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ATTITUDE AND PROBLEM SOLVING IN STUDENTS IN THE 5TH GRADE OF SECONDARY EDUCATION OF A STATE EDUCATIONAL INSTITUTION

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ABSTRACT

This study aimed to determine the relationship between students' attitudes toward mathematics and their problem-solving skills among fifth-grade secondary students at a public educational institution in Trujillo, Peru (2025). A quantitative approach was employed using a non-experimental, cross-sectional correlational design. The sample consisted of 340 students selected through probabilistic sampling. Data were collected using a 20-item Likert-type attitude scale and a 20-item objective problem-solving test. Instrument validity was established through expert judgment (Aiken's V = 1.00), and reliability analysis showed high internal consistency (Cronbach's $\alpha = 0.876$ for attitude; $\alpha = 0.721$ for problem solving). Results indicated a strong positive correlation between attitude and problem-solving skills ($r = 0.878$, $p < 0.01$). Additionally, significant correlations were found between problem solving and the cognitive ($r = 0.849$), affective ($r = 0.861$), and behavioral ($r = 0.858$) components of attitude. These findings suggest that students' attitudes toward mathematics play a substantial role in their ability to solve mathematical problems. The study highlights the importance of fostering positive cognitive, affective, and behavioral dispositions to improve mathematical competence.

KEYWORDS: attitude toward mathematics, problem solving, secondary education, correlational study, educational psychology

1. INTRODUCTION

Attitude is a critical factor in personal growth and development. Its determination is not influenced by external factors; rather, it is shaped by internal processes. According to Sandua (2004), an individual's beliefs, values, and experiences have a profound impact on their cognitive, emotional, and behavioral processes. These factors, in turn, shape the individual's response to the external environment, thereby influencing their actions and interactions with their surroundings.

Regardless of one's perspective on the educational field, the attitude is foundational. Indeed, as Gairín (1990) asserts, the improvement of the individual is inextricably linked to their manner of being and their relationship with the environment.

Bustillos' (2020) research findings indicate that a significant proportion of students, specifically 70%, exhibit a negative attitude toward mathematics, a subject in which failure is a possibility. Dissatisfaction with the subject has been demonstrated to engender demotivation and disinterest in learning, thus impeding adaptation to the learning needs and styles of the student.

The act of problem solving provides an opportunity to assess and refine one's reasoning abilities, devise novel procedures, and refine observational skills, encompassing both induction and deduction. Furthermore, problem solving fosters the enjoyment derived from the fruits of these intellectual pursuits. In essence, problem solving enables the exploration and discovery of new domains of knowledge (Fernández et al., 2003). The resolution of mathematical problems has been demonstrated to engender a number of benefits, including the promotion of critical and reflective thinking, the development of one's own capacities, the encouragement of self-learning, originality, creativity, flexible thinking, a willingness to face challenges, the search for solutions to understand the world and oneself.

In the context of the international arena, the PISA (Program for International Student Assessment) assessment reveals that Mexican students demonstrated performance levels that were below the OECD (Organization for Economic Cooperation and Development) average in the domains of verbal language, mathematics, and science. Recent findings have indicated that 1% of students exhibit a high level of competence, categorized at levels 5 or 6. This percentage is consistent with the OECD average of 16% and 35%, respectively. However, the remaining 99% of students do not attain the minimum competencies at level 2 in the three core areas, as reported by the OECD with an average of 13%. This outcome underscores the significant impact of social and economic inequality on reading, mathematics, and science performance. An analysis of the variation in mathematical performance in PISA 2018 reveals a 11% discrepancy in Mexico, in comparison to 14% in other countries and 12% in the variation of performance in science, as opposed to 13% due to these factors. The Organization for Economic Cooperation and Development (OECD, 2019)

In the La Libertad region, he asserts that, for every 10 students in the 4th year of Primary, 7 demonstrate an inability to comprehend text, and in the domain of rational mathematics, a mere 2 students exhibit proficiency in problem-solving. In secondary school, among 10 students aged 2 years, 9 do not comprehend the material they read and are unable to solve mathematical problems due to a lack of educational resources and the prevalence of affective relationships in the home environment, which are factors that promote school dropout (Peruvian Institute of Economics [IPE], 2019).

In the contemporary social landscape, there is an increasing emphasis on the academic and professional development of young individuals. Consequently, many children experience a sense of apprehension regarding their ability to attain commendable academic outcomes. A lack of strength in these areas is evidenced by subpar understanding, analysis, reasoning, explanation, criticism, and problem-solving skills. The objective of this research is to analyze the relationship between attitude and problem-solving in secondary education.

1.1. Problem statement

What is the relationship between attitude and problem solving in fifth-year students of Secondary Education of a State Educational Institution" Trujillo – La Libertad - 2025?

1.2. Background

In his 2020 study, "Attitudes and the Link with Academic Performance in Mathematics in Secondary School Students at U.E. Los Pinos," Bustillos examined the relationship between attitudes and academic performance in mathematics in secondary education. The study's overarching objective was to investigate the association between attitudes toward mathematics and academic performance in the subject. Bustillos employed a quantitative approach, characterized by a correlational and descriptive nature, in his 2020 study. This methodological decision precluded the implementation of an experimental design. The population of the study included 360 students ranging in age from 12 to 17

years, with a sample of 53 students from the first year of secondary education, 63 students from the third year of secondary education, and 64 students from the fifth year of secondary education. The findings indicated that 70% of the participants exhibited a negative attitude toward mathematics, articulating their dissatisfaction with the subject matter and the pedagogical approach employed. Moreover, 38% of the participants demonstrated inadequate academic performance, suggesting that the students did not attain sufficient knowledge in the domain. This phenomenon can be attributed to transient and non-consolidated learning processes. In conclusion, in order to achieve the relevant transformations in the construction of knowledge, the attitudinal part related to the area that is oriented or evaluated should be considered. Therefore, if the teacher's explanation proves to be inadequate, it will have a detrimental effect on the student's learning process, engendering an attitude of either affinity or aversion toward mathematical tasks.

1.3. National Background

Gallegos (2019) conducted a study entitled "Attitude toward Mathematics and the Resolution of Algebraic Problems in Students of Secondary Education at the JCM Application of the UNA in Puno." The primary objective of this study was to ascertain the correlation between students' attitudes toward mathematics and their proficiency in solving algebraic problems. The investigation was conducted among secondary school students at the JCM in Puno, Peru, using the UNA application. Methodologically, the quantitative approach was considered, with a descriptive and correlational design that included intentional sampling. The sample population comprised 128 students, representing 40% of the total enrollment. The findings indicated a highly statistically significant relationship ($p < 0.01$) and an inverse proportional relationship (Rho = -0.255), as determined by Spearman's Rho correlation analysis. The study's findings indicate that the attitude toward mathematics among high school students is optimal when utilizing the "JCM" application developed by UNA – Puno. According to the most recent data, 32.7% of students exhibit a favorable attitude toward mathematics, attaining an emotional equilibrium that is 32% of the population. In contrast, 28.1% of students do not regard themselves as mathematically inclined, yet they maintain trust in their aptitudes and dispositions.

Similarly, Quiza (2019) conducted a study entitled "Attitude towards Mathematics and Problem Solving of Students in Teacher Training at the Faculty of Education Sciences." The primary objective of this study was to ascertain the correlation between students' attitudes toward mathematics and their problem-solving abilities in the context of teacher training at the Faculty of Education Sciences of the UNAP. A study was conducted with the entire cohort of students enrolled in the first semester of the 2018-2019 academic year in the Department of Education Sciences. In this study, the specific section or part that was the focus of the investigation was not clearly delineated. The study's methodological framework is characterized as non-experimental, descriptive, analytical, and correlational. The findings indicate a very high degree of relationship ($r = 0.736$) and a very high level of significance (0.00) between the two variables, as determined by Spearman's rho test. The study sought to ascertain the correlation between the behavioral attitude toward mathematics and problem-solving aptitude within the context of the Faculty of Education Sciences. The correlation coefficient is $r = +0.566$, which indicates an average positive relationship between the variables.

1.4. Local Background

In the local context, Villanueva's (2019) study, entitled Attitudes and Mathematical Problem Solving in Secondary Education Students, contributes to the existing body of research. The objective of the study was to identify the correlation between attitudes towards mathematics and the resolution of mathematics problems in third grade students of the Secondary School of the I.E.P.M. Gran Mariscal Ramón Castilla in Huanchaco in 2018. The quantitative methodology employed was of a descriptive-correlational nature. The population of the study comprised a total of 105 students, divided into one section of women and four sections of men from the third grade of secondary school. The collection of data was facilitated by a scale called "ESAHMAT," which contains 57 items. The study applies Spearman's correlation (0.55) and significance (psig.<0.05) to posit the hypothesis that the attitude toward mathematics is associated with the resolution of mathematics problems in students of 3rd grade at the Secondary School of the I.E.P.M. Gran Mariscal Ramón Castilla in Huanchaco in 2018. The findings of this study indicate a moderate positive correlation. The findings of the study indicated that the third-grade students of the I.E.P.M. "Gran Mariscal Ramón Castilla" demonstrated an intermediate level of proficiency in mathematics, with 54% of the students exhibiting such proficiency. Additionally, 46% of the students displayed a high degree of proficiency, while 48% expressed satisfaction with their mathematical abilities. Furthermore, the analysis revealed that 47% of the students exhibited a degree of proficiency in problem-solving in mathematics.

1.5. Justification

The objective of this research is to explore the development of attitudes and the attitudes of the student towards mathematics, with a focus on problem solving in fifth-year secondary school students. The purpose of this study is twofold: first, to examine the attitudes of students regarding the area; and second, to identify the elements that affect their disposition and motivation to understand mathematics.

The results obtained from this study allow for the rethinking of various strategies and the implementation of significant adjustments that promote a positive and proactive attitude in students towards mathematics. These attitudes, which encompass the cognitive (conceptual conception and critical thinking), affective (emotions and feelings of the subject) and behavioral components, are essential to improving not only one's ability to solve math problems, but also the educational climate in the classrooms during classes.

In practice, the methods, techniques, and instruments employed during the research, having demonstrated validity and reliability, establish a substantial foundation that can be used in subsequent research. The implementation of this initiative will facilitate the exploration of novel pedagogical approaches and the cultivation of a culture of research and analysis from a comprehensive perspective. These efforts are expected to contribute to a substantial enhancement in educational orientations.

Objectives

2. GENERAL

To determine the relationship between attitude and problem solving in fifth-year high school students of a state educational institution, Trujillo-2025.

A. Specific

To establish the relationship between the cognitive component and problem solving in fifth-year high school students of a state educational institution, Trujillo-2025.

To establish the relationship between the affective component and problem solving in fifth-year secondary school students of a state educational institution, Trujillo-2025.

To establish the relationship between the behavioral component and problem solving in fifth-year secondary school students of a state educational institution, Trujillo-2025.

B. Hypothesis

Alternate hypothesis

H1: There is a relationship between attitude and problem solving in fifth-year secondary school students of a state educational institution, Trujillo-2025.

Null hypothesis

H0: There is no relationship between attitude and problem solving in fifth-year high school students of a state educational institution, Trujillo-2025

2.1. Attitude

2.1.1. Theory

The consistency approach posits that the theory of balance is predicated on the idealism of individuals who must maintain a coherent relationship between beliefs, behaviors, and different attitudes to preserve psychological well-being. In addition, an attempt is made to elucidate the manner in which individuals attain consistency. Of these, cognitive dissonance will be the primary focus due to its prevalence in the social sciences. This phenomenon occurs when an individual attempt to rationalize an inconsistency rather than acknowledge it. This theory posits that behavior is not predictable based on attitude; rather, changes in behavior modify attitudes to adjust them to the former. This is due to the principle that the greater the incentive, the greater the change in attitude (Cabrera et al., 2022).

2.1.2. Definitions

Morales (2006) posits that attitude functions as an intermediate variable, serving as a link between environmental stimuli and subsequent responses. This variable not only facilitates the connection between these two elements, but also allows the response to be observable and, to some extent, measurable. In this context, it is imperative to comprehend the role of the variable in influencing individuals' responses to stimuli, as it has the capacity to impact both the intensity and the nature of the response.

Gómez (2000) posits that this phenomenon is both a positive and a negative trend, seeking to determine the personal purposes that influence behavior. This predisposition exerts a profound influence on our aspirations, objectives, actions, and behaviors.

According to Martinez and Pallí (2004), attitude is defined as a predisposition to behave in a certain way in the face of a situation or social object. This predisposition is influenced by a multitude of elements, including cultural norms, prior

experiences, and responses that guide interactions and decisions in various social circumstances.

2.1.5. Components

From the perspective of Vázquez et al. (2022), it considers the following components of attitude.

A. Cognitive component

This concept pertains to the information possessed by the individual regarding the attitude. This phenomenon is associated with the principles and knowledge that the individual acquires. The concept of "object" in this context encompasses the perceptions, ideas, strikes, and beliefs that an individual possesses regarding that particular entity. It also refers to the beliefs, thoughts, and knowledge that influence an individual's predisposition to act in a certain way.

It is imperative in the formation and maintenance of attitude, as it represents the most rational dimension of processing information and the development of judgments or values that are perceived based on stored memory or acquired data from the environment.

B. Affective component

This concept introduces an association between the formation of an attitude and the expression of positive or negative feelings, thereby influencing the perception of an object. This component is of critical importance, as attitudes are not merely cognitive evaluations; they are also emotional responses that influence the student's behavior.

Frequently, human decisions and actions are driven more by feelings than by rational judgments. The affective component is associated with subjective responses that can be deliberate, in the sense that they are the generation of favorable or unfavorable inclinations to any phenomenon.

C. Behavioral component

This component is defined as the tendency to act as a consequence of previously generated feelings. These elements encompass the subject's intentions and behaviors in relation to their attitudes. This phenomenon is further characterized by its adaptability, whereby the manifestation of the trait may fluctuate in accordance with the contextual or situational factors experienced by the individual. The relationship between behavior and attitude can be direct due to various factors, including social norms, expectations, and other influences that enable behavior to serve as a predictor of future actions. It is widely regarded as a foundational element in comprehending the way in which human beings engage with their surroundings and are impacted by cognitive, emotional, and social elements.

2.2. Troubleshooting

2.2.1. Definition

According to Rey (2003), it is a group of organized tasks that go sequentially and logically, aimed at generating effective solutions to a specific problem. This process involves detecting the problem, collecting new information, and exploring various alternatives. Each stage is designed to progressively move toward resolution, ensuring that different perspectives and approaches are considered.

2.2.2. Problem

According to Azinián (2000) it is a circumstance where the individual challenges the knowledge he has, interrogates and alters it by creating new knowledge, but assuming an emotional mobility of the intellect, an active behavior, the joy of discovery. All knowledge is a solution to different situations or circumstances.

According to House et al. (1983) it is a circumstance that implies an objective to be achieved where there are limitations to achieve it since it requires deliberation, and it is based on the lack of knowledge of the algorithm important to solve the problem.

Solving a problem involves a multifaceted process that is considered fundamental: Formulate clearly and precisely, try different approaches and solutions, start from mistakes, develop models, develop specific languages, ideas, suggest solutions, face the solutions, support, debate them and reconsider if necessary. Mathematical intelligence - logical, spatial, verbal, interpersonal and introspective, merge when solving mathematical problems.

2.2.3. Importance

According to Fernández et al. (2003), the process of problem-solving has been shown to engender a number of significant benefits. These benefits include the promotion of critical and reflective thinking, an increase in confidence in one's own abilities, encouragement of self-directed learning, and the cultivation of originality and creativity. Furthermore, problem-solving fosters the search for solutions, as well as a comprehensive understanding of the world and oneself. The adoption of constructive attitudes toward mathematical activities can facilitate lifestyle planning through problem-solving.

According to Diaz (2004), the role of the calculator is twofold: it serves as a medium for comprehending, assimilating, and expressing mathematical concepts, while also functioning as a tool for applying mathematical principles in real-life contexts. It is widely regarded as the most efficacious method for

the acquisition of mathematical knowledge.

Problem solving is a multifaceted process that can be rife with challenges, potentially resulting in feelings of discouragement. In order to overcome the aforementioned obstacles and achieve learning, it is imperative to recognize the fundamental role of patience and effort in addition to mathematical knowledge and heuristic strategies.

2.2.4. Problem-solving strategies

Based on problem solving, Pólya (1989) considers the following strategies:

A. Understanding the Problem

In order to address this issue in an adequate way, it is imperative to pose the following key inquiries: The objective of this study is to identify the unknown. What are the data? It is imperative to ascertain the nature of the entity in question and its current state. In the course of this inquiry, students are expected to articulate the problem in clear and precise terms. This stage is widely regarded as one of the most arduous to navigate, as novice youth frequently endeavor to articulate procedures prior to attaining the requisite proficiency to execute them in a manner that engenders complications.

It is imperative that students allocate time for reflection to ensure that they possess a comprehensive understanding of the problem before proceeding. This will facilitate the development of a more effective and organized approach to problem-solving.

B. Devise a plan

In this problem-solving phase, Pólya proposes that the student identify problems analogous to those currently encountered. This strategy facilitates comprehension of novel challenges and enables the identification of patterns and effective approaches from prior experiences.

It is imperative that students take a moment to contemplate the various strategies that could be employed, such as the creation of diagrams or the decomposition of the problem into more manageable components.

C. Implementation of the plan

By confirming the adequacy of the plan of attack, which has undergone a process of elaboration and structuring, the subsequent results must be executed and observed. The execution of plans is a dynamic process that demands attention and adaptability. It is a vital step in achieving favorable outcomes in any challenge that arises.

D. Examine the solution obtained

The solution to this problem is contingent upon a thorough examination of the solution that is reached. This is the juncture at which the knowledge obtained is recognized, its pertinence is assessed, and its implementation in novel circumstances is acknowledged. It is at this juncture that critical and creative problem-solving skills are cultivated.

3. METHODOLOGY

3.1. Population, sample and sampling

Population

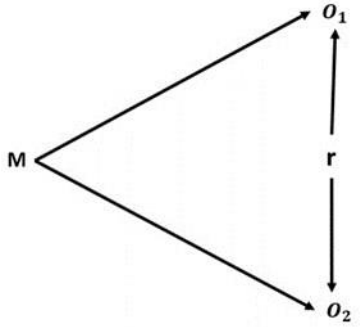
According to the work of Ñaupas (2014), a subgroup is defined as a part of a universe or population that is selected through various methodologies, with the objective of ensuring the representativeness of the universe. The decision was made to implement a simple probabilistic sampling method, which allows for the selection of a subgroup from the total population.

The sample population for this study comprised 340 students in the 5th year of secondary education.

In order to facilitate the analysis of the data, the focus was placed on the 340 students who participated in the application of the instrument. Students who moved, withdrew, or did not attend were excluded from the analysis.

3.2. Contrast design

The study uses a correlational design, employing a cross-sectional approach to address the research questions:



Where:
M: Sample
O1: Variable One
O2: Variable Two
r: Correlation of both variables

3.3. Data collection instruments

According to Idelfonso (2005), the survey is a strategy for collecting information based on an objective, logical and articulated set of questions that guarantee that the data provided by a sample can be

examined through quantitative data, while the results are applied with certain errors and confidence to a population. Malhotra (2004) states that the questionnaire refers to the formal group of questions that seek to collect information from the survey participants.

A. Attitude scale

The technique used to collect data was a survey and the instrument was a questionnaire. To measure the attitude variable, a questionnaire designed to evaluate the levels of attitude was applied. This instrument was adapted from the instrument developed by Ramos and Ruelas (2019) that consisted of 21 items taking into account the components: cognitive, affective, and behavioral. The instrument adapted to this research was made up of 20 items aimed at determining the level of attitude where the score was based on the Likert scale considering the corresponding grades of 1,2,3,4 and 5, at the same time having the options such as: Never (N), Almost never (CN), Sometimes (A), Almost always (CS), Always (S).

The validity of the instruments was established through the examination of 3 specialists in the area, who thoroughly evaluated their content and relevance. To support these judgments, Aiken's V test was performed, achieving a value of 1.00, reaffirming the reliability and solidity of the instrument used in the research. To measure reliability of the instruments, Cronbach's Alpha was used. In the first variable, the reliability was 0.876, where it was classified as a very reliable instrument.

Table: Levels of the attitude variable

	Intervals	
Levels	**Minimal**	**Maximum**
Casualty	20	46.7
Regular	47.7	73.3
Loud	74.3	100

Source. Own elaboration

B. Problem solving

It was used as a technique to collect information for the evaluation. The tool for collecting data was the objective test. According to Medina et al. (2023), the objective test is an assessment tool to assess the degree of learning based on knowledge, skills, and competencies in an objective and systematic way. An objective test consisting of 20 questions was used, each graded between values 0 and 1. Likewise, to evaluate the test scores and identify the degree of problem solving, the following levels were taken into account: beginning, process, achieved and outstanding.

To validate the instruments, it was carried out through the judgment of three specialists in the field, who meticulously evaluated their content and relevance. To support these judgments, Aiken's V test was applied, resulting in a value of 1.00 in both instruments, which reaffirms the reliability and solidity of the instrument used in the research.

Reliability with Cronbach's Alpha was also measured on the instruments. The first variable, reliability, was 0.721, where a reliable instrument was cataloged.

Table: Levels of Problem Solving

	Intervals	
Levels	**Minimal**	**Maximum**
Beginning	0	10
Process	11	13
Accomplished	14	17
Outstanding	18	20

Fountain. Own elaboration

3.4. Data processing and analysis techniques

Descriptive statistics will be used as a technique for information processing.

According to Alvarado and Obagi (2008), descriptive statistics are defined as the set of techniques used to examine, detail, and interpret data obtained about a given phenomenon of interest. The primary objective of descriptive statistics is to inform decision-making, draw conclusions, or formulate hypotheses.

The data collected regarding attitudes and problem-solving skills were meticulously organized in Microsoft Excel software, assigning a grade for each item to each student. The total score of both variables was entered into the SPSS V25 program to determine the normality test, resulting in a normal distribution where the parametric test would be used. The Shapiro-Wilk test was employed due to the

sample size of 34 students. The test stipulates that when the sample size is less than 50, the Pearson correlation test must be used.

Subsequently, tabular and bar charts were generated to ascertain the frequency distribution in relation to the degrees of attitude and problem-solving, based on the programs achieved.

4. RESULTS

Table 1: Levels of attitude of 5th grade students

Levels	fi	%
Low	0	0%
Middle	170	50%
High	170	50%
Total	**340**	**100%**

Note. Data from the application of the instrument to fifth grade students of Secondary School

In Table 4, according to the attitudinal scales shown, we see that 50% are at a medium level and 50% at a high level.

Table 2: Levels of Problem Solving of 5th grade students

Level	**Frequency**	**Percentage**
Beginning	10	3%
Process	50	15%
Accomplished	200	59%
Outstanding	80	24%
Total	**340**	**100%**

Note. Data collected after the application of the instrument to fifth grade students

In Table 5, we can see that the students are at a beginner's level 3%, in process 15%, in achieved 59% and outstanding 24% in problem solving.

4.1. Normality test

Table 3: Normality Attitude and Problem-Solving Test

		Kolmogorov-Smirnova	
Attitude	**Statistical**	**Gl**	**Gis.**
	0.170	340	0.071
Troubleshooting	0.165	340	0.067

Of the attitude, using Kolmogorov-Smirnova as a test, the p-value is 0.071 and in Problem Solving a p-value of 0.067; values that are greater than 0.05, so both variables have a normal distribution; taking into account the normal distribution, Pearson's correlation will be used.

4.2. Hypothesis Testing General Hypothesis

H1: There is a direct and significant relationship between attitude and problem solving in fifth-grade students of Secondary Education of a State Educational Institution, Trujillo-2025.

H0: There is no direct and significant relationship between attitude and problem solving in fifth-grade students of Secondary Education of a State Educational Institution, Trujillo-2025.

Table 4: Correlation between the variables Attitude and Problem Solving

		Attitude	**Resolution of Problems**
Attitude	Pearson correlation Sig. (bilateral)	1. 000	0,878 0.000
	N	340	340
Problem Solving	Pearson correlation Sig. (bilateral)	0,878 0.000	1.000
	N	340	340
	The correlation is significant at the 0.01 level (bilateral).		

In the seventh table, it is evident that Pearson's correlation coefficient attained a value of 0.878, indicating a strong positive correlation. Moreover, the bilateral significance value is p = 0.000, which is less than 0.01. This finding indicates that the null hypothesis is rejected and the alternative hypothesis is accepted. A clear correlation between attitude and problem-solving skills has been demonstrated in the fifth year of secondary education.

4.3. First specific hypothesis

Table 5: Problem Solving and Cognitive Dimension Correlation Test

		Cognitive dimension	Resolution of Problems
Problem Solving	Pearson correlation Sig. (bilateral)	1.000	0,849 0.000
	N	340	340
Cognitive dimension	Pearson correlation Sig. (bilateral)	0,849 0.000	1.000
	N	340	340
	The correlation is significant at the 0.01 level (bilateral).		

In the eighth table, Pearson's correlation coefficient of 0.849 is evident, indicating a robust positive correlation. Moreover, the bilateral significance value is p = 0.000, which is less than 0.01. This finding indicates that the null hypothesis is rejected and the alternative hypothesis is accepted. It is hereby asserted that the act of problem-solving is intrinsically linked to the cognitive dimension of the attitude of the fifth-year section A of the secondary school of the I.E. Marcial Acharan and Smith, Trujillo – 2023.

4.4. Second specific hypothesis

Table 6: Correlation of Problem Solving with the Affective Dimension

		Affective dimension	Resolution of Problems
Problem Solving	Pearson correlation Sig. (bilateral)	1.000	0,861 0.000
	N	340	340
Dimension Affective	Pearson correlation Sig. (bilateral)	0,861 0.000	1.000
	N	340	340
	The correlation is significant at the 0.01 level (bilateral).		

Source: Authors, using SPSS Software V.25

As illustrated in Table 9, the observed correlation coefficient is 0.861, indicating a high degree of statistical significance. Furthermore, the bilateral significance value is p-value = 0.000, which is less than 0.01. This result indicates that the null hypothesis is rejected and the alternative hypothesis is accepted. It is hereby asserted that the act of problem-solving is inextricably linked to the affective dimension of the attitude of students in the fifth year of secondary school.

4.5. Third specific hypothesis

Table 7: Correlation of Problem Solving and the Behavioral Dimension

		Behavioral dimension	Resolution of Problems
Problem Solving	Pearson correlation Sig. (bilateral)	1.000	0,858 0.000
	N	340	340
Behavioral dimension	Pearson correlation Sig. (bilateral)	0,858 0.000	1.000
	N	340	340
	The correlation is significant at the 0.01 level (bilateral).		

In Table 10, Pearson's correlation coefficient is found to be 0.858, indicating a robust and significant positive correlation ($p < 0.01$). This outcome rejects the null hypothesis and supports the alternative hypothesis. It can be posited that the act of problem-solving is associated with the behavioral dimension of the attitude of fifth-grade students enrolled in secondary school.

5. DISCUSSION

The objective of the study was to ascertain the relationship between attitude and problem-solving skills in a sample of five secondary school students from I.E. Marcial Acharan and Smith Trujillo (2023). The findings, obtained through a thorough processing and analysis using Pearson's correlation test, yielded a significant result of 0.948. This indicates that the relationship between attitude and problem-solving skills is statistically significant at the 0.00 level, which is lower than the assumed error rate of 1%. The study concluded that there is a substantial relationship between attitude and problem-solving skills.

The result obtained in this study aligns with the findings of Quiz (2019), indicating a correlation between attitudes toward mathematics and problem-solving abilities in teacher training students at the Faculty of Education of the National University of the Altiplano of Puno. The analysis employed Spearman's Rho correlation coefficient, which yielded a value of 0.666, with a bilateral significance

level of 0.00. This result falls below the assumed error margin of 1%, indicating a high degree of reliability and statistical significance.

In a similar vein, my analysis of de Palomino's work (2018) revealed a significant correlation between students' attitudes toward mathematics and their proficiency in solving arithmetic problems. This correlation was further substantiated by the application of the Spearman's Rho correlational coefficient, which yielded a value of 0.779, with a bilateral significance level of 0.00. This finding indicates that the observed variation is less than the assumed error of 1%, thereby substantiating the reliability and validity of the study's findings.

The present study finds notable parallels with the findings of Villanueva (2019). An investigation was conducted to ascertain the relationship between students' attitudes toward mathematics and their performance in mathematics problems in third grade secondary school students at the I.E.P.M. Gran Mariscal Castilla. The study employed the Spearman's Rho correlational coefficient, which yielded a value of 0.555, with bilateral significance set at 0.00. This finding is notably lower than the assumed error of 5%.

The initial specific objective is to ascertain the relationship between the cognitive component and problem-solving abilities in 5th grade secondary school students of the I.E. Marcial Acharan and Smith Trujillo-2025. This determination is informed by the findings derived from the analysis and evaluation of data utilizing the Pearson test, which revealed a correlation coefficient of 0.849. The bilateral significance value was determined to be 0.00, falling below the 1% error rate threshold. These findings indicate a statistically significant relationship between the cognitive component and problem-solving abilities in the study population.

Quiza (2019) sought to ascertain the relationship between cognitive attitudes toward mathematics and problem-solving abilities among students enrolled in the teacher training program at the Faculty of Education. To this end, Spearman's Rho correlational coefficient of 0.613 was employed, with bilateral significance set at 0.00. This approach yielded a result that fell below the assumed error margin of 1%.

Palomino's (2018) study also revealed a significant correlation between the cognitive dimension and the problem-solving skills of primary school students in Villa El Salvador when solving arithmetic problems. This correlation was measured using Spearman's Rho correlational coefficient, which yielded a value of 0.703. The statistical significance of this coefficient was determined to be 0.00, which is less than the assumed error of 1%.

The second specific objective is to establish a correlation between the affective component and problem-solving skills in fifth-year secondary school students at Marcial Acharan y Smith High School in Trujillo in 2023. Following the data processing and analysis with the Pearson test, a correlation coefficient of 0.861 was obtained, with a bilateral significance of 0.00. This finding indicates a lower than the assumed error rate of 1%, thereby supporting the hypothesis that there is a relationship between the affective component and problem-solving skills.

Palomino (2018) posited that the affective dimension toward mathematics is associated with the problem-solving skills of primary school students in Villa El Salvador who articulated arithmetic problems in 2018. This assertion was supported by a Spearman's Rho correlational coefficient of 0.744, with bilateral significance of 0.00, resulting in a p-value less than the assumed error of 1%.

Villanueva (2019) posited that the affective component toward mathematics is associated with the resolution of mathematics problems in third grade secondary students of the I.E.P.M. Gran Mariscal Castilla. This association was determined using the Spearman's Rho correlational coefficient of 0.045, with bilateral significance set at 0.00. This analysis yielded a result that falls below the assumed error of 5%.

An evaluation was conducted to ascertain the correlation between the behavioral component and problem-solving skills in fifth-grade students enrolled at the I.E. Marcial Acharan and Smith Trujillo secondary school. The findings, derived from the thorough data processing and analysis employing the Pearson test, yielded a correlation coefficient of 0.858, accompanied by a bilateral significance level of 0.00. This result is notably lower than the assumed error rate of 1%, thereby substantiating the established connection between the behavioral aspect of attitude and problem-solving proficiency.

Quiza (2019) discovered a correlation between students' behavioral attitudes toward mathematics and their problem-solving skills. This correlation was identified through the implementation of a Spearman's Rho correlational coefficient of 0.566, with bilateral significance set at 0.00. This analysis yielded a result that falls short of the assumed error of 1%.

Villanueva (2019) identified the behavioral aspect in the resolution of mathematics problems in third-grade secondary school students of the I.E.P.M. Gran Mariscal Castilla, as evidenced by Spearman's Rho

correlational coefficient of 0.50 and a bilateral significance of 0.00, resulting in an error margin of less than 5%.

One of the most salient limitations encountered during the research process pertained to the temporal constraints imposed on the application of the designated tool for the purpose of information collection.

6. CONCLUSIONS

It was determined that there is a strong relationship between students' attitudes and their problem-solving abilities in the fifth year of secondary education at the Marcial Acharan and Smith Secondary School in Trujillo, as evidenced by data collected in 2023. Furthermore, the findings demonstrated a bilateral significance (0.00), indicating a substantial relationship and statistical significance with Pearson's parametric test of (0.948). The present study corroborates the hypothesis that attitudes are associated with problem-solving abilities.

It was determined that the cognitive component exhibits a strong correlation with problem-solving skills among 5th grade secondary school students at the I.E. Marcial Acharan y Smith, Trujillo-2025, with a bilateral significance of 0.00. The Pearson's correlation coefficient was determined to be 0.849, thereby supporting the research hypothesis that posits a relationship between the cognitive component and problem-solving abilities.

It was determined that the affective component exhibited a high degree of correlation with problem-solving skills in fifth-grade secondary school students from the Marcial Acharan and Smith Trujillo-2025 secondary school. This finding was supported by both a bilateral significance of 0.00 and a Pearson parametric statistic of 0.861. These results provide substantial evidence that validates the research hypothesis proposing a link between the affective component and problem-solving abilities in this specific population.

It was determined that the behavioral component exhibited a strong correlation with problem-solving skills among 5th grade secondary school students at the I.E. Marcial Acharan and Smith Trujillo-2025 institution, with a bilateral significance of 0.00 and a Pearson's parametric statistic of 0.858. This finding substantiates the research hypothesis proposing a relationship between the behavioral component and problem-solving abilities.

The results obtained affirm the validity of the research hypothesis, thereby substantiating the notion that attitude is indeed associated with problem-solving capabilities.

6.1. Recommendations

It is suggested that the EI carry out studies related to the attitude to mathematics and problem solving in order to achieve the training process of competencies and capacities considering problem solving.

The principal and teachers are recommended to measure the relationship between attitude and problem solving taking into account the components of the attitudes: cognitive, affective and behavioral, and then work on improving the less developed component by the student without neglecting the other two, where the attitude towards problem solving will be evidenced.

The principal and teachers are recommended to have an active listening to the various problems or phobias that the students have since the learning of the student depends on it.

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