

# INFLUENCE OF STUDENT'S SELF-MOTIVATION ON THE PROBLEM-SOLVING SKILLS OF JUNIOR HIGH SCHOOL STUDENTS

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**ABSTRACT** – *A student's problem-solving skills are affected by various factors, wherein these factors can either improve the student's problem-solving skills or not. Hence, this study sought to: determine the level of students' problem-solving skills; determine the level of students' self-motivation towards Mathematics; find out the relationship between students' level of self-motivation and problem-solving skills; ascertain the students' perception towards problem-solving through interviews. The data were collected through survey questionnaires participated by twelve (12) students from grades 9 and 10 of School Year (S.Y.) 2021-2022 of Lumbo Integrated School, Valencia City, Bukidnon. An explanatory sequential mixed method design was used in the study. The following are the findings after the study was conducted: (1) most of the students' problem-solving skills were deficient; (2) the student's level of self-motivation was rated as highly motivated; and there was a significant relationship between students' self-motivation and problem-solving skills. With the results found, it is recommended that students' motivation should be given attention and improved to capture their interest in problem-solving and enrich their problem-solving skills.*

**Keywords:** Problem-solving skills, self-motivation

## 1. INTRODUCTION

The junior secondary school level is a very critical period in the educational pursuit of students. This is because it is a period of adjustment from childhood to adolescence. They need encouragement to achieve success in life. This form of encouragement given to learners is called self-motivation. Self-motivation is defined as an individual's willingness to carry out their responsibilities [1]. Students who are motivated by themselves are advantageous. It has a positive impact on the educational system. It can help achieve the goal of education worldwide to prepare students to acquire skills required for the future workforce. The students can learn and apply a lot of things if they motivate themselves to do it. Our daily lives can benefit from what we know in school. Mathematics is one of the subjects present in life at every age and in every situation. Students must be equipped with 21st-century skills, especially the capacity to solve problems. An essential cognitive process is used in a practical setting, and this is the students' problem-solving skills. In order to solve problems successfully, people should possess a variety of critical problem-solving abilities, one of which is the ability to select the best approach for the given situation [2]. The ability to solve complex problems is the most in-demand skill today. Given all the changes people face on a regular basis, being able to use logic, critical analysis, and creative thinking to handle a range of problems may be more important than merely learning information [3]. In order to keep up with the quick changes brought on by the digital age, where students will eventually look for solutions to unknowable circumstances, it is crucial to develop this competence [4]. Through its psychologically demanding issues and procedures, mathematics study considerably enhances problem-solving skills [5]. Problem-solving abilities should be passed down from one generation to the next since they are essential to knowledge, according to math teachers. Moreover, shifting from rote learning to problem-solving in mathematics

is essential for human existence [6]. However, numerous students perform poorly in math. In a global context, the study revealed that the Philippines came in at number ten out of the ten nations that took part in the Trends in International Mathematics and Science Study (TIMSS) [7]. Only 1% of the students had attained the advanced level. Math performance issues are not just a problem for elementary and high school students. The Trends in Mathematics and Science Study (TIMSS), conducted in 2003, found that selected Grade 4 and Grade 8 (second-year high school) students from sample schools had low accomplishment scores in Mathematics. In mathematics for grade 4 pupils, the Philippines came in at 23 out of 25 countries, while for grade 8 students, it came in at 42 out of 45 nations. Furthermore, Region X has problems with its performance in mathematics, according to the National Education Testing and Research Center's announcement of the NAT results (2012). The Mean Percentage Score (MPS) for the area, which ought to be 50% higher, is 48.92. On the NAT, the Valencia City Division's math score was 49.7%. Only three of the six private high schools in Valencia City—Bukidnon Faith Christian School, San Agustin Institute of Technology, and Valencia Baptist Christian Academy—had MPS scores from the NAT test that satisfied the Department of Education's standard of 50% or above. Only VBCI and SAIT, two of the schools mentioned above, had an MPS in mathematics above the standard the Department of Education set.

Problem-solving is seen as the cornerstone of mathematics education in the PISA 2012 top-performing nations, such as China, Singapore, Korea, and Japan [8]. The Philippines also recognized its importance and made teaching this skill one of the two main objectives of mathematics education. The most recent PISA results from 2018 show that, despite the efforts of the Philippine educational system, Filipino students' level of mathematics competence in foreign assessments has declined. The Philippines scored 353, which is below the average of participating OECD countries, according to the data (OECD,

2019) [9]. The Mathematics Subtest demonstrates the students' inadequate performance in word problem-solving because the majority of the items contain application difficulties.

In addition, it was emphasized that students' inability to see the connection between mathematics and their daily life is the main factor behind their poor math performance [10]. Self-motivation could be one of the factors that could greatly affect the student's performance in Mathematics. It plays a significant role in an individual's educational life and achievement, and it reflects in learners' choices of academic tasks, the time and effort they allocate to each task, and their perseverance in academic tasks. The concept of motivation is closely related to other constructs in education and psychology. They include attention, needs, goals, and interests, which all focus on stimulating individual learners and raising their interest and attention toward engaging in an action or behavior and the accomplishment of such actions or goals. Educational psychologists are of the view that students' motivation is an indispensable requirement for efficient learning to take place. In the event of insufficient motivation to learn, the outcome of such learning will be unsatisfactory [11]. The concept of motivation has been defined differently. However, many of the researchers were focused on what induces a person to perform the given action. Motivation is "what causes people to behave as they do." To them, motivation sketches the achievement and pursuit of goals [12]. Motivation is goal-directed. That is, individuals, perform an action due to the goal they want to achieve. Motivation is environmentally dependent. That is, people's action is tailored by environmental influences [13]. In view of the importance attached to students' motivation, the researchers will explore the influence of self-motivation on the problem-solving skills of junior high school students.

## 2. METHODOLOGY

The research design employed in this study is an explanatory sequential mixed-method design. The data are analyzed using descriptive statistics on percentage, mean, and standard deviation, and the interview response supports the quantitative results. It would like to ascertain the students' problem-solving with their motivation in Mathematics.

This was conducted at Lumbo Integrated School - Lumbo, Valencia, Bukidnon. A total of twelve (12) grade 9 and grade 10 students of school years 2021-2022 were chosen as the participants. The students who participated in this study were categorized as slow, average, and excellent learners.

There are two research instruments used in this study. The first is for the problem-solving research instrument, which has three problem-solving for grade 9 and three problem-solving for grade 10, which was adopted on an exam pilot tested in 2019 with Kruder-Richardson results of 0.79 and 0.70, respectively. The second one is a questionnaire on students' motivation adopted from the study of [14] with a Cronbach's alpha of

0.9629. The instrument will use a five-scale measurement which ranges from Strongly Agree to Strongly Disagree.

## 3. RESULTS AND DISCUSSION

This portion analyzes and interprets the data gathered from the respondents, which is crucial for testing the study's assumptions. To make the material more accessible, this chapter also includes tables and other figures. The presentation is structured in line with the goals of the investigation.

### 3.1 Students' problem-solving skills

Table 1 presents the level of problem-solving skills of students, indicating the percentage, level of proficiency, and qualitative interpretation.

**Table 1. Student's Problem-Solving Skills**

Participants	Percentage (%)	Level of Proficiency	Qualitative Description
Student 5	100	Exemplary	Very High Performance
Student 11	93	Exemplary	Very High Performance
Student 12	80	Average	Moderate Performance
Student 6	73	Deficient	Very Low Performance
Student 9	73	Deficient	Very Low Performance
Student 3	67	Deficient	Very Low Performance
Student 10	67	Deficient	Very Low Performance
Student 4	60	Deficient	Very Low Performance
Student 2	27	Deficient	Very Low Performance
Student 7	27	Deficient	Very Low Performance
Student 1	20	Deficient	Very Low Performance
Student 8	20	Deficient	Very Low Performance

As seen in Table 1, 9 students, or 75% of the class, had low scores, which are taken to indicate meager problem-solving abilities. One (1), or 8.33 percent of the students, received average scores, regarded as moderate performance in problem-solving abilities. In contrast, two (2), or 16.67% of the students, received exceptional scores, which are very high performance in problem-solving skills. It implies that most of the students had deficient problems skills in mathematics. Students still needed to learn how to solve the given expressions. Interviewee 8 claimed that learning mathematics is complicated, but he is trying his best to learn despite being confused.

Moreover, interviewee 10 emphasizes that she has no time to study mathematics since he needs to help their parents. Based on their response, students' mathematics performance is affected due to deficient performance in problem-solving

skills. Additionally, during this time, switching from face-to-face to online lessons resulted in a lack of control over the learning process or fewer preferences as well as a diminished sense of capability and autonomy to perform academic-oriented learning tactics, which decreased academic motivation [15]. Furthermore, the study of [16] revealed that lack of motivation (among other psychological difficulties), distractions, and lack of routines, as well as the feeling of pressure to deal with all the schoolwork, were the most frequently mentioned aspects that hindered students from coping with the distance learning. Students who assessed themselves higher on the scale of problem-solving skills indicated less felt stress about the pandemic and specifically about the distance learning process. Below is their interview transcript:

**Interviewee 8:** “*Sa akoa dili pa kayo ko kasabot sa math, I try my best nga makasabot jud ko. Sa math akong utok murag mag blanko, ma rattle.*”

*(For me, it can be challenging to solve math. I try my best to learn. In learning mathematics, I feel confused and upset.)*

**Interviewee 10:** “*Usahay rko naay time mag study ug math kay nag tabang ko sa among balay.*”

*(I have no time to study math because I'm helping my parents.)*

**3.2 Students' self – motivation on Problem Solving Skills**

Table 1 shows the students' self–motivation on problem-solving skills, which had an overall mean of 3.47, which can be described as "agree," which means students are highly motivated to solve math problems.

Out of twenty-eight (28) statements about mathematics self–motivation, as shown in the table, students rated seventeen (17) as "agree," which is interpreted as "highly motivated," ten (10) as "neutral," which is interpreted as "moderately motivated," and one (1) as "disagree," which is interpreted as "Low Motivated." The findings imply that students' biggest wish is to understand the content of the learning material used in the class. They are interested in the learning material in math class. If they get a better score, they will learn harder. The skills they learn from the math class can be applied in other courses. They feel the learning materials used in math class are helpful. In math class, they would like to have some challenging materials, and they will make me learn more. Learning math can improve their thinking logic. What they learn in math class can be applied in their daily life. They want to get higher math scores because they want to demonstrate their capability to their classmates. They can get better grades if they pay full attention in math class. If they have enough time to practice math, they will perform better. They most want to get the best grades in math class. They will learn better in class if they have a correct learning pattern to learn math. If they study hard enough, they can understand the content of the learning materials used in math class. They believe that they will have excellent math grades in math class. Their best wish is to attend the ideal university via learning math.

Furthermore, Math is easy for students. Also, some students say they are moderately motivated toward mathematics because they believe they can master every topic in math class. They hope they can get a higher grade in math than any other

classmates. They like every topic and content in math class. They believe they can understand the math materials' most challenging part by themselves. They want to get other people's recognition, so they want higher scores in math class. They believe it is their fault if they do not learn better in math class. As for math, they are competent in teaching their classmates. They would like more projects and homework in math class, which will help them learn more, even though these will not improve their scores. In math exams, they will think negatively that they are inferior to their classmates. Moreover, in math exams, they are blank and cannot remember what they have learned. Lastly, some students say they are low motivated because they need to work harder if they can't understand the topics in math class.

Notably, the items can only be evaluated as highly motivated or low motivated. Instead, all of the items range from low to high motivation. Due to the component's mean score of 3.72, which is read as "Highly motivated," it is clear that students are motivated to learn mathematics by solving problems. Given the favorable judgments of the other elements, it can be said that Lumbo Integrated School pupils are sufficiently motivated to learn how to solve arithmetic problems. They are aware of their internal urge to develop their mathematical problem-solving abilities.

**Table 2. Students of self-motivation toward problem-solving skills**

Indicators	Mean	Qualitative Description
My biggest wish is to understand the content of the learning material used in the math class.	4.167	Highly Motivated
I am interested in the learning material in math class.	4.167	Highly Motivated
To get a better score in math, I will learn harder.	4.083	Highly Motivated
The skills I learned from the math class can be applied in other classes.	4.000	Highly Motivated
I feel the learning materials used in math class are helpful.	4.000	Highly Motivated
In math class, I would like to have some challenging materials, and they will make me learn more.	3.917	Highly Motivated
Learning math can improve my thinking logic.	3.833	Highly Motivated
What I learned in the math class can be applied daily.	3.750	Highly Motivated
I want to get higher scores in math class because I want to demonstrate my capability in the class.	3.667	Highly Motivated
If I pay full attention in math class, I can get better grades.	3.667	Highly Motivated

If I have enough time to do practice in math, I will have better performance.	3.667	Highly Motivated
My most wanting is to get best grades in math class.	3.583	Highly Motivated
If I have correct learning pattern to learn math, I will learn better in the class.	3.583	Highly Motivated
If I study hard enough, I can understand the content of the learning materials used in math class.	3.583	Highly Motivated
I believe that I will have excellent math grades in math class.	3.500	Highly Motivated
My best wish is to attend ideal university via learning math.	3.417	Highly Motivated
Math is not difficult to me.	3.417	Highly Motivated
I believe that I can master every topic in math class.	3.333	Moderately Motivated
I hope I can get higher grade in math than any other classmates.	3.250	Moderately Motivated
I like every topic and content in math class.	3.167	Moderately Motivated
I believe that I can understand the most difficult part in the math materials by my own.	3.167	Moderately Motivated
I want to get other people’s recognition so I want higher scores in math class.	3.083	Moderately Motivated
If I do not learn better in the math class, I believe it is my fault.	3.083	Moderately Motivated
As for math, I am competent to teach my classmates.	3.083	Moderately Motivated
In math class, I would like to have more projects and homework which will help me learn more, even though these will not improve my scores.	3.000	Moderately Motivated
In taking math exam, I will have negative thought that I am inferior than other classmates.	2.917	Moderately Motivated
In taking math exam, I am totally blank and cannot remember what I have learned before.	2.833	Moderately Motivated
If I could not understand topics in math class, that is because I did not work hard enough.	2.333	Low Motivated
<b>Overall mean interpretation</b>	3.47	Highly Motivated

The finding implies a high level of self–motivation toward problem-solving skills in learning mathematics among the students of Lumbo Integrated School. The data indicate that the student's problem-solving skills in mathematics are influenced by their self–motivation. Learners can be motivated to complete problem-solving tasks independently or due to task design. In this regard, [17] distinguished between task-elicited effort, which is related to the subjective difficulty of the task, and self-initiated effort, which is due to learners' drive. A prominent illustration of task-elicited effort is the entry study's long series of mathematics tasks [18]. The type of assignment design made people more willing to devote more time to studying. Even the discomfort experienced during the problem-solving activity decreased when a few slightly easier tasks were added to the beginning or finish of a challenging sequence of activities. Additionally, this outcome is consistent with the study's finding that students' motivation in mathematics is a crucial resource for ensuring the progression of their education [19]. The ability to solve problems and the right motivation can be utilized to predict a student's learning outcomes. This knowledge results from how teachers might use various mathematical materials to improve student's learning outcomes [20]. The role of the teacher and the atmosphere in the classroom have a significant impact on how motivated students are to work with math. Although motivation cannot be immediately seen, it can be thought of as a state, a sensation, or an event that prompts activity in the person. This circumstance keeps the activity alive and directs it in certain areas. When students can collaborate and discuss in groups while completing problem-solving tasks, their sense of affiliation is significantly improved [21]. It is stated that a pleasant learning atmosphere, when paired with hearing how others approach problems, has a favorable impact on classroom dynamics and that students who experience a positive learning environment tend to be more motivated [22]. Being a part of a group can thereby enhance students' learning because of the sharing of mathematical ideas.

*3.3 Correlation analysis of self-motivation on the problem-solving skills of Junior High School Students*

This section discusses the degree to which the *self-motivation* of the independent variable has an impact on students' *problem-solving skills the Junior High School Students*

**Table 3. Correlation analysis of self - motivation on the problem-solving skills of Junior High School Students**

Indicators	Correlation Coefficient	Probability
Self - Motivation	.827	.001

As shown in Table 3, correlation results show enough evidence at the 0.05 level to conclude that there is a linear relationship between students' self–motivation and problem-solving skills. Students' self–motivation of Problem-solving skills ( $r=0.827$ ) showed a highly significant relationship. The following are students' transcripts below.

**Interviewee 1:** “Motivated ko everytime mag solve ko kay gusto pa nako ma enhance akong skills sa math.”

(I am motivated to solve math problems because I want to enhance my solving skills in mathematics.)

**Interviewee 3:** “Math motivates me and makes me happy whenever makatuon kog new problems and solutions.”

**Interviewee 6:** “Yes, kay mao ning ako favorite nga subject. tapos mtap ko sa una.”

(Yes, because this is my favorite subject)

The results imply that students' problem-solving skills in mathematics are correlated with the self-motivation of the students. To promote learning and problem-solving, first, learners can contribute to better learning outcomes through motivation, goal orientation, learnings efforts, and self-efficacy. Second, the design of the learning environment can facilitate learning and problem-solving processes by adapting essential conditions such as difficulty, language, or learning aids [23]. Additionally, the study of [24]. They have demonstrated that when students are exposed to an intervention, their motivation for mathematics significantly changes. It has long been held that a student's motivation and learning methods are vital to academic success [25]. Problem-solving focuses on a defined procedure for completing a particular task. Solving mathematics problems using different techniques is also a trend nowadays [26]. This could be a valuable skill to teach to the students. As a result, mathematics teachers will be challenged to be more creative in their teaching and to think about different techniques that can be used to solve such problems, as well as ways to relate mathematical problems to students' everyday lives.

#### 4. CONCLUSIONS AND RECOMMENDATIONS

Students might become more conscious of their inner drive to improve their mathematical problem-solving abilities by researching the impact of self-motivation on students' problem-solving skills. Numerous elements that have an impact on students' learning can motivate them on their own. Therefore, when selecting appropriate assessments for the teaching and learning process, teachers should take into account these factors. Additionally, the institution's objectives for improving the problem-solving abilities of its students are focused on preserving their enthusiasm to learn and delivering excellent student-centered training.

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