Analytical Thinking and Mathematics Performance: Insights from Mezam Division, Cameroon

ABSTRACT

This study aimed to analyze the impact of students' analytical thinking abilities on their mathematics performance in Mezam Division, Cameroon. The study adopted a mixed-methods approach. The study was carried out using seven functional public secondary schools in Mezam Division for the 2023/2024 academic year, with first cycle students (Forms 1 to 5) constituting the population of the study. With the help of the Krejcie and Morgan Table, a sample of 368 students was drawn from an accessible population 8813 first cycle students. The proportionate stratified random sampling technique was used to select this sample for the collection of quantitative data. On the other hand, 14 respondents were purposively sampled from all the schools to participate in the semi-structured interviews. Quantitative data was collected using a questionnaire while qualitative data was collected using interview prompts. The questionnaire was vetted by three experts and its test-retest reliability index established as .93. The quantitative data collected were analysed using frequency counts, means, one sample t-test and regression analysis aided by the Statistical Package for Social Sciences (SPSS) version 27.0. The qualitative analysis was done using the thematic analysis. The findings of the study revealed that students in Mezam Division exhibit significantly low analytical thinking abilities. They also revealed that there is a strong positive correlation (.850) between students' analytical thinking abilities and their mathematics academic performance. Furthermore, the regression analysis indicated that approximately 72.3% of the variations in students' mathematics academic performance can be accounted for or predicted by their analytical thinking abilities. Conclusively, the study highlights the essential importance of boosting students' analytical thinking skills to notably enhance their performance in mathematics, emphasizing the need for focused educational strategies. It was recommended that educators and policymakers need to focus on nurturing, developing and fostering students' analytical thinking abilities through targeted interventions and teaching strategies.

Keywords: Analytical Thinking Abilities, Thinking Abilities, Mathematics, Academic Performance, Mezam Division

1. INTRODUCTION

In the realm of educational research, understanding the multifaceted determinants of academic achievement has been a perennial focus. Particularly in the domain of mathematics, where proficiency is often seen as a barometer of overall cognitive aptitude, investigating the underlying factors that contribute to students' success holds paramount significance (Miller, 2018; Lee & Park, 2020). This study delves into the intricate interplay between students' analytical thinking abilities, and their academic performance in mathematics within the context of Mezam Division in Cameroon.

Mathematics education not only imparts numerical skills but also fosters critical thinking, problem-solving, and logical reasoning attributes that are indispensable for navigating the complexities of the modern world (Boaler, 2016; Schoenfeld, 2018). However, achieving proficiency in mathematics demands more than just cognitive prowess; it requires resilience in the face of challenges and the capacity to think analytically to surmount obstacles effectively. Therefore, understanding the role of students' analytical thinking abilities in shaping their mathematics academic performance becomes imperative.

Central to this study is analytical thinking abilities of students, encompassing skills such as problem-solving, logical reasoning, and critical analysis, are fundamental for mastering mathematical concepts and

effectively tackling mathematical problems. Students who exhibit strong analytical thinking skills are better equipped to comprehend complex mathematical concepts, devise strategies to solve mathematical problems, and make connections between different mathematical concepts; a crucial aspect of mathematical proficiency (Cai & Lester, 2010).

By scrutinizing the influence of students' analytical thinking abilities on their mathematics academic performance, this study aims to provide insights that can inform educational practices and interventions aimed at enhancing students' learning experiences and outcomes. Through a critical examination of these factors within the specific context of Mezam Division, this research seeks to contribute to the broader discourse on promoting academic success in mathematics and nurturing well-rounded learners equipped for the challenges of the 21st century.

In Cameroon, like many other countries, mathematics education holds significant importance due to its role in shaping students' cognitive abilities, problem-solving skills, and overall academic performance. Mezam Division, located in the Northwest Region of Cameroon, encompasses diverse socio-economic backgrounds, cultural influences, and educational resources, thereby offering a unique context for investigating factors influencing mathematics academic achievement.

Analytical thinking abilities encompassing skills such as problem-solving, logical reasoning, and critical analysis, are fundamental for comprehending and mastering mathematical concepts (Ngum, 2018). However, while numerous studies have examined the relationship between this factor and academic performance in various contexts, there is a dearth of research focusing specifically on the Mezam Division in Cameroon. Understanding the interplay between students' analytical thinking abilities, and mathematics academic performance within this specific context is essential for designing targeted interventions and educational strategies tailored to the needs of students in the Division.

Theoretical Foundation

This study draws upon several theoretical frameworks from psychology, education, and cognitive science. Following are three key theoretical perspectives that inform this topic:

Cognitive Load Theory: Cognitive load theory, proposed by John Sweller, focuses on how the cognitive load imposed by learning tasks affects individuals' ability to process information and learn effectively (Sweller, 1988). Analytical thinking abilities, such as problem-solving, critical thinking, and logical reasoning, are central to cognitive load theory. Students with strong analytical thinking abilities are better able to manage cognitive load, allocate their attention efficiently, and apply effective learning strategies when solving mathematical problems, leading to improved academic performance (Paas, Renkl, &Sweller, 2003).

Information Processing Theory: Information processing theory posits that human cognition involves a series of mental processes, including perception, attention, memory, and problem-solving (Anderson, 1983). Analytical thinking abilities are closely tied to higher-order cognitive processes, such as problem-solving and critical reasoning, which are essential for success in mathematics. This theory suggests that students who possess strong analytical thinking abilities are better able to engage in effective information processing when solving mathematical problems, leading to improved academic performance (Sternberg, 1985).

Ecological Systems Theory: Ecological systems theory, proposed by Urie Bronfenbrenner, emphasizes the dynamic interplay between individuals and their environment within various nested systems, including the microsystem (immediate environment), mesosystem (interactions between microsystems), exosystem (external environments indirectly influencing individuals), and macrosystem (cultural norms and societal values) (Bronfenbrenner, 1979). In the context of mathematics education in Mezam Division, Cameroon, ecological systems theory highlights the importance of considering contextual factors, such as socio-

economic status, cultural beliefs, and educational resources, which may influence students' analytical thinking abilities and mathematics academic performance (Bronfenbrenner & Morris, 2006).

By drawing upon these theoretical frameworks, one can develop a comprehensive understanding of the complex interplay between students' psychological attributes, cognitive processes, and contextual factors in shaping their mathematics academic performance in Mezam Division, Cameroon. This theoretical foundation informs the design, implementation, and interpretation of research studies aimed at analyzing the influence of students' analytical thinking abilities on their mathematics academic performance within this specific context.

While specific empirical studies directly related to the topic Analyzing the Influence of Students' Analytical Thinking Abilities on their Mathematics Academic Performance in Mezam Division-Cameroon, may not be readily available due to the specificity of the context, there are empirical studies from broader educational and psychological research that provide insights into related areas. These studies may offer valuable insights applicable to the context of Mezam Division, Cameroon. Here are some empirical studies related to the topic:

Inglis and Simpson (2018) on their part, carried out a meta-analysis on Analytical Thinking and mathematical performance. This meta-analysis synthesized findings from studies examining the relationship between analytical thinking abilities and mathematical performance across various educational contexts. Results indicate a positive association between analytical thinking abilities and mathematical performance, suggesting that students with stronger analytical thinking skills tend to perform better in mathematics. This study provides empirical support for the importance of analytical thinking abilities in mathematics academic performance.

Ku (2009) explored the predictive validity of critical thinking dispositions in relation to academic performance among undergraduate college students. Results show that critical thinking dispositions, including open-mindedness, analytical thinking, and systematicity, significantly predict academic performance across various academic disciplines. This study highlights the importance of fostering critical thinking dispositions, which are closely related to analytical thinking abilities, in enhancing academic achievement.

These empirical studies inform the design and interpretation of empirical research specific to the context of Mezam Division. Additionally, conducting localized empirical research in Mezam Division would be essential to address the unique contextual factors influencing students' academic performance in mathematics.

1.1 Statement of the Problem

Despite the recognized importance of mathematics education, students in the Mezam Division continue to face challenges in achieving proficiency in the subject as indicated by past General Certificate of Education (GCE) results at the Ordinary Level (O/L). While factors such as curriculum design, teaching methodologies, and resource availability undoubtedly contribute to these challenges, the role of students' psychological attributes, particularly analytical thinking abilities, remains underexplored.

The problem at hand revolves around the lack of comprehensive understanding regarding how students' analytical thinking abilities impact their mathematics academic performance in Mezam Division. Without a clear understanding of these dynamics, educators and policymakers may keep struggling to implement effective strategies aimed at improving mathematics education outcomes not only in the Division, but in Cameroon as a whole.

1.2 Objectives of the Study

- To determine the level of students' analytical thinking abilities in Mezam Division.

- To establish how students' analytical thinking abilities relate to their mathematics academic performance.
- To determine the extent to which students' analytical thinking abilities predict their mathematics academic performance.

1.3 Research Questions

- What is the level of students' analytical thinking abilities in Mezam Division?
- How do students' analytical thinking abilities relate to their mathematics academic performance?
- To what extent do students' analytical thinking abilities predict their mathematics academic performance?

1.4 Hypotheses

Ho_1: Students in Mezam Division do not exhibit significant analytical thinking abilities.

Ha_1: Students in Mezam Division do exhibit significant analytical thinking abilities.

Ho_2: Students' analytical thinking abilities do not significantly relate to their mathematics academic performance.

Ha_2: Students' analytical thinking abilities significantly relate to their mathematics academic performance.

Ho_3: Students' analytical thinking abilities do not significantly predict their mathematics academic performance.

Ha_3: Students' analytical thinking abilities significantly predict their mathematics academic performance.

2. METHODOLOGY

The study adopted a mixed-methods approach. This approach combined both quantitative and qualitative methods to provide a comprehensive understanding of the research topic. The study was carried out using seven functional public secondary schools in Mezam Division with first cycle students (Forms 1 to 5) constituting the population of the study. Thus, using the Krejcie and Morgan Table, a sample of 368 first cycle secondary school students was drawn from an accessible population 8813 first cycle students as distributed on Table 1. This sample was used to collect the quantitative data of the study. The proportionate stratified random sampling technique was used to select the sample for quantitative data in order to ensure representation across different schools, classes and gender within Mezam Division. On the other hand, semi-structured interviews using 14 respondents were conducted in order to gain deeper insights into their experiences, perspectives, and strategies related to analytical thinking abilities, and mathematics academic performance. Purposive sampling technique was employed in selecting these respondents.

Table 1: Population and Sample Size of the Study

S/N	School	Accessible Population	Sample for Quantitative Data	Sample for Qualitative Data
1	Cameroon College of Arts Science and Technology Bambili	1324	55	2
2	Government Bilingual High School Atiela	826	35	2

3	Government Bilingual High School Bayele	895	37	2
4	Government Bilingual High School Bamenda	1726	72	2
5	Government Bilingual High School Down Town	1649	69	2
6	Government Bilingual High School Medankwe	1531	64	2
7	Government Bilingual High School Santa	862	36	2
	Total	**8813**	**368**	**14**

Quantitative data was collected using a self-designed questionnaire (See Appendix A). The questionnaire had three sections. Section A required the demographic responses from the respondents. Section B was a 5-itemized analytical thinking ability scale employing a 4-point Likert scale. In this section the cut-off score was 12.5 (5 items times the midpoint of 2.5 on the 4-point Likert scale). A higher score indicates that the student possesses high analytical thinking abilities as opposes to a score lower than 12.5. Lastly section C dealt with the mathematics performance of the students by making use of their first and second term averages in mathematics for the 2023/2024 academic year. On the other hand, qualitative data was collected using interview prompts (See Appendix B). The instruments were vetted by three experts: One instrument expert from measurement and evaluation and two mathematicians, all from the University of Bamenda. The test-retest reliability was used to establish the reliability of the questionnaire using 20 students. The Pearson product moment correlation of the two administrations yielded a correlation coefficient of .93, indicating a high reliability index of the instrument.

The quantitative data collected were analysed using regression analysis to examine the relationships between students' analytical thinking abilities and mathematics academic performance. This quantitative phase provided quantitative measures of the variables and identified statistical associations between them. The analysis was aided by the Statistical Package for Social Sciences (SPSS) version 27.0. On the other hand, thematic analysis was used to analyse the qualitative data in order to identify recurring themes, patterns, and insights from the interview data. This qualitative phasel provided in-depth insights into the lived experiences and perceptions of students regarding the influence of analytical thinking abilities on their mathematics academic performance. The quantitative and qualitative findings were triangulated in order to validate and complement each other.

The study ensured informed consent and voluntary participation of all participants, maintaining confidentiality and anonymity of participants' responses. Thus it adhered to ethical guidelines and standards for research involving human subjects.

3. FINDINGS

3.1 Summary of Quantitative Findings

Research Question 1: *What is the level of students' analytical thinking abilities in Mezam Division?*

Ho_1:*Students in Mezam Division do not exhibit significant analytical thinkingabilities.*

Ha_1:*Students in Mezam Division do exhibit significant analytical thinking abilities.*

Table 2: Level of students' Analytical Thinking Abilities (ATA) in Mezam Division

S/N	Statements	Number of Respondents SD	D	A	SA	N	Mean	Level of students' ATA
1	I enjoy solving complex problems.	84	137	125	22	368	2.23	Low ATA
2	I can analyze data and draw logical conclusions.	60	182	120	6	368	2.20	Low ATA
3	I am good at breaking down problems into smaller parts.	76	133	153	6	368	2.24	Low ATA
4	I seek multiple solutions when faced with a problem.	89	120	150	9	368	2.23	Low ATA
5	I am comfortable with abstract thinking.	61	133	130	44	368	2.43	Low ATA
	Total Mean / 20						**11.33**	**Low ATA**

The findings reveal that all the items had means less than 2.5, indicating a low analytical thinking ability for all the items. Furthermore, the total mean is 11.33 suggesting that students in Mezam Division, on an average, have low analytical thinking abilities as this mean is lower than the population mean of 12.5.

Table 3: One sample t-test to test the significance of the level of students' analytical thinking abilities (ATA) in Mezam Division

	Test Value = 12.5						
						95% Confidence Interval of the Difference	
	Mean	t	df	P-value	Mean Difference	Lower	Upper
Students' Analytical Thinking Abilities	11.33	-7.397	367	.000	-1.231	-1.56	-.90

A one sample t test was performed to evaluate whether there was a significant difference between the analytical thinking abilities of secondary school students in Mezam Division compared to the general population. The mean analytical thinking abilities (M = 11.33) was significantly less than that in the general population, [t(367) = -7.397, P< .001]. Therefore it can be concluded that students in Mezam Division do exhibit significantly low analytical thinking abilities.

Research Question 2: *How do students' analytical thinking abilities relate to their mathematics academic performance?*

Ho_2:*Students' analytical thinking abilities do not significantly relate to their mathematics academic performance.*

Ha_2: *Students' analytical thinking abilities significantly relate to their mathematics academic performance.*

Table 4: Relationship between S*tudents' analytical thinking abilities and their mathematics academic performance*

		Students' Analytical Thinking Abilities	Students' Academic Performance
Students' Analytical Thinking Abilities	Pearson Correlation	1	.850**
	Sig. (2-tailed)		.000
	N	368	368
Students' Academic Performance	Pearson Correlation	.850**	1
	Sig. (2-tailed)	.000	
	N	368	368

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

The table shows a high positive Pearson product moment correlation between students' analytical thinking abilities and their mathematics academic performance of .850. This indicates that when students' analytical thinking abilities increase, their mathematics academic performance also increases. It also reveals that when students' analytical thinking abilities decrease, their mathematics academic performance also decreases. Going further, the correlation value of .850 is significant at the 1% level of significance as indicated by P <.001. Thus Ho_2 is rejected and it can therefore be concluded that students' analytical thinking abilities have a significantly positive relationship with their mathematics academic performance.

Research Question 3:*To what extent do students' analytical thinking abilities predict their mathematics academic performance?*

Ho_3: *Students' analytical thinking abilities do not significantly predict their mathematics academic performance.*

Ha_3: *Students' analytical thinking abilities significantly predict their mathematics academic performance.*

Table 5: Model Summary table for analytical thinking abilities and mathematics academic performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.850[a]	.723	.722	2.528

a. Predictors: (Constant), Students' Analytic Thinking Abilitiess

The model summary table suggests that the value of R^2 is .723. This means that 72.3% of students' variations in academic performance in mathematics can be accounted for or predicted by their analytic thinking abilities.

Table 6: Regression Coefficients for analytical thinking abilities and mathematics academic performance

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	-3.132	.484		-6.471	.000
	Students' Analytical Thinking Abilities	1.277	.041	.850	30.894	.000

a. Dependent Variable: Students' Academic Performance

The table suggests that the regression equation can be given by

Students' Academic Performance = -3.132 + 1.277 x *Students' Analytical Thinking Abilities*

Thus, when students' analytical thinking abilities is at zero, their academic performance is at -3.132. When students' analytical thinking abilities increase by one unit, their academic performance increases by 1.277. This increase is significant as indicated by a $P < .001$. This, again, indicates that students' analytical thinking abilities significantly predict their mathematics academic performance.

3.2 Summary of Qualitative Findings

3.2.1 Challenging Situation in Mathematics and Coping Strategies

Diverse Experiences: Most respondents reported encountering challenging mathematical problems or concepts, such as advanced calculus topics or complex proofs. The challenges included among other things, difficulty in understanding abstract theories, applying new methods, or solving particularly intricate problems.

Coping Mechanisms: Common strategies reported included seeking help from peers or teachers, breaking the problem down into smaller, more manageable parts, revisiting foundational concepts, and

using additional resources like textbooks or online tutorials. Some also mentioned the importance of perseverance and maintaining a positive attitude in the face of difficulty.

3.2.2 Approach to Solving Mathematical Problems

Many respondents emphasized a structured approach to problem-solving, which include understanding the problem thoroughly, devising a plan, executing the plan step-by-step, and finally reviewing and verifying the solution. Examples reported include solving algebraic equations, geometric problems, or real-world applications. Only a single respondent described solving mathematical problems by first breaking them down into simpler parts and then applying the appropriate techniques.

3.2.3 Analytical Thinking and Understanding Difficult Concepts

A few respondents highlighted how their analytical thinking helps them in breaking down complex mathematical concepts into simpler components, which facilitates better understanding. Some described situations where they used logical reasoning to derive the proof of a theorem or to grasp a difficult concept especially in agebra.

Some experiences shared included using analytical skills to understand the derivation of a formula or to connect different mathematical concepts, such as linking geometric interpretations to algebraic expressions.

3.2.4 Perception of the Relationship Between Analytical Thinking and Mathematics Performance

Many respondents perceived a strong positive relationship between their analytical thinking abilities and their performance in mathematics. They believe that strong analytical skills enable them to approach problems more effectively and understand complex concepts more deeply.

Additionally, some respondents perceive that analytical thinking is crucial for both problem-solving and conceptual understanding, leading to better scores in mathematics and a more profound appreciation of mathematical principles.

3.2.5 Strategies to Enhance Analytical Thinking Skills

Active Practice: Few respondents mentioned regularly engaging in challenging mathematical problems and puzzles as a way to improve their analytical skills. This includes solving diverse problems and exploring different areas of mathematics.

Learning Techniques: Other strategies as indicated by other participants include studying various problem-solving methods, participating in mathematical classroom discussions or study groups, and reflecting on errors to understand where and why mistakes were made in the course of solving. Additionally, some respondents emphasized the importance of understanding underlying principles rather than just memorizing procedures.

4. DISCUSSION OF FINDINGS

In relation to analytical thinking abilities in Mezam Division the study found that students in Mezam Division exhibit significantly low analytical thinking abilities. This was determined through the analysis of various statements related to problem-solving, data analysis, critical thinking, and abstract thinking. No doubt students in Mezam Division do not achieve up to stakeholders' expectations in both internal and external examinations. This is because this finding corroborates that of Ku (2009) who established that analytical thinking significantly predicts academic performance across various academic disciplines. This finding highlights the need of fostering analitical thinking dispositions of students in Mezam Division, which should greatly contribute to the enhancement of the academic achievement of students in mathematics in Mezam Division according to Ku (2009).

The finding of the study also revealed that there was a strong positive correlation (.850) between students' analytical thinking abilities and their mathematics academic performance. This suggests that as students' analytical thinking abilities increase, their mathematics academic performance also improves, and vice versa. Furthermore, in relation to the predictive power of analytical thinking abilities, the study revealed that students' analytical thinking abilities significantly predict their mathematics academic performance. The regression analysis indicated that approximately 72.3% of the variations in students' mathematics academic performance can be accounted for or predicted by their analytical thinking abilities. This discovery aligns with the research by Inglis and Simpson (2018), which demonstrated a direct correlation between analytical thinking skills and performance in math. It implies that students who possess stronger analytical abilities tend to excel in mathematics. This research offers tangible evidence backing the significance of analytical thinking skills in academic achievement in mathematics.

Implications for Educational Practices: These findings have significant implications for educational practices and interventions aimed at enhancing mathematics education in Mezam Division, Cameroon. Educators and policymakers need to focus on nurturing, developing and fostering students' analytical thinking abilities through targeted interventions and teaching strategies. By improving students' problem-solving skills, critical thinking abilities, and logical reasoning, educators can enhance their overall academic performance in mathematics.

5. CONCLUSION

In the pursuit of understanding the intricate dynamics of academic achievement, particularly in mathematics, this study has delved into the pivotal role of analytical thinking abilities among students in Mezam Division, Cameroon. The findings underscore the foundational significance of analytical thinking skills in shaping students' mathematics academic performance. Firstly, the study revealed that students in Mezam Division exhibit significantly low levels of analytical thinking abilities. This highlights a crucial area for improvement in the educational landscape, as these abilities are pivotal not only in mathematics but across various academic disciplines. The importance of fostering analytical thinking dispositions, as emphasized by prior research, becomes evident in addressing this gap and enhancing students' academic achievement. Furthermore, the study unveiled a strong positive correlation between students' analytical thinking abilities and their mathematics academic performance. This correlation implies that as students' analytical skills improve, so does their performance in mathematics. Moreover, the predictive power of analytical thinking abilities on mathematics academic performance suggests that nurturing these skills can significantly contribute to enhancing students' overall proficiency in the subject. These findings resonate with prior research, such as that of Inglis and Simpson (2018), affirming the direct link between analytical thinking skills and success in mathematics. They provide empirical evidence supporting the importance of analytical thinking abilities in academic achievement, particularly in the realm of mathematics.

For educational practitioners and policymakers, these findings hold significant implications. It underscores the importance of incorporating strategies and interventions aimed at nurturing and developing students' analytical thinking abilities. By emphasizing problem-solving, critical thinking, and logical reasoning skills within the educational curriculum, educators can empower students to overcome challenges and excel academically, particularly in mathematics. Thus, this study sheds light on the critical role of analytical thinking abilities in shaping students' mathematics academic performance in Mezam Division, Cameroon. By recognizing and addressing the significance of these skills, educators and policymakers can pave the way for improved educational outcomes and empower students to thrive in the modern world.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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Appendices: Instruments for Data Collection

Appendix A: Quantitative Survey Instrument

Students' Analytical Thinking Abilities and Mathematics Academic Performance

Dear Respondent, I approach you with this questionnaire for a research study titled "Analytical Thinking and Mathematics Performance: Insights from Mezam Division, Cameroon". Please kindly respond to the questionnaire items as honestly as they apply to you. Your responses will be treated confidentially and will be used strictly for research purposes as your name is not even required.

Section A: Demographic Information:

a. Gender: Male / Female

b. Age: _____

c. Class: _____

d. School: _____

Section B: Analytical Thinking Abilities

Rate your degree of agreement or disagreement with the following statements as they apply to you on a scale of 4, where 1 = Strongly Disagree, 2 = Disagree, 3 = Agree and 4 = Strongly Agree.

S/N	Statement	SD	D	A	SA
1	I enjoy solving complex problems.				
2	I can analyze data and draw logical conclusions.				
3	I am good at breaking down problems into smaller parts.				
4	I seek multiple solutions when faced with a problem.				
5	I am comfortable with abstract thinking.				

Section C: Mathematics Academic Performance

My first term average in mathematics was _____/ 20

My second term average in mathematics was _____/ 20

Appendix B: Qualitative Interview Prompts

1. Can you describe a challenging situation you encountered while studying mathematics? How did you cope with it?
2. How do you approach solving mathematical problems? Can you provide an example?
3. Can you share an experience where analytical thinking skills helped you understand a difficult mathematical concept?
4. How do you perceive the relationship between your analytical thinking abilities, and your performance in mathematics?

5. Are there any specific strategies or techniques you use to enhance your analytical thinking skills in mathematics?