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Research Article

Determinants that impact on students' problem-solving ability in mathematics education

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Abstract

One of the most challenging things a teacher needs to accomplish is making mathematics simple for students. Mathematics is a difficult topic, and it is hard to identify the difficulties that both students and teachers experience; therefore, teachers must develop techniques to identify these challenges. This study aimed to explore the key factors that influence students' problem-solving abilities in mathematics education. The participants were college students who were officially enrolled at the Philippine Integrated College Academy Foundation. The investigation in this study used a qualitative case study research style. The four reoccurring themes that came out of the case analysis formed the basis for this study's findings. The themes that emerged from the data were recalling mathematical formulas, a lack of comprehensive abilities, self-efficacy, and trouble with problem-solving. It is important that math teachers assist their students in building their self-esteem, cognitive abilities, and problem-solving skills because it is beneficial for them to comprehend concepts that are meaningful to them. This study advocates more meaningful explanations about determinants that are needed for students' mathematics problem-solving abilities and highlights the necessity for forming a learner-centered teaching and learning environment to develop problem-solving comprehension skills.

Keywords: Problem-solving ability; mathematics formula; comprehension skills; self-efficacy and problem-solving test.

Introduction

Direct Problem solving is an essential part of mathematics education since it appears to be the only vehicle for achieving all three of the ideals of mathematics such as functional, logical and aesthetic. The main goal of teaching students to answer mathematical problems is to help them have a general understanding of how to use arithmetic in real-world situations. It can also be applied as a teaching strategy to improve students' comprehension of concepts (Gurat, 2018; Baker et al., 2022; Mazana et al., 2023). Students'

problem-solving abilities in analyzing and understanding problems in mathematics have an impact on their mathematics problem-solving performance nowadays. Problem-solving ability is vital for students' academic success and has garnered widespread public interest as an important competency in modern society. For instance, higher secondary students' capacity for problem-solving and academic performances was examined by Kanmani and Nagarathinam (2017). The study concludes that making mathematics problem solving simple for students is one of the most difficult tasks for a teacher. Teachers must discover strategies to recognize these challenges because mathematics is a challenging subject and it is difficult to identify the obstacles that both students face (Altintas and İlgün, 2017). Furthermore, mathematics concepts introduced at the secondary and basic levels of the K-12 curriculum are increasingly challenging and difficult to understand (Mitten et al., 2021). Higher education is where more students have the most difficulty with it. For example, Simamora et al. (2019) in a study looked at ways to increase students' self-efficacy and ability to solve mathematical problems through guided discovery learning within the context of the local culture. According to the study's findings, math teachers should try to use quality learning resources and incorporate local culture into their lessons. Similarly, Limbong (2021) described problem-solving skills and higher order thinking through a problem-based learning model. The findings of this study demonstrated that the high-level thinking and problem-solving abilities of students might be enhanced by the use of a problem-based learning approach to mathematics instruction. Therefore, the study aims to answer the central research question: "What are the determinants influencing students' problem-solving ability in mathematics?" The following subordinate questions are looked at in order to provide a collection of descriptive cases that attempt to address the main research topic for this study.

1. What are the determinants that students believe to influence their problem-solving ability in mathematics?
2. How do the identified factors influence students' mathematics problem solving ability?

Literature Review

Problem-solving skills in mathematics are a tool for teaching children how to think critically to solve simple issues, particularly those that arise in everyday circumstances. The ability of learners to figure out mathematical issues is the key to efficient instruction in mathematics (Pimta et al., 2009). Solving issues from the subject matter is a way for learners to practice their problem-solving abilities while strengthening their thinking capacity critically. In mathematics, the ability to solve problems is regarded as the core of mathematics education since it demonstrates the development of cognitive abilities along with subject knowledge. As the techniques for solving mathematical problems are comparable to those for addressing common issues, learners may apply their knowledge and problem-solving abilities to be beneficial in everyday situations (Schommer-Aikins, 2005). Thus, teachers must focus on problem-solving in mathematics to help learners acquire these essential skills. Problem solving is a multifaceted and integrative task because the facts offered in the problem must be understood by the students. Additionally, it calls for the students to choose and employ cognitive processes and

techniques required for task accomplishment (Feudel and Unger, 2022). In everyday life and in the workplace, being able to solve problems can lead to great advantages. Solving a lot of problems is not the only way to develop the capacity and skill to solve difficulties. It benefits from gaining comfort and familiarity with various problem-solving approaches as well as from learning the thought processes involved in each of these techniques. When these procedures are understood and used, they can be learned and internalized (Pusmaz and Ozdemir, 2012). The capacity to solve issues, especially mathematical ones, can allow someone to develop their analytical skills and solve difficulties in different contexts, making it crucial for everyone. Therefore, students need to consider several determinants that assist them to build successful problem-solving ability in mathematics that broaden their general ability in solving problems.

One of the crucial elements that students must take into account if they want to improve their capacity for problem-solving ability in mathematics is the use of mathematical formulas. The fundamentals behind how the mathematical formulae function must be reviewed and understood by students in order for them to comprehend how the formulas were derived. Also, none of the students could understand the issue. For them to comprehend each problem, their mathematical comprehension skills must advance. The students also lacked faith in their ability to provide answers to queries and even solutions to each challenge. Since it influences how individuals feel about themselves and whether they are successful in reaching their life goals, they should place a high priority on self-efficacy. Lastly, despite having trouble understanding the questions, several students still tried to come up with answers.

Like recalling mathematics formulas, according to Nicolasa and Ematab (2018), students' problem-solving abilities, particularly in the areas of ordering/integrating and critical thinking, are improved more effectively by reading comprehension. Students could swiftly and easily solve the word problem if they acquired this competence. Students believed that most of the problems given to them were difficult in which they did not understand some of the problems. In answering problem solving test, students must have a comprehension skill to understand the problem and students should develop this kind of skills although it is not easy to acquire skills such as compression skills in mathematics. Improving comprehension skills in mathematics typically requires attention to the activities or process of developing concepts, building comprehension skills, and reading related materials. Thus, in order for students to learn mathematics, it is helpful for them to understand how to resolve verbal problems in context that are meaningful to them. Therefore, Akbaşl et al. (2016) state that one of the major influences on math or science achievement is reading comprehension.

Along with reading comprehension, students' mathematical self-efficacy should highlight their confidence in their capacity to succeed in mathematics. The study by Ayotola and Adedejib (2009) showed a significant correlation between mathematics achievement and mathematical self-efficacy. The goal of the study conducted by Siegle and McCoach (2007) was to raise students' self-efficacy and, in turn, their academic accomplishment. A variety of instructional strategies were used. Students also began to question if they had the necessary mental capacity to successfully complete the problem-solving test. The mental health of the students is a key factor in mathematics learning.

Self-efficacy in mathematics refers to a student's confidence in their capacity to overcome challenges or impediments in order to solve mathematical problems. Students must develop their sense of self-efficacy in order to succeed in mathematics because it is crucial for problem-solving. Higher mathematics self-efficacy students are better at solving problems accurately and quickly than lower self-efficacy students (Arifin et al., 2021). Students who have stronger self-efficacy succeed in mathematics because they perform intellectually better, are more motivated to continue in the face of difficulties, suffer from less arithmetic anxiety, and are more eager to study the subject (Watson, 2015). People who have higher levels of self-efficacy are more likely to handle challenging situations well. Students' capacity for solving mathematical problems is influenced by their level of self-efficacy, or confidence in their own abilities (Bandura, 2002; Hourigan and Leavy, 2022). The belief that one has in one's level, generality, and strength in diverse activities and circumstances of learning mathematics is known as one's mathematical self-efficacy. The teacher needs to take the student's sense of self-worth seriously (Simamora et al., 2019). Teachers must focus on self-efficacy through creating appropriate learning experiences in order to enhance students' abilities to learn mathematics (Ayotola and Adedeji, 2009).

Teacher behavior is a factor in guaranteeing that every student receives a high-quality education (Poisson, 2009; Russo et al., 2021; Olivaares et al., 2021). Teachers' interactions with students are directly impacted by the way they conduct themselves. Even more, how the teacher acts and how the class is run may have an impact on the students' motivation to go to school and their learning outcomes. In a study, Latterell (2008) concluded that a good person is an excellent teacher. An excellent teacher has a positive outlook on life, is content with him, is humorous, and enjoys interacting with others. An excellent instructor is adaptable. The word "flexible" is by far the most frequently used when describing effective teachers (Ozmantar and Agac, 2023). This quality consistently outshines all others when successful teaching is described in the research, whether directly or implicitly (the latter is most frequently the case). In other words, a successful teacher doesn't appear to be intellectually narrowed down by a single viewpoint or method. In order to fulfill the diverse requirements of his students, a competent teacher is aware that he cannot be one type of person and cannot adopt one style of instruction. They came to the conclusion that the following teacher traits made for better instruction.

Finally, expectations set by the teacher for the class are important. Only by being exposed to complex problems do students learn how to handle them. Instead of a sequence of easy activities that grew from a difficult activity, students need to have the chance to work on complicated problems. This is significant for developing the students' enduring mathematical knowledge and boosting their mathematical reasoning (Anthony and Walshaw, 2007). Teachers need to look at the formulas that support mathematical learning if they want to understand how students develop their problem-solving skills.

Methodology

Research Design

This research used qualitative case study methodology to examine student's problem-solving ability that impacts mathematics education in ungraduated level students. According to Creswell, (2013), case study research is a qualitative approach in which the

investigator explores a real-life, contemporary, bounded system (a case) over time through detailed, and in-depth data collection. In order to explore the factors influencing student's problem-solving ability in mathematics, the study employed a single case study design within a group of students (Merriam, 2015). Students were asked to provide basic ideas and criteria, which could be expressed in interview question. The evaluation method consisted of a one-on-one semi-structure interview with a few randomly chosen students from Philippine Integrated College Academy Foundation (PICAF). In order to gather information, the researchers used semi-structured interviews and basic qualitative case study criteria.

Participants

The participants of this study were the 10 (ten) College students who were officially enrolled at the Philippine Integrated College Academy Foundation (PICAF). The majority of the students from PICAF are graduates of the Ibn Siena Integrated School Foundation, where most of their students succeed in mathematics, hence this group of students was chosen for the study. On the basis of their grades in junior high school mathematics, the researchers, however, selected participants who were proficient in mathematics and those who were not. Students from PICAP were specifically sampled to serve as participants in this qualitative case study. Table 1 shows the background of each participant. To protect the confidentiality of participating students, the researchers used and assigned codes when quoting appropriate comments. The ensuing reporting of the interview data adopts a thematic analysis narrative method.

Table 1. General Background of the participants.

Students' Codes	Age	High School	Courses
Student A	18	RC-AKIC	BS Accountancy
Student B	20	Ibn Siena	BEED
Student C	19	Ibn Siena	BEED
Student D	19	Datu Mamintal NHS	BS Accountancy
Student E	20	RC-AKIC	BEED
Student F	19	PIS	BS Accountancy
Student G	18	Ibn Siena	BS Social Work
Student H	18	Ibn Siena	BEED
Student I	19	Ibn Siena	BEED
Student J	20	JPI	BS Social Work

Data Collection Procedure

This study used purposeful sampling. The instruments for data collection were semi-structured interviews. Merriam (2009) contends that the ideal approach to take when doing in-depth investigations on a small number of chosen people is interviewing. As building trust and transparency is the researcher's first concern, the researchers provided a brief introduction at the beginning of the interview before diving right into the questions. Each participant had a semi-structured interview that lasts 40 to 50 minutes. One of the investigators captured the participant interviews in video and audio formats,

and he later directly transcribed the recordings. The interviews were audio-video-taped rather than having respondents follow a script or taking notes while the interview was going on.

Data Analysis

After transcribing the audio recordings, the researchers watched the video recordings to include any body language or expressions that could aid in interpretation. The researchers coded all recurrent themes that emerged in the interviews using Microsoft Excel and a highlighter. To protect their privacy, the participants' identities were not be revealed in the transcripts; instead, a code name was given to them. Within 24 hours, the recorded interviews were transcribed. The goal of this quick transcription process is to give the researcher as much time as possible to familiarize with the data.

In addition, the researchers used line by line open coding to find patterns or codes in the transcripts of the interviews. Axial coding was used to examine the themes and codes and identify the motifs in the data. The highlighted themes were further examined in order to address the research questions. According to Charmaz (2006), the procedures involved in data analysis are cyclical and only serve to reveal new categories and themes. These steps include coding, theme identification, and data comparison.

The procedures were reviewed throughout time as part of the analysis, which is a continuous process; with each reading, a new level of analysis is attained. Thus, both the data analysis and the literature review took place simultaneously. The process of data analysis also informs the related literature that is required to be reviewed, even though the literature review help the researchers in observing specific aspects related to the topic under investigation during the analysis phase.

Results

As mentioned above, the article aims to examine students' problem-solving ability in mathematics education. The findings revealed that four recurring themes, like recalling mathematics formulas, lack of comprehension skills, self-efficacy, and problem-solving test difficulty, determined students' problem-solving ability in mathematics education. Each theme focuses on students' understanding and experiences of problem-solving ability in mathematics education. For instance, in theme one, students considered remembering mathematics formulas was one of the most significant determinants that influences students' mathematics problem-solving ability. Similarly, Students talked about how their lack of understanding abilities contributed to their inability to solve the mathematical problems discussed in theme 2. Thus, Self-efficacy and problem-solving test difficulty were the other two factors that influenced students' problem-solving abilities in mathematics education.

Theme One: Recalling Mathematical Formulas

The following comments are samples of what students said in response to the interview question about what factors affected their mathematical problem-solving skills. Their opinions and beliefs made it clear that remembering mathematical formulas is difficult.

Student A: *"I can't remember the formula in problem number 1 what will I use to solve the problem. I try my best to solve it"*

Student B: *"For me, some factors that can influence my problem-solving ability is to recall the formula"*

Student E: "*Based on my understanding, it's too hard to remember the formula and steps that I almost forgot.*

Student F: *"I think I am bad at remembering the formula especially in some formulas and examples. That's the first factor influencing my mathematics ability"*

Student G: "*One of the factors influence my mathematics problem solving ability is I can't remember the formula"*

Student I: "*I easily forget sometimes. If I cannot remember it, I easily give up. It takes time to remember the formulas."*

Recalling the formula is the main problems for the students. Even though they tried to recollect the formula, Students A and G found it difficult to do so. Student E forgot the formula, which made it harder for him to recall the processes for solving the problems. She would take time to recall the formula because, as a student, she prone to forgetting things. Student F believes that the reason she has trouble remembering formulas is because she is bad at memorizing them.

According to the students' responses above, it appears that they are prone to forgetting mathematical formulas, and that this is one of the main factors influencing their ability for problem-solving in mathematics. Due to the fact that math formulas are used in every aspect of our lives, it is important to understand them. Mathematical formulas have the purpose of simply and symbolically expressing information and they are the result of years of research. Despite being unable to recall the formula for the presented problem, Student B understood the value of formulas.

Student B: "*I was confused on how to solve the problem because I can't remember the formula. But we need to remember the formulas because they are important*."

Moreover, math formulas are very important in our career, they are frequently used in building, architecture, engineering, and other fields. Algebraic formulas are employed in the domains of computer science and financial planning. In medicine, drug dosage is calculated using algebraic formulas based on a patient's age and weight. Area, perimeter, and the Pythagorean Theorem are common geometry formulas used in the construction of various kinds of constructions or buildings. Students I also cannot remember the formula because she did not review her lessons. It is very important for students to review and understand the concepts behind how the math formulas work as it helps them to understand how the formulas were derived.

Student I: *"If I did not review the lesson, I cannot remember the formulas and how to solve the problem"*

Thus, it is clear that students always review the formulas in case a test question calls for their use. Whether they realize it or not, they need to use algebraic formulas to efficiently manage their schedule and complete their tasks.

Theme Two: Lack of Comprehension Skills

Comprehension skill is important because it affects the students' academic performance in all subjects where reading is the main source of information including mathematics. The second theme formulated from the excerpts of the students' beliefs to influence their

problem-solving ability in mathematics was lack of comprehension skills. For instance, student H and student A revealed that they did not understand the problem 1 and 2. Student H and decided to try to solve the problem based on her understanding and. Student A read properly the questions many times and analyzed to understand them.

Student H: *"Honestly, I really don't understand the question 1 and 2 so I decided to create my own formula based on my understanding"*

Student A: "*I read properly the questions many times and analyzed them but I still can't understand the problems especially the number 1 and 2 questions."*

Students frequently struggle with the abstraction process and the fundamental logical underpinnings of mathematical concepts during the mathematics learning process. The following responses are the samples of students' beliefs that were extracted from the interviews. Their views and beliefs revealed that it is students need to improve their comprehension skills in mathematics.

Student A: "*I read properly the questions many times and analyzed them but I still can't understand the problems especially the number 1 and 2 questions."*

Student B: "*When it comes to the factors of understanding, it is very hard for me to understand because I am a slow learner in mathematics, one of my weakness subjects"*

Student D: "*I struggle because I did not understand the problems that arise when time is extremely limited.*"

Student I: "*I can't understand the problem. My only solution if I can't understand it is to ask my teacher."*

The students are unable to comprehend the problem to the point where they have to read it more than once, not just twice. Even though they are familiar with half of the problems, their comprehension skills were put to the test with those problems because they did not understand some of them. Student A read and analyzed problems 1 and 2 numerous times, but she is still unable to grasp the problem. The statement made by Student B indicates that he is a slow arithmetic learner. He had trouble solving mathematical problems. Student D and Student I struggle to comprehend problems. If they did not understand the problems, they asked their teacher.

Math education aims to help students comprehend a range of issues. When we understand a problem, we are better able to recollect it, apply knowledge to fresh contexts, use concepts in novel scenarios, examine the issue from several perspectives, and explain the circumstance to others in a clear and understandable way. The importance of problem-solving in learning mathematics comes from the belief that mathematics is primarily about reasoning, not memorization. Student I struggle in understanding the problems. However, he would use social media sites like YouTube to understand the problems if given the chance.

Researcher: *Did you understand the problem in question number 2?*

Student I: *No sir.*

Researcher: *Why?*

Student I: "*Very hard, sir! I can't understand the question 2even if my classmates teach me.*"

Researcher: *What is your other option to understand the problem?*

Student I: *YouTube. I did not have enough time to watch it on YouTube. Whenever I get the chance, I watch it.*

Most of the students used internet to understand problems like You Tube or Google. Students used YouTube to solve and understand problems by watching videos. Despite not using real meetings, the discussion of mathematics on social media is more effective, overcoming the expenses and space restrictions. Social media has given rise to a new kind of relationship between teachers and students. Understanding a variety of problems is the goal of math education. When we comprehend a problem, we are better able to recall it, apply information to new contexts, apply concepts to unusual situations, look at the problem from many angles, and describe the situation to others in a way that makes sense. Students must master comprehension skills that aid in their understanding of the scenarios they are presented with in order to comprehend challenges.

Theme Three: Self-Efficacy

The third theme formulated from the responses of the students during interviews is self-efficacy. Some students solved problems during the administration of the problem-solving test. However, Students' beliefs about their answers and solutions were not confident enough to conclude that they have answered the problems correctly.

Student C: "*to be honest, I didn't learn that much because my problem-solving ability is very low*"

Student J: "*The factor considered that it made me think hard while solving the problem is I am not sure about my answer. I was not confident that my solution is correct.*"

They feel unmotivated to tackle issues that pertain to their interests. They believed that their answers weren't the right ones. This was anticipated as, although self-efficacy influences how people think, feel, motivate, and behave, the outcomes of an individual's behavior mostly depend on their views about how well they can perform in particular settings.

When students have self-efficacy, which has been found to effect physical and mental health, learning and accomplishment, career and job satisfaction, and family relations, they may take control of the circumstances that have an impact on their lives. The replies that follow demonstrate the representative sample of student beliefs that were gleaned from the interviews. Their opinions revealed that their beliefs about how well they could solve the difficulties on their own did not support their conclusion that they had.

Student J: "*The factor considered that it made me think hard while solving the problem is I am not sure about my answer. I was not confident that my solution is correct.*"

Student E: "*It made me think so hard while solving the problems but I don't trust my solutions, they are not correct.*"

Student C: "*to be honest, I didn't learn that much because my problem-solving ability is very low.*"

Student I: "*If I did not listen to the discussion, I cannot answer even one thing in the problem because I am not sure if I answer and the solutions, I write will be correct or not.*"

The students lacked confidence in their ability to respond to questions and even to present solutions to each problem. Student J gave a confident but unsure response. Student E strived to come up with a solution to the problem. He also lacked assurance in his answers and solutions. Student C thought that he did not learn much because his problem-solving skills are so poor. Student I is unable to answer because he feels he did not pay attention to the class discussion. Also, he was unsure about the accuracy of his solutions and responses. Some students are confident in their abilities to respond to questions and find solutions even though they have encountered difficulties, but when time is short, they abruptly halt to reflect and evaluate problems. Even though Student C despises math, he had trouble answering the problems but kept understanding them.

Student C: "*I struggle in solving but I often give up when I'm close to the answer, especially when I'm running low on time. I actually don't like math subject*"

Since it often develops as a result of the execution of their strongest beliefs, students occasionally need to practice their confidence, even if it's just a little bit of confidence. Confidence is having a strong belief in anything, whether it be positive or bad. Self-efficacy is having a strong, positive belief that pupils have the ability and skills to achieve goals. Researchers in psychology have discovered that people with lower levels of self-efficacy are more inclined to focus on failure than accomplishment. The importance of self-efficacy notions in determining a person's capacity to successfully manage financial concerns should therefore come as no surprise.

Theme Four: Problem-Solving Test Difficulty

The complexity of the tests or assessments given to students after each course in mathematics is one of their issues. This subject clarified the students' perceptions and insights into the problem-solving test that was administered to them. Despite the fact that the test's goal is to assess students' problem-solving abilities and their capacity to consider both positive and negative solutions to a problem, the majority of students claimed that the problem-solving portion was challenging.

Student A: *"I can't understand the questions, it is very hard. The hard question is number 1 and 3"*

Student G: "*sometimes the given problem is difficult to understand and others…"*

Student H: *"In question number 1, I think it is the permutation problem. To be honest it is hard for me"*

The problem-solving test required the students to provide solutions whether it is correct or not within the decided time. Problem solving is essential skill for students to progress toward achieving academic goals. It also entails the capacity to spot solutions to a variety of issues that present themselves as difficulties during any endeavor. Therefore, problem-solving abilities have an impact on our careers, whether we are the ones solving the problems for others or helping others do so. Table 2 shows students' beliefs about their problem-solving ability in mathematics.

The samples of student beliefs that were taken from the interviews are presented in the following student responses. Their opinions and beliefs demonstrated how difficult it is to understand the problem-solving test.

Student A: *"I can't understand the questions, it is very hard. The hard question is number 1 and 3"*

Student B: *"The factor that can also influence my problem-solving ability is that maybe in terms of the problem test because it is very difficult"*

Student G: *"sometimes the given problem is difficult to understand and others…"*

Student H: *"In question number 1, I think it is the permutation problem. To be honest it is hard for me"*

Student J: *"The problem questions are familiar to me but they are not clear or I cannot remember what the exact point is"*

Table 2. Sample of Student's beliefs that influence their problem-solving ability in mathematics.

Question	Students' response during interview	Themes of the students' response
What are the factors influence students' problem-solving ability in mathematics?	"I think I am bad at remembering the formula especially in some formulas and examples. That's the first factor influencing my mathematics ability" (Erah) "Based on my understanding on the test, it's too hard to remember the formula and steps. I totally forgot the formula" (Ayd)	Recalling Mathematical Formulas
	"Even I tried to understand the questions, I still cannot get it. If I try understanding the lesson it will never stay in my mind. It was like it absorbed and following time, I did not understand and even remember them again" (Hanie) "I read properly the questions many times and analyzed them but I still can't understand the problems especially the number 1 and 2 questions" (Maa)	Lack of Comprehension Skills
	"It made me think so hard while solving the problems but I don't trust my solutions, they are not correct" (Ana) "To be honest, I didn't learn that much because my problem-solving ability is very low" (Moha)	Self-Efficacy
	"I struggle because I don't understand the problems." "I find myself struggling with the problems as I almost finish the test. The test is very difficult and I hate math" (Oden)	Problem-Solving Test Difficulty

Although many students struggled to understand the questions but they still attempted to find solutions, and some of them discovered the right answer but failed to provide the appropriate solutions. During the interview, Students A and H admit that problem 1 is hard. Students B and H claimed that the problem-solving portion of the test is quite challenging. Student H guessed the first problem, which is a permutation, yet he still discovered the right answers and solutions. One of the most important subjects to teach is problem solving, even though the students did not understand the proper procedure. Students will gain an understanding of solving real-life problems and applying mathematics to real-world circumstances through problem-solving lessons. Student J

claimed that although the problems were known to him, he did not fully grasp the significance of them or the point being made. He was questioned on why it was not clear and how the problem had made things difficult. He responded:

Student J: "*I think the questions were really confusing. I need to review my vocabulary to understand the problem.*"

Every problem-solving test involves context, which students are expected to understand because doing so is necessary for picturing the actual problem. They should also be able to defend their solutions, talk quantitatively, and present strong mathematical justifications. Nonetheless, educators should support and facilitate their pupils' learning. Effective teachers encourage their students to communicate their ideas orally, in writing, and using a variety of representations. As what student D expressed:

Student D: "*Math subject is one of the subjects that I don't like but sometimes I love it the way I understand the discussion. If I don't understand the discussion of the teacher, I lost my interest to listen that's why I don't understand the problem.*"

Sometimes students' weak or malfunctioning mathematical skills prevented them from understanding the problem because they were under stress at the time. Even when they have some thoughts, they don't even read or analyze each problem.

Student F: "*I have difficulty of understanding the questions because these past few days, I was stressed out because of some tasks I have to do and also the outcome of my performance on grade in some of my subjects. But some of the problems are familiar to me, so it is not so hard to answer the problem but I think I am not just quite sure that my answers are correct.*"

Discussion

The present study takes a step forward in addressing one of the most problematic issues in mathematics teaching by explaining mathematics students' experiences and understanding of problem-solving ability in mathematics education. The students' statements highlighted that recalling mathematical formulas is the first factor that students believed that they influenced their mathematics problem solving ability. The theme provides insight into the students believe on how the formulas in mathematics is important in answering problem solving in which they cannot recall the formulas. The students cannot recall that fact or a rule written with mathematical symbols. It is important to teach and to review the students the basic formulas in mathematics particularly in Algebra and Geometry. This finding is consistent with the previous study by Altintas and İlgün (2017). The study concluded that teachers should promote the usage of formulas in order to stop students from choosing the simple solution and to change students' perceptions of how formulas work into more rational and educational ideas. Instead of simply imposing a formula on students, teachers should construct formulae alongside them to encourage thinking. Therefore, understanding how students perceive formula and rule, the concepts that typically come to mind first when it comes to mathematics, especially what formulas and rules are permanent in their minds, how their relationship with mathematics is perceived, and what students think about these concepts are necessary for establishing mathematics education programs and the teaching strategies to be used by teachers (Altintaş and Lgün, 2017).

Like recalling mathematics formulas, reading comprehension skill is very important in answering mathematic problem-solving ability. Students must understand the problem and must be familiar with the words or vocabulary used in the problem. Lack of comprehension skills emerged as the second issue from the student's views that affected their ability to solve mathematical problems. The ability for comprehension is crucial since it influences students' academic success in all areas, especially mathematics, where reading is the primary source of information (Nicolasa and Ematab, 2018).

According to the responses of the students, it appears that the majority of them lacked confidence in their ability to solve mathematical problems. Their ability for problem-solving is insufficient for them to carry out tasks and be successful. In order to become self-effective, they must also build their self-confidence. To increase the self-confidence of the students, parents and teachers must send a supportive message. Thus, students should value self-efficacy since it affects how they feel about themselves and whether or not they succeed in achieving their life goals. Thus, Bandura (2002) claims that a person's self-system, which consists of their attitudes, skills, and cognitive capacities, includes self-efficacy. This system has a significant impact on how we perceive and react to various situations.

It can be concluded that the mathematics teacher supports the students' growth in self-assurance, understanding abilities, and problem-solving skills in light of the findings. It is beneficial for them to comprehend concepts that have personal significance to them. Before beginning the lessons, the math teacher should review the students. The concepts underlying mathematics must be reviewed and understood by students. Last but not least, math instructors should use specialized teaching strategies that can hasten student learning and present tests that students can correctly answer.

Conclusion

Philippines is still working to offer a top-notch math education, expanding its teachers' teaching methods to suit the needs of the adult students. Therefore, it is significant to understand relevant determinants that contribute to undergrade engineering students' problem-solving ability in mathematics education. However, there is a need for learning communities within the mathematics teaching-learning strategies to lead and design appropriate classroom teaching lessons to maximize the output of students' problem-solving abilities so that engineering students can build their skills to compete the future needs. Thus, to prevent any obstacles from impeding the development of students' problem-solving skills, teachers and curriculum designers must create the necessary strategies to boost students' confidence and comprehension.

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