

The Interplay among Students' Social Behavior, Thinking Skills, and Academic Performance in Core Subjects

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Date received: March 8, 2024

Date revised: March 18, 2024

Date accepted: March 22, 2024

Originality: 99%

Grammarly Score: 99%

Similarity: 1%

Recommended citation:

Santisteban, A., Futralan, M.C. (2024). The Interplay among Students' Social Behavior, Thinking Skills, and Academic Performance in Core Subjects. *Journal of Interdisciplinary Perspectives*, Vol. 2, Number 4, pp. 130-137. <https://doi.org/10.69569/jip.2024.0059>

Abstract. This study delved into students' thinking skills in dealing with real-life situations and how such skills are associated with their academic performance in the following core subjects: Mathematics, Science, and English. The research is quantitative, specifically a descriptive-correlational type. The respondents came from four big private schools in Dumaguete City. An adapted questionnaire was utilized to gauge the students' thinking skills, and their academic performance was garnered based on their grades in the three core subjects. Percentages means, and chi-square tests were utilized as data treatment tools. The data indicated that students demonstrated a "very satisfactory" level of performance in Mathematics and Science, whereas their performance in English was notably "outstanding." Furthermore, the results showed that nearly half of the students use their problem-solving, decision-making, and thinking skills in dealing with real-life situations, while only a few of them struggle to effectively utilize the aforementioned skills. The data further revealed that the students' performance in Mathematics and Science and their thinking skills in dealing with real-life situations are significantly correlated.

Keywords: Social behavior; Thinking skills; Academic performance; Core subjects; Critical thinking.

1.0 Introduction

The issue of whether highly intelligent individuals can successfully solve problems in the real world is not directly addressed by the majority of theories of intelligence (Halpern & Dunn 2021). Students, for instance, exhibit a distinctive blend of proactive engagement and academic performance when addressing real-life problems tied to global issues. According to Schetsche (2022), students apply coping strategies and, most frequently, they cope by seeking social support, problem-solving, cognitive restructuring, avoidance, and positive reappraisal. Some students also adopt problem-solving strategies such as engaging in critical thinking, analyzing the situation, and developing action plans, while others tend to be avoidant and evade the problem altogether. The definition of problem-solving abilities evolved with the introduction of cognitive learning theories. Problem-solving was then considered a sophisticated mental activity that involves a range of cognitive abilities and tasks (Rahman, 2019). Researchers claimed that many students lack problem-solving and critical thinking abilities, which are supposedly necessities in the workforce (Lestari et al., 2020).

People have different ways of dealing with challenges. Filipinos, for example, show camaraderie as their way of surviving hardships (Martinez et al., 2022). Meanwhile, Ocaik et al. (2021) claimed that one of the main aims of education is to help individuals acquire the capability to solve problems and a positive attitude towards science. Nonetheless, the study of Amran et al. (2019) revealed that students' critical thinking ability is very low.

In addition, recent studies have indicated that the creative thinking ability of students is a determinant of their academic performance (Adeyemi & Oladele, 2020). To lead a successful life and develop crucial skills necessary for navigating a rapidly evolving world, students must expand their knowledge across diverse subject areas (Rahman, 2019). According to Albay (2019), central to the efficiency of the problem-solving strategy is the students' ability to collaborate, communicate, and actively engage in the entire problem-solving process. However, it remains unclear what the link between students' behavior in decoding real-life dilemma and their achievement in core subjects is. Other studies substantially discussed the students' attitude towards problem-solving and their academic performance, but no existing study has yet tackled specifically the students' behaviors, namely, avoidant, impulsive, indecisive, collaborative, and adaptive.

The current study is therefore conducted to examine the nuances of students' behavior in solving real-life problems and its bearing on their performance in core subjects, specifically Mathematics, Science, and English (Language). The goal of this query is to provide an extensive knowledge of the interplay linking problem-solving behavior, thinking skills, and academic outcomes in core subjects, offering insightful conclusions and suggestions to aid students' educational pursuits. Teaching requires flexibility and adaptability. Hence, through this study, teachers would be further motivated to address students' individual needs effectively, facilitating the successful implementation of differentiated instruction techniques.

2.0 Methodology

2.1 Research Design

The research is a descriptive-correlational type. First, it describes the performance of the students in core subjects as well as their thinking skills and behavior when confronted with problems. Second, it explores how students' thinking skills are related to their performance.

2.2 Research Participants

The data were gathered from two big colleges and two universities situated right in the heart of the well-known "University Town," Dumaguete City. Two-hundred fifty (250) Grade 11 students were randomly selected as the study's respondents. The selection was done using the systematic sampling technique with a random start, wherein every 2nd student in the list was chosen as a respondent. The two colleges and two universities, where the respondents were enrolled, were purposively selected.

2.3 Research Instrument

The questionnaire on "thinking skills" taken from Auckland Council-Controlled Organization was used in this study because the researchers found it a highly valuable and suitable instrument for research. However, some situations presented in the "thinking skills" questionnaire were modified to fit the environment and culture in the Philippines where the study was carried out. The organization was informed through an email regarding the use and modification of the questionnaire. To warrant the validity of its contents, the questionnaire was presented to three Mathematics educators. These experts have a master's degree and experience in research-related tasks. Their suggestions were taken into consideration in finalizing the research's working title and objectives. A trial test was also done to solicit ideas from students through their responses and to evaluate and analyze the results.

2.4 Data Gathering Procedure

A formal letter was sent to the respective presidents of the four schools to ask for approval to carry out the study. After the request was granted, the school's Vice President for Academic Affairs was notified so that the researcher could approach the teachers and float the questionnaires. The retrieval of the questionnaires, tallying of responses using MS Excel, data analysis through Jamovi Software, and interpretation of all data then followed.

2.5 Ethical Considerations

The researcher adhered to all required ethical standards throughout the whole course of the study. To protect the gathered data, confidentiality was rigorously upheld. Additionally, the researcher followed the ethical guidelines established by the University's Ethics Committee. Before commencing the study, the researchers also obtained approval from the appropriate authorities.

3.0 Results and Discussion

3.1 Students' Performance in Core Subjects

Table 1 provides the performance of the Grade 11 students in the following core subjects: Mathematics, Science, and English. The presentation of data is based on Department of Education Order No. 8, series of 2015 since the respondents of this study come from different private schools having dissimilar rating classifications and descriptions.

Table 1. Students' performance in core subjects (n = 265)

Rating	Mathematics		Science		English	
	f	%	f	%	f	%
90 – 100	113	42.64	115	43.40	136	51.32
85 – 89	104	39.25	117	44.15	106	40.00
80 – 84	33	12.45	24	9.05	15	5.66
75 – 79	15	5.66	9	3.40	8	3.02
Total	265	100.00	265	100.00	265	100.00
Mean	88.42		88.74		89.68	
	(Very Satisfactory)		(Very Satisfactory)		(Outstanding)	
SD	5.15		4.47		4.59	

As shown, 42.64% of the students exhibit an “outstanding” rating and 39.25% of them display a “very satisfactory” rating in Mathematics. Generally, the students are categorized as being at the “very satisfactory” level, with an overall rating of 88.42%. These findings align with what Despojo (2021) found in her study, where she unveiled that the students garnered average ratings of 89.64% and 89.62% in General Mathematics, and Statistics and Probability subjects. The same findings are apparent in the study of Diputado (2022), wherein students in Mathematics showed a “very satisfactory” performance with ratings equivalent to 85.74% and 87.99% during the first and second quarters, respectively. Although the subject is classified as one of the difficult subjects for Filipino students (Capuno et al., 2019), the current findings provide a positive connotation that students can still learn Mathematics. This is essential because many professions today demand mathematical analysis and mathematical skills to solve novel problems (McGunagle & Zizka, 2020).

Meanwhile, 43.40% of the students obtained an “outstanding” rating, and 44.15% of them attained a “very satisfactory” rating in the Science subject. Synthesizing the results, the researchers found that the students' general rating is 88.74% with a verbal description of “very satisfactory.” These outcomes are closely parallel to Despojo's findings (2021), which identified that senior high school students' grades in Science subjects are at the “outstanding” level with ratings around 91%. This performance of students is a good indication that they have effectively learned the Science concepts. Likewise, Morados (2020) emphasized that science education is critical to a country's success, while Broughel and Thierer (2019) stated that science and technology contribute significantly to the nation's economic development and prosperity and that the advancements in science and technology determine the nation's well-being.

Furthermore, the data indicate that 51.32% of the students have an “outstanding” rating and 40.00% of them got a “very satisfactory” rating in English. In summary, the students are classified as “outstanding” with an overall rating of 89.68%. These results support the findings of Despojo (2021) that senior high school students' grades in English subjects are at the “outstanding” level with ratings around 92%. Proficiency in English is important as it leads to a brighter future, a progressive career, and a satisfying life, according to Sailabada and Soontornwipast (2023).

The findings further imply that despite the reported decline in Philippine English Proficiency in previous years by an international company, Education First (EF), Filipino students remain proficient in English. Filipinos hold 10-15 percent of the BPO market globally, which employed 1.3 million Filipinos as of 2023. Since most employers perceive English proficiency as a pivotal factor for workplace success (Gaytos et al., 2019), it can be inferred that students are adaptive in terms of considering future workability (Oducado et al., 2020).

Moreover, the data in Table 1 reflect the standard deviations of the students' performances in Mathematics, Science, and English. The standard deviation is the degree of data dispersion concerning the mean. As shown,

the standard deviations are 5.15, 4.47, and 4.59 for Mathematics, Science, and English, respectively. These figures can be rounded off to 5. This means that the ratings of the students deviate 5 points from the mean.

3.2 Thinking Skills of Students in Dealing with Real-Life Situations

Table 2 unveils the students' thinking skills in dealing with real-life situations. The way students think and analyze the problem eventually reveals their behavior in certain situations.

Table 2. Thinking skills of students in dealing with real-life situations (n = 265)

*Explanations of Students' Choices when Dealing with Real-Life Situations		f	%
A.	The students need to develop their cognitive skills. They shy away from dealing with problems due to the frustration that comes with it. In such instances, they may not take responsibility for their issues nor consider the consequences of their actions. This approach can be detrimental to their personal growth and academic progress. Therefore, it would be advantageous for students to practice calmly assessing their options when faced with problems and devising effective solutions. - Avoidant	5	1.89
B.	The students feel anxious, fearful, or nervous when confronted with problems. Emotions can cloud their judgment, leading to impulsive decisions when they feel overwhelmed. Encouraging students to cultivate a sense of confidence in their decision-making abilities can be highly beneficial. By practicing these skills, they can develop the self-assurance needed to face challenges head-on. - Impulsive	19	7.17
C.	It seems that students' approach to problem-solving is contingent on the complexity and significance of the problem at hand, as well as their sense of responsibility towards it. While this might work in certain situations, it may not always be the best course of action in real-world scenarios, particularly in a professional setting where problem-solving is a necessary skill. Rather than evaluating the magnitude of a problem and making a decision based on personal preferences, students should cultivate a habit of problem-solving regardless of the circumstances. - Indecisive	40	15.10
D.	Students are generally adept at using their cognitive abilities and decision-making skills to tackle problems. However, they could benefit from improving their ability to consider all available options when attempting to solve a problem. Additionally, they tend to seek input and suggestions from those around them. - Collaborative	74	27.92
E.	Students approach problems with a well-planned, thoughtful strategy, utilizing their problem-solving, decision-making, and critical thinking skills. - Adaptive	127	47.92
Total		265	100.00

*Explanations were adapted from the Auckland Council-Controlled Organization's thinking skills questionnaire.

It can be drawn from the data that 47.92% of students are proficient in using their problem-solving, decision-making, and thinking skills. The results indicate that the students approach problems with careful and well-thought-out planning. This finding signifies that the students are "adaptive" to the situation and willing to provide a solution to the problem.

Being adaptive is closely related to the personality trait, "openness." This trait is manifested when individuals are open to experience (Sassenberg et al., 2022). Adaptive people are willing to explore new things and are motivated to take on new challenges (Cherry, 2018). The data also imply that the students take careful measures when developing possible solutions to a problem. This is probably because, in 21st-century education, students are provided with opportunities to probe, discover, and be responsible for their learning, which include familiarizing and critically solving real-life problems (Ali, 2019).

The table also shows that 27.92% of the students use their skills in decision-making to disentangle problems. However, the students need to put more effort into considering and evaluating all available choices or alternatives when attempting to solve a problem. They approach problems by soliciting ideas and suggestions from people around them. These thinking skills of students can be characterized as being "collaborative," a behavior that can be related to the personality trait of "extraversion." Individuals with this behavior believe in the saying that "no man is an island." They are more active when they are among their buddies. They also enjoy engaging in conversations and participate better in group activities (Alipio et al. 2022). As stressed by Martinez et al., (2022), Filipinos' strong sense of solidarity enables them to withstand adversity by turning to their friends and family for assistance.

Furthermore, Table 2 exposes that 15.10% of the students acquire ways of solving problems, which vary depending on the circumstances. For students, solving problems depends on how complicated their problem is, or whether the problem is their responsibility or not. This trait could be characterized as being "indecisive,"

which has a negative connotation because, in real life, people really must fix or solve problems whether they like it or not regardless of the weight of that problem.

Cherry (2018) posited that indecisiveness as a trait is the opposite of “agreeableness.” Agreeable individuals prioritize social contacts and value teamwork. Seyal and Suhali (2019) also supposed that agreeable people are receptive to debate and more adept at learning, particularly when learning opportunities involve group work and practical application. Unfortunately, in the current study, some of the students (15.10%) lack these characteristics.

Moreover, the data reflects that 7.17% of students approach problems emotionally and decide immediately without careful and proper planning. The students manifest the trait of being “impulsive.” These students lack assertiveness in decision-making and do not believe that they can overcome problems. These characteristics contradict the personality trait of “conscientiousness.” Conscientious individuals hardly ever make hasty or irresponsible decisions and usually make more deliberate, planned, and rational choices, according to Othman et al. (2020). They are committed to work plans and are determined to finish identified goals based on work plans (Albalawi, 2019). Unfortunately, the current findings divulged that a portion (7.17%) of the students do not manifest conscientiousness.

Lastly, Table 2 data depicts that 1.89% of students need to work on their cognitive skills. These students despise dealing with problems, often avoid issues, and do not try to sort them out. In short, they are “avoidant.” Being avoidant can be related to the personality trait of “neuroticism.” Students with high levels of neuroticism struggle to self-regulate and frequently resort to help-seeking behaviors (Bruso et al., 2020). They also have fears and insecurities that cause them to panic quickly (Alipio et al., 2022). These traits are not beneficial to students at school or in life in general. It would be good for students to practice being calm while they look at their options during hard times and plan out how they can fix their problems.

Noteworthy studies have documented drawbacks in students’ problem-solving abilities. Some disclosed that students tend to quickly perform the calculations using the provided numbers to reach a solution. In other words, they may focus primarily on computational aspects without deeply engaging in critical thinking or problem-solving strategies. It has also been emphasized that students are not competent at solving problems, especially non-routine ones (Dündar & Yaman, 2015; İncebacak & Ersoy, 2016; Albayrak & Şimşek, 2018).

3.3 Association between the Students’ Performance in Core Subjects and Their Thinking Skills

Table 3 exposes the data in identifying the association between the students’ performance in the core subjects and their thinking skills in dealing with real-life situations. It is shown that the avoidant and impulsive categorizations of students’ manifestations of their thinking skills are merged. This is done because only a few of the students belong to these categories, and some assumptions in the use of the Chi-Square Test cannot be satisfied. In addition, based on the descriptions of these two behaviors, the students have negative characteristics as compared with the other three categories.

The data further indicate that students’ thinking skills in dealing with real-life situations are significantly associated with their performance in Mathematics ($p = 0.001 < \alpha = 0.05$) and Science ($p = 0.024 < \alpha = 0.05$). This connotes that students’ thinking skills are dependent on their performance in Mathematics and Science or that their performance in these two subjects can account for how they think and deal with situations, which in turn display their behavior. It can also be seen, according to the data, that the student performances vary based on their groupings. Moreover, being “adaptive” received the highest rating in both Mathematics and Science subjects. Second in rank is the group of students who manifest “collaborative” behavior, and third is the group exhibiting “indecisive” behavior. The groups marked as “avoidant” and “impulsive” got the lowest ratings in both Mathematics and Science subjects. The order of these behaviors can be labeled as likable to unlikable.

Table 3. Association between the students' performance in core subjects and their thinking skills (n = 265)

Variables		χ^2	p-value	Remark
Performance in Mathematics and Thinking Skills		28.78	0.001	Significant
Thinking Skills/Behavior	Performance			
• A/B (Avoidant/Impulsive):	83.63%			
• C (Indecisive):	87.25%			
• D (Collaborative):	89.05%			
• E (Adaptive):	89.31%			
Performance in Science and Thinking Skills		19.13	0.024	Significant
Thinking Skills/Behavior	Performance			
• A/B (Avoidant/Impulsive):	86.10%			
• C (Indecisive):	87.88%			
• D (Collaborative):	89.05%			
• E (Adaptive):	89.32%			
Performance in English and Thinking Skills		7.18	0.618	Not significant

Level of significance = 0.05; df = 9

It was found by Adeyemi and Oladele (2020) that the creative thinking ability of students is a determinant of their academic performance. Similarly, students' academic performance enables them to think critically. This is also affirmed by Cresswell and Speelman (2020), who revealed that mastery of Mathematics can facilitate the cognitive skills and intellectual abilities of students. Therefore, students' thinking skills in dealing with real-life situations are significantly associated with their Mathematics performance. Ajisuksmo and Saputri (2017) also acknowledged the role of Mathematics in fostering students' capacity for rational, analytical, systematic, critical, and creative reasoning.

Meanwhile, the findings indicate that the students' performance in English is not significantly associated with their thinking skills ($p = 0.618 > \alpha = 0.05$), which suggests that there is no sufficient evidence signifying that the two variables are related. This may further imply that their English performance cannot account for their thinking skills in dealing with real-life situations. This result contradicts the findings of Ennis (2018) and Al Roomy (2022) that the student's performance in English has a strong association with their critical literacy or academic literacy.

4.0 Conclusion

The students' exposure to problem-solving in Mathematics and Science subjects cultivates their analytical thinking skills in dealing with situations. It also enables them to process problems methodically. The challenges posed by these subjects foster a creative mindset as students explore innovative solutions and think beyond conventional approaches. The application of theoretical knowledge to practical situations sharpens students' ability to address real-world challenges, creating a bridge between academic concepts and everyday problem-solving. On the other hand, students may struggle with grasping complex mathematical and scientific concepts leading them to rush through problem-solving without fully understanding the underlying principles. This hinders students' ability to think critically and solve problems methodically. Students who exhibit impulsive and avoidant behaviors face a range of challenges that extend beyond academic settings and impact various aspects of their lives.

To help those students who manifest negative behaviors in dealing with real-life problems, teachers must strengthen interdisciplinary learning, which requires students to draw upon knowledge from various disciplines to solve complex problems. Collaboration with faculty members from different disciplines to co-teach courses should also be pursued. Project-based learning is an example of this approach, which necessitates students to work together and may involve community engagement, encouraging students to address issues that extend beyond the confines of a single discipline. This approach fosters a holistic understanding of real-world challenges and enhances students' ability to think critically across different contexts.

5.0 Contributions of Authors

The authors confirm their equal contribution to every part of this research. All authors reviewed and approved the final version of this paper.

6.0 Funding

This work received no specific grant from any funding agency.

7.0 Conflict of Interests

The author declares no conflicts of interest

8.0 Acknowledgment

The authors are grateful to the faculty members of Foundation University Graduate School and Metro Dumaguete College for all the support and encouragement throughout the conduct of the study.

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