N*	*Mean*
Parental Involvement in Learning Mathematics	356	3.25
Attitude Towards Mathematics	356	3.33

Computed Value (F), 0.403; p-value <0.001; Decision- Reject Ho; Interpretation- Significant at 0.05 level of significance

Table 8 shows that the mean of parental involvement in learning Mathematics of students and attitude towards Mathematics is 3.25 and 3.33 respectively.

After computing the data using Spearman Rho, the computed value is 0.403 and with a p-value of <0.001 which is less than 0.05 level of significance. Therefore, the null hypothesis is rejected, and this means that there is a significant relationship between the parental involvement in learning Mathematics and attitude of students. This implies that parental involvement in learning Mathematics is significantly related to the attitude of students towards the said subject. The said result confirms with the study of Bearneza (2020) which states that there was a significant relationship between the extent of parents' involvement and the level of attitude of the students towards Mathematics. This implies that parents' involvement has a fair association with students' attitudes toward learning Mathematics.

Relationship between Parental Involvement in Learning Mathematics and Academic Performance of Students

The table below presents the relationship between parental involvement in learning Mathematics and academic performance of Grade 9 students in the Division of Bago City for School Year 2022-2023.

Table 9. *The Relationship between Parental Involvement in Learning Mathematics and Academic Performance of Students*

Variables	*N*	*mean*
Parental Involvement in Learning Mathematics	356	3.25
Academic Performance	356	89

Computed Value (F), -0.107; p-value <0.001; Decision- Reject Ho; Interpretation- Significant at 0.05 level of significance

Table 9 shows that the mean of parental involvement in learning Mathematics and academic performance students is 3.25 and 89 respectively.

After computing the data using Spearman Rho, the computed value is -0.107 with a p-value of 0.044 which is less than 0.05 level of significance. Therefore, the null hypothesis is rejected, and this means that there is a significant relationship between the parental involvement in learning Mathematics and academic performance of students. This implies that parental involvement significantly influenced the academic performance of students. The said result confirms the study of Varghese et al. (2019) which states that parents who were highly involved resulted in their children's high achievement in Mathematics. When parents supported their children, the students scored a higher level of achievement in Mathematics.

Relationship between Attitude and Academic Performance of Students

The table below presents the relationship between attitude and academic performance of Grade 9 students in the Division of Bago City for School Year 2022-2023.

Table 10. *The Relationship between Attitude and Academic Performance of Students*

Variables	*N*	*Mean*
Attitude towards Mathematics	356	3.33
Academic Performance	356	89

Computed Value (F), 0.192; p-value <0.001; Decision- Reject Ho; Interpretation- Significant at 0.05 level of significance

Table 10 shows that the mean of attitude towards Mathematics and the academic performance of students is 3.33 and 89 respectively.

After computing the data using the Spearman Rho, the computed value is 0.192 with a p-value of <0.001 which is less than 0.05 level of significance. Therefore, the null hypothesis is rejected, and this means that there is a significant relationship between attitude towards Mathematics and academic performance of students. This implies that attitude towards Mathematics greatly affected their academic performance in the said subject. This study is in consonance with the study of Hwang and Son (2021) which states a positive relationship between students' attitudes toward Mathematics and Mathematics achievement. He further explained that student group with a positive attitude toward mathematics tended to have higher mathematics achievement than the student group with a negative attitude toward mathematics (Hwang and Son, 2021). The findings of this study also corroborate those of previous studies that reported a positive

relationship between students' attitudes toward mathematics and mathematics achievement (e.g., Dowker et al. 2019; Kiwanuka et al. 2020). Furthermore, Alova (2019) also revealed a significant relationship between students' attitude towards Mathematics and their academic performance in Mathematics.

Conclusions

Based on the results of the study, students were more than male students. In terms of family monthly income, most of the students belonged to income range of Php 12, 082 and below, students' parents attained high school education and students' parents had other works aside from being mentioned. Students had a moderate parental involvement in learning Mathematics regardless of their sex, family monthly income, parent's educational attainment and occupation. Students had a moderate parental involvement in learning Mathematics in terms of resource provider, monitor, Mathematics content advisor, and Mathematics learning counselor. In terms of motivator and nature of Mathematics, students had a high parental involvement in learning Mathematics. Students had a moderate attitude towards Mathematics regardless of their sex, family monthly income, parent's educational attainment and occupation. Students had a very satisfactory academic performance in Mathematics regardless of their sex, family monthly income, parent's educational attainment and occupation. There is a significant difference on the parental involvement in learning Mathematics of students in terms of motivator, resource provider, monitor, Mathematics content advisor, Mathematics learning counselor, and nature of Mathematics. Scheffe test also revealed that some of the means were statistically different. Parental involvement plays a vital role for students' perspective in Mathematics, if parents are more involved then students display good attitude in the said subject. Parental involvement in learning Mathematics helps the students to achieve desirable academic performance in the said subject, and attitude really matters to perform well in the said subject.

Based on the findings of this study, the following recommendations are put forward for consideration:

To improve parental involvement in Mathematics, the school may continue to encourage and motivate parental involvement by implementing and imposing some programs and activities specifically in Mathematics. Some strategies and activities may include, but are not limited to, allowing parents to cooperate and participate in various activities such as Mathlympics and Math Camps, developing parent outreach training programs promoting numeracy skills, and encouraging parent-discussion groups through Parent- Teacher conferences which are actually observed every quarter.

Teachers may guide and assist their students in order to improve and enhance their attitude towards Mathematics and give awareness to the society on the application of Mathematics in real-life situation. Guidance counselors may also conduct symposiums about personality development which can help students to increase their confidence. Education policy makers may also devise certain measures which could lead them in making new policies to be implemented in secondary schools.

To further improve the academic performance of students in Mathematics, teachers are recommended to use appropriate strategies that fit the level of thinking of students. The teacher can also be creative in delivering the lesson inside the classroom by using manipulatives in presenting the concepts and ideas about the topic. In terms of assessment and evaluation, the teacher may also consider the weak points of the students so that immediate intervention such as remedial classes can be applied.

Parents may think about making links between their understanding of mathematics and how their children feel about the topic by encouraging their efforts in the subject, keeping an eye on them, supervising them, and assisting them with their homework. To reach their greatest potential in Mathematics, parents may also help their children develop the confidence and optimism they need to understand the subject. They can also encourage them to have faith in their own skills and talents.

To promote students' learning in Mathematics, teachers may design initiatives and projects that build strong bonds with parents. Using social media and other modern methods of communication, such as mobile phones, parents and teachers may easily exchange the details they need regarding their children's academic achievement in the relevant topic. Meetings and conferences where students' performances are discussed for the purpose of improving students' overall academic achievement are other ways that parents and teachers can participate in parent-school communication.

To further improve academic performance in Mathematics, students be encouraged to positive attitude first in dealing the said subject. Liking the subject and having positive attitude in it is very important to be able to have a desirable performance. This could be possible by giving them different activities that could boost their interest in the said subject. Giving meaningful and enjoyable activities in Mathematics are essential because it helps students to be interested in the subject most especially if the teacher allows them to manipulate and maneuver things for they will have retention in learning.

The results of this study may be used by future researchers to replicate it with greater scope.

References

Aguhayon, H.G., Tingson, & Pentang, J.T. (2023). Addressing Students Learning Gaps in Mathematics through Differentiated Instruction. International Journal of Educational Management and Development Studies, 4 (1), 69-87. https://doi.org/10.53378/352967

Al-Matalka, F. I. (2018). The influence of parental socioeconomic status on their involvement at home. International Journal of

Humanities and Social Science, 29(3), 390–402

Alova, Chard Aye. (2019). Attitude Towards Mathematics in Relation to Academic Performance of Grade 11 Students. 7. 1-27. 10.5281/zenodo.7236086

Andamon, Jocelyn & Tan, Denis. (2018). Conceptual Understanding, Attitude and Performance in Mathematics of Grade 7 Students. International Journal of Scientific & Technology Research. 07. 96-105.

Azucena, L. J. R., Gacayan, P. J. L., Tabat, M. A. S., Cuanan, K. H., Pentang, J. (2022). GeoGebra intervention: How have students' performance and confidence in algebra advanced? Studies in Technology and Education, 1(1), 51-61. https://doi.org/10.55687/ste.v1i1.17

Baclig, C. E. (2020). PH's Grade 4 students lowest in math, science around the world-int'l study. Inquirer. Retrieved on December 21,2020 from https://newsinfo.inquirer.net/1370289/phs-grade-4-students-lowest-in-math-science-around-the-world-study

Bakar, N. A., Ayub, A. F. M., Ahmad, N. A., & Abdullah, S. I. S. S. (2021). Mathematics Achievement: The Relationship between Student Engagement, Parental Involvement, and Peer Influence. International Journal of Academic Research in Business and Social Sciences, 11(5), 496–513.

Batool, Tahira & Riaz, Jannat. (2019). Variations in Parental Participation in Curricular and Co-Curricular Activities of University Students. Global Social Sciences Review. IV. 239-249. 10.31703/gssr.2019(IV-IV).31.

Bearneza, Francis Jose. (2020). The self-efficacy and anxiety in learning mathematics of college students. Globus Journal of Progressive Education. 10. 101. 10.46360/globus.edu.220201014.

Berger, N., Mackenzie, E., & Holmes, K. (2020). Positive attitudes towards mathematics and science are mutually beneficial for student achievement: A latent profile analysis of TIMSS 2015. The Australian Educational Researche, 47, 409–444. Available at: https://doi.org/10.1007/s13384-020-00379-8.

Berk, L., & Winsler, A. (1995). Scaffolding children's learning: Vygotsky and early childhood learning. Washington, DC: National Association for Education of Young Children. https://www.simplypsychology.org/zone-of-proximal-development.html

Brooks, J. (2011) The Process of Parenting (8th ed.). Toronto, ON: McGraw-Hill.

Cabuquin, J. C. (2023). An examination of written work and performance task in general mathematics and precalculus of Filipino STEM learners. Jurnal Pendidikan Progresif, 13(2), 375-386. http://dx.doi.org/10.23960/jpp.v13.i2.202317

Cai, J., Moyer, J and Wang, N (1999). Parental Roles in Students' Learning of Mathematics: An Exploratory Study: Research in Middle Level Education Quarterly, 22:3, 1-18 DOI: 10.1080/10848959.1999.11670147

Capuno, R., Necesario, R., Etcuban, J. O., Espina, R., Padillo, G., & Manguilimotan, R. (2019). Attitudes, Study Habits, and Academic Performance of Junior High School Students in Mathematics. International Electronic Journal of Mathematics Education, 14(3), 547-561. https://doi.org/10.29333/iejme/5768

Cerbito, Adonis. (2020). Comparative Analysis of Mathematics Proficiency and Attitudes Toward Mathematics of Senior High School Student. International Journal of Scientific and Research Publications (IJSRP). 10. 211-222. 10.29322/IJSRP.10.05. 2020.p10125.

Chen, L., Bae, S. R., Battista, C., Qin, S., Chen, T., Evans, T. M., & Menon, V. (2018). Positive attitude toward math supports early academic success: Behavioral evidence and neurocognitive mechanisms. Psychological Science, 29(3), 390–402. Available at: https://doi.org/10.1177/0956797617735528.

Chow, J. C., Broda, M. D., Granger, K. L., Washington-Nortey, M., Sayers, R., & Dunn, D. (2023). A sociometric approach to understanding characteristics of same-and other-gender friendships in young children. Early Childhood Research Quarterly, 62, 385-393. https://doi.org/10.1016/j.ecresq.2022.09.009

Dela Cruz, M. P., & Natividad Jr, E. B. (2022). Parental Roles, Learners' Attitudes, ad Mathematics Performance. American Journal of Multidisciplinary Research and Innovation, 1(5), 81–101. https://doi.org/10.54536/ajmri.v1i5.871

Doctor, M. M. (2020). Filipino grade four students worst in math, science proficiency-study. Retrieved on December 22,2020 from https://thepost.net.ph/news/nation/filipino-grade-four-student worst-in-math-science-proficiency study

Dowker, A., Cheriton, O., Horton, R. et al. (2019). Relationships between attitudes and performance in young children's mathematics. Educ Stud Math 100, 211–230. https://doi.org/10.1007/s10649-019-9880-5.

Estanislao, A. Jr. (2019). Grade 6 National Achievement Test 2018 (NAT) scores at "low mastery level". Retrieved on January 18, 2021. https://www.manilatimes.net/2019/09/26/campus-press/grade-6-nat-scores-at-low-mastery-level/621772.

Furner, J. M. (2017). Teachers and Counselors: Building Math Confidence in Schools. European Journal of STEM Education. Retrieved

on January 8, 2021 from https://bit.ly/2UgFQaX

Geesa, R. L., Izci, B., Song, H., & Chen, S. (2019). Exploring factors of home resources and attitudes towards mathematics in mathematics achievement in South Korea, Turkey, and the United States. Eurasia Journal of Mathematics, Science & Technology Education, 15(9), 1–18

Gimba R, W; Hassan, A. M; Hassan, A. A & Bashir, A.U (2019). Relationship between Parental Involvement and Mathematics Achievement of Secondary School Students in Bosso Local Government Area of Niger State, Nigeria. 2nd International Conference on Research and Innovation in Education (AICRIE, 2019), held at University of Nairobi College of Education and External Studies, Nairobi, Kikuyu Kenya from 23rd to 25th October, 2019.

Grace, M., & Gerdes, A. C. (2019). Parent–teacher relationships and parental involvement in education in Latino families. Contemporary School Psychology, 23(4), 444–45

Hernandez, Eduardo & Bazán - Ramírez, Aldo & Bazán-Ramírez, Wilfredo & Solano-Gutierrez, Juan & José, Nacional & Arguedas, María & Andahuaylas, & De, Facultad & Administrativas, Ciencias & Marcos, San & Lima. (2023). Parental participation and parents' support: effects on mathematics achievement, 2018 national assessment of learning, Mexico. Frontiers in Psychology. 14. 10.3389/fpsyg.2023.1154470.

Hurst, Nicolas. (2018). Learning teaching Research and reporting in ELT practicum.

Hwang, Sunghwan and Son, Taekwon (2021). Students' Attitude toward Mathematics and its Relationship with Mathematics Achievement. Journal of Education and e-Learning Research, 8(3): 272-280

Idris, K., Khazila, K., Agustina, A., & Lisa, L. (2021). High school students' attitudes toward mathematics and its relation to mathematics learning achievement. Jurnal Riset Pendidikan Matematika, 8(1), 33– 45. https://doi.org/10.21831/jrpm.v8i1.37002

Jaika, Krizelle, T., Santillan., Francis, Jose, D., Bearneza. (2023). Extent of Parent's Involvement and Levels of Attitude and Achievement of Students in Mathematics. International journal of social science and human research, doi: 10.47191/ijsshr/v6-i2-45

Jameson, M. M. (2020). Time, time, time: Perceptions of the causes of Mathematics anxiety in highly Maths anxious female adult learners. Adult Education Quarterly, 70(3), 223-239. https://doi.org/10.1177/0741713619896

Jay, T., Rose, J., & Simmons, B. (2018). Why Is Parental Involvement in Children's Mathematics Learning Hard? Parental Perspectives on Their Role Supporting Children's Learning. SAGE Open, 8(2). https://doi.org/10.1177/2158244018775466

Kang, Chenyu & Hu, Ridong. (2022) Age structure of the population and the choice of household financial assets. Economic Research-Ekonomska Istraživanja 35:1, pages 2889-2900.

Kastner, M., & Kastner, M. (2020). What are motivators and what is motivation? Life Learning Academia. Retrieved on January 18, 2021 from https://bit.ly/3ainnQc.

Kim S. (2020). Meta-analysis of parental involvement and achievement in east Asian countries. Educ. Urban Soc. 52, 312–337. doi: 10.1177/0013124519842654

Kiwanuka, H. N., Van Damme, J., Van den Noortgate, W., & Reynolds, C. (2020). Temporal relationship between attitude toward mathematics and mathematics achievement. International Journal of Mathematical Education in Science and Technology, 51, 1–25. Available at: https://doi.org/10.1080/0020739x.2020.1832268.

Kunhertanti, K., & Santosa, R. H. (2018). The Influence of students' self-confidence on mathematics learning achievement. IOP Conf. Series: Journal of Physics: Conference Series, 1097, 1-6. https://doi.org/10.1088/1742-6596/1097/1/012126.

Kunwar, Rajendra. (2020). Impact of Parental Education and their Occupation on Mathematics Achievement of Secondary Level Students in Nepal.

Leongsan, J.B. (2003). Assessing the Mathematics Achievement of College Freshman using Piaget's Logical Operation, Hawaii International Conference on Education, Waikiki, Hawaii, USA.

Lijie, Z., Zongzhao, M., & Ying, Z. (2020). The Influence of Mathematics Attitude on Academic Achievement: Intermediary Role of Mathematics Learning Engagement. Jurnal Cendekia : Jurnal Pendidikan Matematika, 4(2), 460-467. https://doi.org/10.31004/cendekia.v4i2.253

Liu, Y., Sulaimani, M. F., & Henning, J. E. (2020). The significance of parental involvement in the development in infancy. Journal of Educational Research and Practice, 10, 161–166. https://doi.org/10.5590/JERAP.2020.10.1.11

Makur, A. P., Prahmana, R. C. I., & Gunur, B. (2019). How mathematics attitude of mother ini rural area affects their children's achievement. In Journal of Physics: Conference series, 1188(1), p.012009. IOP Publishing.

Mann, P, Dela, Cruz., Eldefonso, B, Natividad, Jr. (2022). Parental Roles, Learners' Attitudes, ad Mathematics Performance. American journal of multidisciplinary research and innovation, doi: 10.54536/ajmri.v1i5.871.

Mark Owusu Amponsah, Eugene Yaw Milledzi, Eric Twum Ampofo, and Martin Gyambrah, "Relationship between Parental Involvement and Academic Performance of Senior High School Students: The Case of Ashanti Mampong Municipality of Ghana." American Journal of Educational Research, vol. 6, no. 1 (2018): 1-8. doi: 10.12691/education-6-1-1.

Mazana, Yahya Mzomwe. Suero Montero, Calkin. Olifage, Casmir Respickius. (2019). Investigating Students' Attitude towards Learning Mathematics. International Electronic Journal of Mathematics Education, 14 (1), 207-231. 10.29333/iejme/3997.

Mozahem, N. A., Boulad, F. M., & Ghanem, C. M. (2021). Secondary school students and self-efficacy in mathematics: Gender and age differences. International Journal of School & Educational Psychology, 9(1), 142-152. https://doi.org/10.1080/21683603.2020.1763877

Mullis, I. V. S., Martin, M. O., Foy, P., Kelly, D. L., & Fishbein, B. (2020). TIMSS 2019 international results in mathematics and science. Paper presented at the TIMSS & PIRLS International Association for the Evaluation of Educational Achievement.

Musa, D., & Garba, A. (2019). Attitude to Mathematics, Study Habit and Academic Performance of Selected Secondary Schools in Makurdi Metropolis. Journal of Advance Research in Mathematics and Statistics (ISSN 2208-2409), 6(7), 01-11.

Naungayan, R. R. (2022). Attitude towards mathematics and mathematics achievement of secondary school learners in Banayoyo-Lidlidda District. Puissant, 3, 395-407.

Ntekane, A. (2018). Parental involvement in schools.

Nyabuto, A. N., & Njoroge, P. M. (2014). Parental involvement on pupils' performance in Mathematics in public primary schools in Kenya. Journal of Educational and Social Research, 4 (1), 19.

OECD. (2019). Programme for international students' assessment (PISA) results from PISA 2018. OECD 2019, 1(3), 1-12. https://www.oecd.org/pisa/publications/PISA2018_CN_PHL.pdf

Olivier, E., Archambault, I., De Clercq, M., & Galand, B. (2019). Student self- efficacy, classroom engagement, and academic achievement: Comparing three theoretical frameworks. Journal of youth and adolescence, 48(2), 326-340.

Pentang, J., Bautista, R., Pizaña, A., & Egger, S. (2020). Mathematical needs of Laura Vicuña learners. Western Philippines University Graduate Journal, 5(1), 78-82

Peteros, E., Columna, D., Etcuban, J. O., Almerino Jr, P., & Almerino, J. G. (2019). Attitude and Academic Achievement of High School Students in Mathematics Under the Conditional Cash Transfer Program. International Electronic Journal of Mathematics Education, 14(3), 583-597. https://doi.org/10.29333/iejme/5770

Peteros, E., Columna, D., Etcuban, J. O., Almerino, Jr., P., & Almerino, J. G. (2019). Attitude and Academic Achievement of High School Students in Mathematics Under the Conditional Cash Transfer Program. International Electronic Journal of Mathematics Education, 14(3), 583-597. https://doi.org/10.29333/iejme/5770

Pollanen, M., Kang, S., & Cater, B. (2018). Increasing engagement of underrepresented groups using a novel mathematics communication tool. International Journal of Information and Education Technology, 8(7), 502-505. https://doi.org/10.18178/ijiet.2018.8.7.1089

Purnomo, Yoppy & Safitri, Eni & Rohmah, Nur & Rahmawati, Rizki & Abbas, Nor'Arifahwati. (2021). Parental Involvement in Online Mathematics Learning: Examining Student Report and Links with Engagement. The New Educational Review. 66. 120-130. 10.15804/tner.21.66.4.10.

Reinke, W. M., Smith, T. E., & Herman, K. C. (2019). Family-school engagement across child and adolescent development. School Psychology, 34(4), 346.

Rodríguez, S., Regueiro, B., Piñeiro, I., Estévez, I., and Valle, A. (2020). Gender differences in mathematics motivation: differential effects on performance in primary education. Front. Psychol. 10:3050. doi: 10.3389/fpsyg.2019.0305

Santillan, Jaika Krizelle & Bearneza, Francis Jose. (2023). Extent of Parent's Involvement and Levels of Attitude and Achievement of Students in Mathematics. International Journal of Science and Mathematics Education. 10.47191/ijsshr/v6-i2-45

Sari, M.H., & Hunt, T. E. (2020). Parent-Child Mathematics Affect as Predictors of Children's Mathematics Achievement. International Online Journal of Primary Education, 9(1), 85-96

Shapira-Lishchinsky O., Zavelevsky E. (2020). Multiple appearances of parental interactions and math achievement on TIMSS international assessment. Int. J. Sci. Math. Educ. 18, 145–161. doi: 10.1007/s10763-018-09949-w

Smith, T. E., & Sheridan, S. M. (2019). The effects of teacher training on teachers' family-engagement practices, attitudes, and knowledge: A meta-analysis. Journal of Educational and Psychological Consultation, 29(2), 128–157.

Tan, C. Y., Lyu, M., & Peng, B. (2019). Academic benefits from parental involvement are stratified by parental socioeconomic status: A meta-analysis. Parenting. Advance online publication. https://doi.org/10.1080/15295192.2019.1694836

Tang, Thuy & Tran, Duong. (2023). Parental influence on high school students' mathematics performance in Vietnam. Eurasia Journal of Mathematics, Science and Technology Education. 19. em2249. 10.29333/ejmste/13068.

Tapia, M. (1996). The Attitudes Toward Mathematics Instrument. Paper presented at the annual meeting of the Mid-south Educational Research Association, Tuscaloosa, AL (ERIC Reproduction Service No. ED 404165).

Thapa, Dhana & Paudel, Tara. (2020). Secondary School Students' Attitude towards Mathematics. Mathematics Education Forum Chitwan. 5. 34-39. 10.3126/mefc. v5i5.34761.

Van Geel, M., Keuning, T., Frèrejean, J., Dolmans, D., Van Merriënboer, J., & Visscher, A. J. (2019). Capturing the complexity of differentiated instruction. School Effectiveness and School Improvement, 30(1), 51-67. https://doi.org/10.1080/09243453.2018.1539013

Varghese, P. I., & Jasmine Suthanthira Devi, K. B. (2019). Relationship between Parent Involvement and Achievement in Mathematics of Higher Secondary First Year Students in the Coastal Area. International Journal of Recent Technology and Engineering. 8(3), 5029-5033. https://ww w.ij rte.org/wp-content/uploads/papers/v8i3/C566 009 8319.pdf"

Vasquez, Ariston & Vasquez, Alfred Rey. (2022). Parental Involvement and Students' Attitude: It's Influence on Students' Achievement in Mathematics in the Modular Distance Learning. 10. 1-9.

West, M. R., Pier, L., Fricke, H., Hough, H., Loeb, S., Meyer, R. H., & Rice, A. B. (2020). Trends in student social-emotional learning: Evidence from the first largescale panel student survey. Educational Evaluation and Policy Analysis, 42(2), 279-303. https://doi.org/10.3102/016237372091223

Ying,Zhou, Tanu Wijaya, T., & Gao Ya. (2020). INVESTIGATION ON THE ATTITUDE OF MATHEMATICS EDUCATION STUDENTS TOWARDS LEARNING MATHEMATICS IN GUILIN. Kalamatika: Jurnal Pendidikan Matematika, 5(2), 93-102. https://doi.org/10.22236/KALAMATIKA.vol5no2.2020pp93-102

Yiran Cui, Danhui Zhang & Frederick K. S. Leung (2021) The Influence of Parental Educational Involvement in Early Childhood on 4th Grade Students' Mathematics Achievement, Early Education and Development, 32:1, 113-133, DOI: 10.1080/10409289.2019.1677131

Zhang, Feng & Jiang, Ying & Ming, Hua & Ren, Yi & Wang, Lei & Huang, Silin. (2020). Family socio-economic status and children's academic achievement: The different roles of parental academic involvement and subjective social mobility. British Journal of Educational Psychology. 90. 10.1111/bjep.12374.

Zhao, T., & Perez-Felkner, L. (2022). Perceived abilities or academic interests? Longitudinal high school science and mathematics effects on postsecondary stem outcomes by gender and race. International Journal of STEM Education, 9(1), 1- 26. https://doi.org/10.1186/s40594-022-00356-w

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