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IMPLICATION OF MOTIVATION ON PUPILS' MATH ACHIEVEMENT

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ABSTRACT

The purpose of this descriptive-correlational survey was to determine the implications of intrinsic and extrinsic motivation on Grade 6 pupils' mathematics achievement. The components of intrinsic motivation included interest/enjoyment, effort/importance, perceived competence, and value/usefulness, while extrinsic motivation included teacher support and parents' support. A total of 79 pupils from a public elementary school in the district of Misamis Oriental were considered participants. A questionnaire was used to collect data on pupils' motivation, and second-quarter grades were obtained from teachers. Data were analyzed and interpreted using descriptive statistics and Pearson's r. The general findings showed that none of the extrinsic motivation components influenced graders' mathematics achievement. Interest/enjoyment, effort/importance, and perceived competence were significantly associated with the graders' achievement in mathematics. Neither teacher support nor parent support was significantly associated with pupils' mathematics achievement. This study found that pupils' achievement is high when intrinsic motivation is strengthened.

Keywords: *intrinsic, extrinsic, motivation, mathematics achievement, descriptive-correlational*

INTRODUCTION

Mathematics is a foundation subject that enables people to perform in almost all fields of human activity, especially in business, inventions, and other practical applications and solutions in daily life. A concrete example of this is the use of electronic gadgets, which require skills in manipulating and analyzing numbers. To fully acquire the competencies and skills in mathematics, Filipino graders are expected to actively participate in and constructively analyze mathematical statements, thereby enhancing their mathematical knowledge and understanding. Most of the time, pupils interact with their teachers and parents. These people may help develop their critical thinking and problem-solving skills. However, pupils have their own motivation for learning the subject, which propels their desire to get actively involved in class.

In the present situation, the teacher makes an effort to encourage the pupils to engage in her mathematics discussions and activities, as they are regularly monitored against the expected performance standards they are expected to meet. On the other hand, most pupils demonstrate passivity in learning, as evidenced by their lack of interest. They do not actively participate in class and only respond when prompted. In addition, others admitted that they were hesitant to answer. Some are silent, pretending to listen while taking notes rather than participating in the mathematics discussion. Lastly, several pupils are interested in class only when their teachers and parents offer extrinsic rewards for getting the correct answer or the highest score.

The most compelling evidence is the 2014-2015 National Achievement Test (NAT), a national standardized test, designed to determine Grade 6 pupils' academic levels, strengths, and weaknesses in 5 categories; English, Filipino, Mathematics, Science and *Araling Panlipunan* (DepEd Order no. 5, s. 2005), the results reveal that the pupils in her school got 81.6 percent in mathematics area.

These behaviors call for the researcher to examine indicators of intrinsic motivation

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among her pupils' achievement in mathematics. Learners' motivation is important because teachers nowadays are no longer the sole carriers of knowledge in the classroom (Al-Said, 2023). The teachers' role is to ensure that pupils are motivated from within, leading them to become knowledgeable, caring, and skilled individuals in the future.

When pupils are motivated, they aim to accomplish something and take action to do so. Motivated action may be self-determined, experienced as freely chosen and emanating from oneself, not driven by internal needs or external forces (Morris et al., 2022). However, even if they are free to do the task, they still need supportive conditions from teachers and parents (Li et al., 2025; Schmid & Garrels, 2021).

As Valcke et al. (2022) emphasized, teachers, as facilitators of learning, should help students better understand mathematical concepts by using a variety of classroom activities that engage students. These activities include group collaboration, board work, and games that will encourage students to exert effort, persist in difficult tasks, and view mistakes as learning experiences. Parents, on the other hand, are involved in the teaching-learning process, since the major part of a pupil's personality is formed at home. They were the first people to educate and raise their children. As a result, they play a strong fundamental base in pupils' academic achievement (Yigzaw, 2019). Pupils' academic success has always been the main concern in education (Rabaz et al., 2020). However, pupils are not always interested in engaging in the teaching-learning process, despite support from their teachers and parents. Despite their youth, they have their own motivation to participate in activities (Abubakar et al., 2017) and means of expressing their ideas and taking full responsibility for them (Jain et al., 2024).

This study is anchored in Self-Determination Theory (SDT) by Ryan and Deci (2000), which explains how learners' motivation can be classified into intrinsic and extrinsic forms. The theory posits that intrinsically motivated pupils engage in learning tasks out of interest, enjoyment, and personal satisfaction, whereas extrinsically motivated pupils participate for external rewards, recognition, or pressure. In the context of mathematics learning, SDT provides a relevant framework for understanding how different types of motivation influence pupils' engagement, persistence, and ultimately their academic achievement. By applying this theory, the present study seeks to examine how intrinsic and extrinsic motivation contribute to pupils' performance in mathematics.

Hence, this study assessed the level of motivation that affects pupils' achievement in mathematics, as the researcher, as a teacher, observed lower achievement in her mathematics class despite considerable effort. For this reason, the study was conducted to determine the implications of intrinsic and extrinsic motivation on pupils' mathematics achievement.

Statement of the Problem

This study intended to determine whether the pupils' intrinsic and extrinsic motivation significantly relates to their achievement in mathematics. Specifically, it sought answers to the following questions:

1. What is the participants' level of intrinsic motivation in terms of the following:
    1.1 interest/enjoyment;
    1.2 effort/importance;
    1.3 perceived competence; and
    1.4 value/usefulness?
2. What is the participants' level of extrinsic motivation sourced from the following support:
    2.1 teacher; and
    2.2 parent?
3. What is the level of participants' achievement in mathematics?

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4. Are the participants' intrinsic and extrinsic motivations significantly associated with their mathematics achievement?

Review of Related Literature

Motivation plays a crucial role in pupils' mathematics achievement, as it influences their behavior, engagement, and academic success. It refers to the reasons behind learners' actions, and studies show that higher motivation is linked to better performance, while a lack of motivation can lead to poor outcomes (Zhou & Ahmad, 2025). Motivation is categorized into intrinsic and extrinsic types based on the Self-Determination Theory (Ryan & Deci, 2000). Intrinsic motivation comes from genuine interest, enjoyment, and personal value of tasks, supported by factors such as interest, effort, perceived competence, and usefulness (Bandhu et al., 2024). In contrast, extrinsic motivation is driven by external rewards or outcomes (Gagné & Deci, 2005). While both affect achievement, intrinsic motivation promotes deeper engagement, whereas excessive reliance on extrinsic rewards may reduce long-term interest (Bandara et al., 2025).

Teachers and parents significantly influence pupils' motivation and performance. Supportive teaching practices, positive classroom environments, and high expectations improve engagement and achievement (Wilkins et al., 2022). Similarly, parental involvement enhances learners' confidence and academic success (Oranga et al., 2023). Overall, motivation, both intrinsic and extrinsic, along with teacher and parent support, plays a key role in pupils' mathematics achievement.

Mathematics is a key foundation for subjects like technology and engineering, but many students need stronger motivation to appreciate and succeed in it (Saadati & Celis, 2023). Motivation refers to learners' desire to participate in learning activities and is essential for academic engagement (Jacob et al., 2020).

Research shows that intrinsic motivation, such as curiosity, interest, and achievement, leads to greater confidence, deeper learning, and higher academic performance. At the same time, external rewards may also influence students' appreciation of learning (Chen, 2023). Interest, in particular, is a strong intrinsic factor that improves performance and is important for strengthening foundational knowledge in subjects such as mathematics (Phan, 2026).

Motivation is developed through experience, instruction, expectations, and social influence, especially from teachers and parents (Jacob et al., 2020). Studies also show that students with stronger motivational profiles tend to achieve higher academic results, while enjoyment and pride in learning are linked to better grades (Hernik & Jaworska, 2018).

Teachers play a major role through effective teaching methods and positive classroom environments that promote student participation and self-esteem (Shah, 2023). Likewise, parental motivation and expectations strongly influence students' drive to learn (Özyıldırım, 2024). Overall, motivation shaped by teachers, parents, and learning experiences greatly affects students' academic achievement in mathematics.

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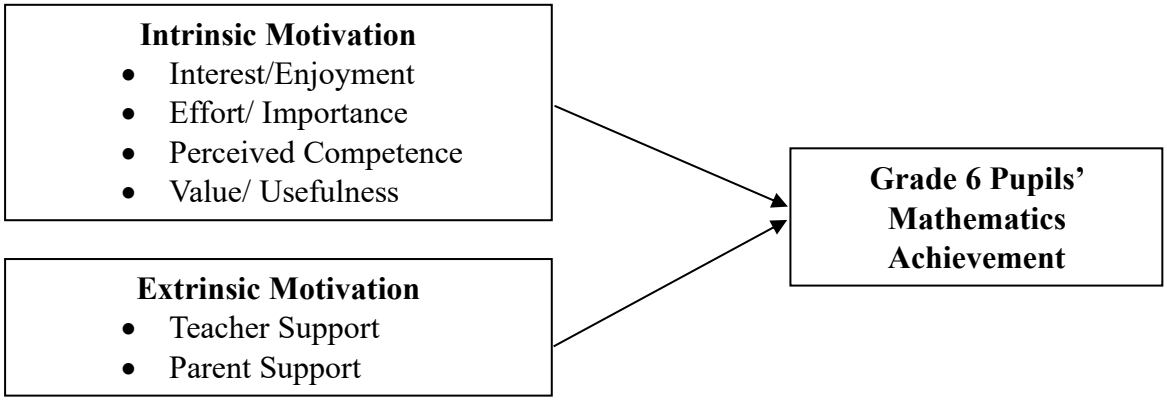

Figure 1. Schematic Diagram showing the interplay of the variables

METHODOLOGY

The study employed the descriptive-correlational survey method. Descriptive research focuses on describing existing conditions and identifying important variables involved in a phenomenon, while correlational research examines the relationships among variables to determine their degree of association (Lomax & Li, 2013; Punch & Oancea, 2014). Specifically, this study aimed to determine the relationship between pupils' motivation and their mathematics achievement.

The study involved 79 Grade Six pupils from three sections of a public elementary school in Misamis Oriental during the school year 2016-2017. A complete enumeration, or total population sampling, was used since all pupils in the identified sections were included as respondents. In addition, one Grade Six mathematics teacher, who handled the three sections, was included to provide contextual support for the study. Before conducting the study, the researcher secured permission from the Department of Education Region X School Division Superintendent of Misamis Oriental, the Public School District Supervisor, the school principal, and the class teacher. After approval was granted, the researcher personally administered the questionnaires to the pupils.

Participants were given clear instructions for completing the survey instruments. They were informed that participation was voluntary, that their responses would remain confidential, and that their answers would not affect their grades. To ensure cooperation, the respondents were assured that all information gathered would be used solely for the study. After the questionnaires were completed, the responses were collected, checked for completeness, encoded, analyzed, and interpreted.

The collected data were analyzed using both descriptive and inferential statistics. Frequency counts, percentages, and means were used to describe the pupils' levels of motivation and mathematics achievement. To determine the relationship between pupils' motivation and their mathematics achievement, the Pearson Product-Moment Correlation Coefficient (r) was used.

The study tested one null hypothesis stating that pupils' intrinsic and extrinsic motivation are not significantly associated with their mathematics achievement at the 0.05 level of significance. The computed correlation values were compared with the critical value to determine whether a significant relationship existed. A significant result would lead to the rejection of the null hypothesis, whereas a non-significant result would support its acceptance.

Ethical standards were strictly observed throughout the study. Considering that the participants were minors, informed consent was obtained from their parents or guardians, while assent was secured from the pupils themselves. The study's purpose was clearly explained, and participation was entirely voluntary. The respondents were assured that their answers would

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remain confidential and would be used solely for research purposes. They were also informed that they could withdraw from the study at any time without any consequences. These procedures were carried out in accordance with the ethical guidelines of the American Psychological Association (2020) and the World Medical Association (2013).

RESULTS

Table 1 on the next page presents the pupils' level of intrinsic motivation in terms of interest/enjoyment, effort/importance, perceived competence, and value/usefulness. The overall mean of 3.69 (*SD* = 0.67) indicates that the respondents generally demonstrated a high level of intrinsic motivation toward mathematics. Among the four dimensions, value/usefulness obtained the highest composite mean (*M* = 3.99, *SD* = 0.70), followed by effort/importance (*M* = 3.89, *SD* = 0.75), interest/enjoyment (*M* = 3.76, *SD* = 0.72), and perceived competence (*M* = 3.13, *SD* = 0.49). The results suggest that pupils generally recognize the importance and usefulness of mathematics, exert effort in performing mathematics-related tasks, and enjoy learning the subject. However, they are less confident in their own mathematical ability.

The pupils demonstrated a high level of effort and importance toward mathematics, with a composite mean of 3.89 (*SD* = 0.75). This indicates that the respondents generally put effort into mathematics activities and view the subject as important. The item "I put a lot of effort into the Math activities" obtained the highest mean (*M* = 4.04, *SD* = 1.18), followed closely by "Math activities are important to me so I try my best to do them" (*M* = 4.01, SD = 0.98) and "I tried very hard to solve problems in Math" (*M* = 4.00, *SD* = 1.11).

These findings indicate that the pupils are willing to invest time, attention, and energy in mathematics tasks. Meanwhile, the statement "I didn't put much energy in Math activities" obtained the lowest mean (*M* = 3.72, *SD* = 1.42), although it was still interpreted as high. This may suggest that some pupils occasionally struggle to maintain consistent effort in mathematics activities.

Perceived competence had the lowest composite mean among the intrinsic motivation dimensions, at 3.13 (*SD* = 0.49), indicating a slightly high level. This suggests that although pupils are generally motivated and interested in mathematics, they are less confident in their own ability to perform mathematical tasks successfully. The highest-rated item under this subscale was "Basic mathematical operations are easy for me" (*M* = 3.38, *SD* = 0.90), followed by "I am satisfied with my performance in this subject" (*M* = 3.25, *SD* = 0.95). These results indicate that pupils are relatively more confident in performing basic mathematical skills. However, the lowest-rated item was "I feel that I am better than half of my classmates in Math" (*M* = 2.75, *SD* = 0.87). This finding may indicate that pupils do not strongly perceive themselves as better performers compared to their peers. It may also suggest modesty or uncertainty regarding their mathematical ability.

Among the four dimensions, value/usefulness obtained the highest composite mean of 3.99 (*SD* = 0.70), indicating that pupils highly recognize the importance and practical value of mathematics. The highest-rated indicator was "I think that doing Math activities is useful for enhancing my reasoning skills" (*M* = 4.24, *SD* = 0.91), followed by "Math could help me manage my time and resources" (*M* = 4.19, *SD* = 1.06) and "I believe that Math is an important subject" (*M* = 4.14, *SD* = 0.98). These findings indicate that pupils perceive mathematics as beneficial not only in school but also in everyday life. However, the item "I am willing to do activities in Math because it is valuable to me" had the lowest mean within the subscale (*M* = 3.49, *SD* = 0.93), although it remained at a high level. This may suggest that, while pupils acknowledge the usefulness of mathematics, they may not always be personally motivated to engage in mathematical activities solely because of its perceived value.

Table 1. Respondents' Level of Intrinsic Motivation

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Interest / Enjoyment	Mean	SD	Interpretation
1. I am interested to study Mathematics.	3.54	1.33	High
2. Mathematics activity usually holds my attention.	3.76	1.22	High
3. I enjoy doing puzzles or other Math games.	3.97	1.49	High
4. I am eager to learn our Math lessons.	4.23	1.04	High
5. Activities in mathematics are fun to do.	3.66	1.27	High
6. I enjoy solving problems involving numbers.	3.56	1.06	High
7. It's my pleasure dealing with numbers.	3.63	1.22	High
Composite Mean	*3.76*	*0.72*	*High*
Effort / Importance			
8. I put a lot of effort into the Math activities.	4.04	1.18	High
9. I didn't try very hard to do well in Math activities.	3.77	1.45	High
10. I tried very hard to solve problems in Math.	4.00	1.11	High
11. It was important to me to do well in Math activities.	3.77	1.25	High
12. I didn't put much energy in Math activities.	3.72	1.42	High
13. Math activities are important to me so I try my best to do them.	4.01	0.98	High
14. I give my full attention in our Math subject so I can perform well.	3.90	0.97	High
Composite Mean	*3.89*	*0.75*	*High*
Perceived Competence			
15. I can solve Math problems easily.	3.19	0.99	Slightly High
16. I feel that I am better than half of my classmates in Math.	2.75	0.87	Slightly High
17. I am satisfied with my performance in this subject.	3.25	0.95	Slightly High
18. I can easily understand the concepts in Math without help.	3.00	1.09	Slightly High
19. Basic mathematical operations are easy for me.	3.38	0.90	Slightly High
20. I couldn't do Math activities very well.	3.18	0.93	Slightly High
21. I think I am pretty good in Math.	3.14	0.93	Slightly High
Composite Mean	*3.13*	*0.49*	*Slightly High*
Value / Usefulness			
22. I believe that Math is an important subject.	4.14	0.98	High
23. I am willing to do activities in Math because it is valuable to me.	3.49	0.93	High
24. I believe that doing activities in Math would help me to become a better person.	3.84	0.93	High
25. I believe doing Math activities could be beneficial to me.	4.09	1.08	High
26. I think that doing Math activities is useful for enhancing my reasoning skills.	4.24	0.91	High
27. Math could help me manage my time and resources.	4.19	1.06	High
28. Math activities are useless in my life.	3.95	1.33	High
Composite Mean	*3.99*	*.70*	*High*
Overall Mean	**3.69**	**0.67**	**High**

Note: Negatively worded items were reverse-coded prior to analysis; thus, higher mean scores indicate higher levels of intrinsic motivation.

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Table 2. Respondents' Level of Extrinsic Motivation

Indicators (Teachers)	Mean	SD	Interpretation
1. My teacher provides me with activities that support math learning.	3.90	1.03	High
2. There is enough provision of books and interactive materials from my Math teacher.	2.59	1.46	Slightly High
3. My teacher explains the topics step by step and it gives me a clear picture on how to solve Math problems.	4.09	1.21	High
4. My math teacher answers accurately all my questions regarding Math.	3.54	1.27	High
5. When I commit mistakes in solving, my teacher directly corrects my mistake.	3.57	1.36	High
6. I am inspired to study because my teacher is encouraging us to learn.	3.41	1.28	Slightly High
7. My teacher uses varied teaching methods that facilitate our learning.	3.80	1.03	High
Composite Mean	*3.56*	*0.64*	*High*
Indicators (Parents)			
8. My parents make a follow-up of my math performance.	3.47	1.29	Slightly High
9. My parents reward me for perfect quizzes and tests especially in Math.	2.95	1.38	Slightly High
10. My parents help me learn difficult mathematical operations.	3.62	1.24	High
11. My parents do not allow me to watch TV or play unless I have finished my Math homework.	3.81	1.33	High
12. My parents assist me in my Math assignments.	4.06	1.04	High
13. My parents provide me learning materials in Math.	4.09	0.98	High
14. My parents collaborate with my teacher about my performance in Math.	4.09	1.06	High
Composite Mean	*3.73*	*0.67*	*High*
Overall Mean	**3.65**	**0.66**	**High**

Table 2 presents the pupils' levels of extrinsic motivation regarding teacher and parent support. The overall mean of 3.65 (SD = 0.66) indicates that the respondents generally experienced a high level of extrinsic motivation. Among the two dimensions, parent support obtained the higher composite mean (M = 3.73, SD = 0.67), while teacher support obtained a composite mean of 3.56 (SD = 0.64). These findings suggest that the pupils perceive both their teachers and parents as important sources of encouragement and support in mathematics.

Teacher support obtained a composite mean of 3.56 (SD = 0.64), indicating a high level of support. This indicates that the respondents generally perceive their mathematics teachers as supportive in facilitating their learning. Among the indicators, "My teacher explains the topics step by step and it gives me a clear picture on how to solve Math problems" obtained the highest mean (M = 4.09, SD = 1.21). This was followed by "My teacher provides me with activities that support math learning" (M = 3.90, SD = 1.03) and "My teacher uses varied teaching methods that facilitate our learning" (M = 3.80, SD = 1.03). These findings indicate that pupils value teachers who explain lessons clearly, provide meaningful activities, and use varied teaching methods. Such practices help learners better understand mathematical concepts and maintain their interest in the subject. On the other hand, the lowest-rated item was "There is enough provision of books and interactive materials from my Math teacher" (M = 2.59, SD = 1.46), interpreted as slightly high. This suggests that pupils perceive a lack of availability of learning materials and resources for mathematics.

Parent support had a composite mean of 3.73 (SD = 0.67), indicating a high level of support. This suggests that pupils generally perceive their parents as actively involved in

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supporting their mathematics learning. The highest-rated indicators were "My parents provide me learning materials in Math" (M = 4.09, SD = 0.98) and "My parents collaborate with my teacher about my performance in Math" (M = 4.09, SD = 1.06). In addition, "My parents assist me in my Math assignments" also received a high mean (M = 4.06, SD = 1.04). These findings indicate that parents play an active role in their children's mathematics education by providing materials, monitoring school performance, and helping with assignments. Meanwhile, the lowest-rated item was "My parents reward me for perfect quizzes and tests especially in Math" (M = 2.95, SD = 1.38), although it was still interpreted as slightly high. This may suggest that while parents are generally supportive, they may not frequently use material rewards as a form of motivation.

Table 3. Respondents' Level of Achievement in Mathematics

Achievement in Math (Second Quarter)	Frequency (f)	Percentage (%)
Outstanding (90–100)	3	3.8
Very Satisfactory (85–89)	20	25.3
Satisfactory (80–84)	42	53.2
Fairly Satisfactory (75–79)	14	17.7
Did Not Meet Expectations (Below 75)	0	0.0
Total	**79**	**100.0**
Mean = 82.67 **SD = 3.74** **Interpretation = Satisfactory**		

Table 3 presents the frequency and percentage distribution of the pupils' achievement in mathematics during the second quarter. The overall mean grade of the respondents was 82.67 (SD = 3.74), indicating a satisfactory level. This indicates that, on average, the pupils demonstrated an acceptable level of mathematics performance. More than half of the respondents, or 53.2%, obtained grades ranging from 80 to 84, which falls under the satisfactory level. Meanwhile, 25.3% of the pupils achieved very satisfactory performance, while only 3.8% reached the outstanding level. On the other hand, 17.7% of the respondents were classified as fairly satisfactory, and none of the pupils received a grade below 75. The findings suggest that most pupils met the minimum expected level of proficiency in mathematics. However, only a small proportion of the respondents attained higher levels of achievement.

Table 4 on the next page presents the relationship between pupils' intrinsic motivation and their mathematics achievement. The findings reveal that three dimensions of intrinsic motivation were significantly associated with mathematics achievement: interest/enjoyment (r = .286, p = .011), effort/importance (r = .409, p = .000), and perceived competence (r = .310, p = .005). In contrast, value/usefulness was not significantly related to mathematics achievement (r = -.021, p = .855).

Table 4. Relationship Between Intrinsic Motivation and Math Achievement

Dimensions of Intrinsic Motivation	Pearson Correlation (r)	p-value	Interpretation
Interest / Enjoyment	.286*	.011	Significant
Effort / Importance	.409**	.000	Significant
Perceived Competence	.310**	.005	Significant
Value / Usefulness	-.021	.855	Not Significant

Note:
** Correlation is significant at the 0.01 level (2 tailed)
* Correlation is significant at the 0.05 level (2 tailed)

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Among the four dimensions, effort/importance showed the strongest relationship with mathematics achievement, followed by perceived competence and interest/enjoyment. These findings indicate that pupils who enjoy mathematics, exert more effort, and perceive themselves as competent tend to perform better in the subject. Thus, the null hypothesis is rejected for interest/enjoyment, effort/importance, and perceived competence, but accepted for value/usefulness.

Table 5. Relationship Between Extrinsic Motivation and Math Achievement

Dimensions of Extrinsic Motivation	Pearson Correlation (r)	p-value	Interpretation
Teacher Support	.136	.234	Not Significant
Parent Support	-.014	.900	Not Significant

Table 5 presents the relationship between pupils' extrinsic motivation and their mathematics achievement. The findings reveal that teacher support was not significantly associated with mathematics achievement ($r = .136$, $p = .234$). Likewise, parent support was not significantly related to mathematics achievement ($r = -.014$, $p = .900$). Since both p-values are greater than the 0.05 level of significance, the null hypothesis for extrinsic motivation cannot be rejected. This indicates that the perceived support received from teachers and parents was not significantly related to the pupils' mathematics achievement.

DISCUSSION

On the Level of Intrinsic Motivation

The findings indicate that pupils are more motivated when mathematics lessons involve games, puzzles, and enjoyable classroom activities. Such activities enhance persistence, critical thinking, and active participation. This supports the findings of Zeng et al. (2024), who reported that games increase intrinsic motivation, interest, and engagement. The results also reinforce the importance of creative teaching strategies in sustaining pupils' interest in mathematics.

The high level of effort and importance suggests that pupils recognize mathematics as a meaningful subject and are generally willing to work hard in it. This finding supports Hirt et al. (2021), who found that learners who focus on mastery goals believe that effort leads to success. Likewise, the results are consistent with Irvine (2020), who reported that students are willing to spend time and energy on mathematics activities.

Although pupils showed high levels of interest, effort, and perceived usefulness, their perceived competence was only slightly high. This suggests that many pupils may still doubt their own mathematical ability despite their positive attitude toward the subject. The relatively lower confidence level highlights the need for teachers to provide encouragement, constructive feedback, and opportunities for success in mathematics. This finding supports Tazkiya (2023), who emphasized that mastery of basic mathematical operations is essential for progression to more complex mathematical concepts.

Finally, the high rating for value/usefulness suggests that pupils recognize the practical importance of mathematics, particularly in improving reasoning skills and helping them manage time and resources. However, some pupils may still view mathematics activities as requirements rather than personally meaningful tasks. Thus, teachers should continue relating mathematics lessons to real-life situations so that pupils can better appreciate the value and relevance of mathematics in their daily lives.

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On the Level of Extrinsic Motivation

The findings suggest that both teacher support and parent support contribute positively to pupils' motivation in mathematics. Teacher support was particularly evident in the clear explanation of lessons and in the use of varied teaching methods. These findings imply that pupils are more motivated when teachers provide structured explanations, engaging activities, and diverse instructional strategies. The result supports the view of Sukardiyono and Kuswanto (2025), who emphasized that pupils who struggle with problem-solving need guidance from teachers. Clear instructions and step-by-step demonstrations may help learners understand mathematical processes and apply them effectively when solving problems. However, the relatively low mean for the provision of books and interactive materials indicates that the availability of instructional resources may be limited. This may affect pupils' ability to review lessons independently and engage with mathematics in more interactive ways. The finding is consistent with the study of Hong (2019), which found that the lack of textbooks makes it difficult for pupils to complete tasks effectively. Similarly, Türközü and Dinçer (2025) noted that identifying and providing appropriate materials for all learners is one of the greatest challenges teachers face.

In terms of parent support, the findings indicate that parents contribute positively to their children's mathematics learning by providing learning materials, assisting with assignments, and maintaining communication with teachers. This suggests that parental involvement remains an important factor in strengthening pupils' motivation and academic performance. The findings support the view of Musengamana's (2023) study on parental involvement, which noted that parent-teacher conferences, homework monitoring, volunteering, and school involvement help improve children's learning outcomes. Although parental rewards for good performance received the lowest rating, this does not necessarily indicate a lack of support. Instead, it may reflect the limited financial capacity of some families. Despite this, parents still appear to provide strong emotional, academic, and practical support for their children's mathematics learning.

On the Level of Math Achievement

The satisfactory level of achievement indicates that pupils possess the basic knowledge and skills necessary to perform mathematical tasks at an acceptable level. However, the concentration of grades within the satisfactory range suggests that many pupils may still need additional support and enrichment to move toward very satisfactory or outstanding performance. The findings further indicate that although no pupil failed to meet expectations, only a limited number of respondents reached the highest achievement category. This may imply that while the pupils are generally coping with mathematics lessons, they may still encounter difficulties in mastering more advanced concepts and problem-solving skills.

Studies by Cadiz-Gabejan and Quirino (2021) and Qian (2025) demonstrated that satisfactory grades reflect minimal acceptable proficiency in a subject. Thus, there remains a need for teachers to strengthen instructional practices, provide remediation for struggling learners, and offer enrichment activities for higher-performing pupils. The result also highlights the importance of maintaining pupils' motivation, confidence, and engagement in mathematics, since these factors may contribute to improved academic performance and help more pupils reach higher achievement levels.

On the relationship between the dimensions of intrinsic motivation to math achievement

The findings suggest that pupils who are more interested in mathematics, exert greater effort, and have higher confidence in their abilities are more likely to achieve better academic performance. In particular, effort/importance showed the strongest relationship with

Asian Research Journal of Education, 2026
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P-ISSN: 3028-0834
Vol. 3 No. 2
DOI: https://doi.org/10.66206/eduheart.2026.293

mathematics achievement, indicating that persistence and commitment play an important role in pupils' success in mathematics. These findings are consistent with Kehle and Urhahne (2025), who emphasized that interest in a subject serves as a mental resource that improves learning and academic performance. Similarly, Weiland (2024) explained that students with a well-developed interest in a subject are more likely to demonstrate higher achievement.

The results are also supported by Thiel and Hanssen (2025), who found that pupils are more likely to participate actively in tasks they find enjoyable and meaningful. Likewise, studies by Bendol and Dalayap (2025) showed that pupils who maintain interest, effort, and confidence in mathematics tend to achieve better academic outcomes. Similarly, Wahid et al. (2025) reported a positive relationship between academic effort and achievement. On the other hand, value/usefulness was not significantly related to mathematics achievement. This may indicate that pupils at this stage are not yet fully able to connect the long-term value of mathematics with their actual academic performance. They may still see mathematics mainly as a classroom requirement rather than as a subject with practical importance in everyday life. According to Lundqvist et al. (2018), younger pupils may still have limited ability to think abstractly and appreciate the broader value of academic subjects.

On the relationship between the dimensions of extrinsic motivation to math achievement

The findings suggest that teacher support and parent support, although rated highly by the pupils, did not significantly influence their mathematics achievement. This may imply that pupils' performance in mathematics is more strongly influenced by internal factors such as interest, effort, and confidence rather than by external support alone. The findings are consistent with the study of Prananto et al. (2025), who found that some elementary pupils maintain their academic achievement despite limited teacher support. Similarly, Hyder and Anbar (2025) emphasized that parental support does not always contribute directly to pupils' academic achievement.

However, the findings do not support the study by Lundqvist et al. (2018), which found that parental and teacher support was positively associated with school engagement and achievement. One possible explanation is that while external support may help pupils feel encouraged and guided, it may not directly translate into higher mathematics performance unless pupils themselves are motivated to learn, exert effort, and develop confidence in their mathematical abilities.

CONCLUSIONS

Based on the study's findings, the intrinsic motivation components of interest/enjoyment, effort/importance, and perceived competence contribute significantly to mathematics achievement. When pupils are interested in learning mathematics, especially through engaging activities such as puzzles and games, they tend to participate more actively, exert greater effort, and develop stronger competence in basic mathematical operations.

The findings further suggest that at this stage, pupils' achievement depends more on their own effort, confidence, and interest rather than on the support they receive from teachers and parents. This study supports the Self-Determination Theory, which emphasizes that intrinsic motivation enhances pupils' abilities, skills, and performance more strongly than external support. Furthermore, when intrinsic motivation is strengthened and pupils receive positive feedback and recognition of their feelings, they are more likely to achieve better academic performance and demonstrate greater persistence.

RECOMMENDATIONS

School administrators should encourage teachers to create classroom conditions that

Asian Research Journal of Education, 2026
E-ISSN: 3028-0842
P-ISSN: 3028-0834
Vol. 3 No. 2
DOI: https://doi.org/10.66206/eduheart.2026.293

foster pupils' enjoyment of mathematics. This may be achieved through training programs on the use of interactive teaching materials and effective classroom strategies that align with the needs and interests of today's learners.

Teachers should nurture pupils' personal interest in mathematics by emphasizing the relevance and meaning of lessons. They should also develop innovative learning materials and engaging activities that encourage pupils to value mathematics and invest greater effort in learning. In addition, teachers should conduct activities that promote enthusiasm, enjoyment, and confidence in the subject.

Parents should regularly monitor their child's mathematics performance at home and find ways to help them learn difficult mathematical operations. They should also encourage their child to enjoy mathematics, exert more effort, and develop greater confidence in the subject.

Future researchers may explore other factors that influence pupils' mathematics achievement, such as perceived choice, relatedness, peer support, and other motivational variables.

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