

## ANALYSIS OF CREATIVITY DEVELOPMENT PROGRAM TO SOLVE THE PROBLEMS BASED ON INTELLIGENCE QUOTIENT IN STUDENT LEARNING PROCESS

Akhmad Ramli<sup>1</sup>, Anugriaty Indah Asmarany<sup>2</sup>, Samuel PD Anantadjaya<sup>3</sup>,  
Irma M Nawangwulan<sup>4</sup>, Budi Mardikawati<sup>5</sup>

<sup>1</sup>Program Studi Manajemen Pendidikan Islam, Universitas Islam Negeri Sultan Aji Muhammad Idris Samarinda

<sup>2</sup>Program Studi Psikologi, Universitas Gunadarma

<sup>3</sup>PMI Business School

<sup>4</sup>Prodi Manajemen Perhotelan dan Pariwisata, IULI-International Univ Liaison Indonesia

<sup>5</sup>Prodi Manajemen Transportasi Jalan, Politeknik Transportasi Darat Bali

*e-mail:* akhmadramli@uinsi.ac.id

### Abstrak

Tujuan dari penelitian ini adalah untuk menguji seberapa kreatif siswa memecahkan masalah yang berkaitan dengan IQ mereka. Metodologi penelitian kuantitatif digunakan dalam penelitian ini. Siswa merupakan populasi penelitian. Purposive sampling digunakan dalam penelitian ini, dan total 100 siswa dilibatkan. Dalam penelitian ini statistik deskriptif digunakan untuk menguji data yang dikumpulkan dari instrumen tes kemampuan pemecahan masalah kreatif siswa. Berdasarkan hasil penelitian dapat disimpulkan bahwa kemampuan pemecahan masalah kreatif berada dalam kategori sedang, artinya sebagian besar siswa dapat mengidentifikasi informasi yang paling relevan dengan solusi masalah yang ingin dipecahkannya, mengklasifikasikan masalah dan menghubungkannya dengan informasi yang ditemukan, mengidentifikasi berbagai ide yang dapat menjadi solusi dari masalah yang ingin dipecahkan, dan memilih berbagai solusi yang mempunyai potensi terbesar dalam menyelesaikan masalah. Kemampuan pemecahan masalah kreatif siswa masuk dalam kategori tinggi. Jadi berdasarkan hasil analisis tes ANOVA, kecerdasan intelektual (IQ) siswa berpengaruh terhadap kemampuan kreatif pemecahan masalah pada materi pembelajaran.

**Kata kunci:** Pemecahan Masalah, Kreatif, Intelligence Quotient, Siswa

### Abstract

The purpose of this study is to examine how creatively pupils solve problems in relation to their IQ. Quantitative research methodologies are employed in this study. Students made up the study's population. Purposive sampling was used in this study, and a total of 100 students were involved. In this study, descriptive statistics were used to examine the data collected from the test instrument for students' creative problem-solving ability. Based on the research results, it can be concluded that creative problem-solving ability is categorised in the medium category, meaning that most students can identify the information that is most relevant to the solution to the problem they want to solve, classify the problem and connect it with the information found, identify various ideas that could be a solution to the problem they want to solve, and select different solutions that have the greatest potential for solving the problem. Students' creative problem-solving abilities is categorised in high category. So based on the results of the ANOVA test analysis, students' intelligence quotient (IQ) influences their creative problem-solving abilities in learning materials.

**Keywords:** Problem Solving, Creative, Intelligence Quotient, Students

### INTRODUCTION

Education is a process of humanism, known as humanizing humans. Therefore, we must be able to respect everyone's human rights (Khairani & Reflina, 2020). In other words, students are not human machines that can be controlled at will, but they are a generation that we must help and care for in every mature reaction so that they can develop independence, critical thinking, moral attitudes, and kindness (Layali & Masri, 2022). That is why education not only forms humans who are different from other characters who can eat and drink, dress, and have a house to live in, but is said to humanize humans (Shinta et al., 2019). Such is the importance of education in the efforts of its members to destroy the poverty of the nation's life, improve the standard of living at all levels of society, and build the dignity of the state and nation; therefore, the government is trying to give serious attention to overcoming various problems in the field of improving education, starting from the first level of

elementary, middle, and tertiary (Sulasih et al., 2021). This attention is demonstrated by providing a very meaningful budget allocation as well as making policy regulations related to improving business quality (Setyawati et al., 2023). What is even more important is to continue to make breakthroughs and innovate various kinds of efforts to create opportunities for citizens and the general public to receive teaching from all levels of educational units (Solehati et al., 2022). Since developing a nation's quality is primarily dependent on the teaching and learning process. The more the quality of education improves, the more advanced the nation will be (Amelia & Setyawati, 2023).

Learning is an effort to create conditions that can maximize student participation in the learning process (Setyawati, 2023). Learning is an activity related to knowledge and the environment that is organized systematically to facilitate student learning (Astuti & Setyawati, 2022). We can conclude that learning is the result of the instructor's efforts to encourage or assist students' learning as well as their position as the catalyst for acquiring knowledge (Pramudito et al., 2023). Mathematics is one of the subjects that is crucial to Indonesia's educational objectives (Pramudito et al., 2021). Thinking logically, analytically, and methodically is possible through the use of mathematics, which paves the way for the creation of knowledge based on the framework and foundation of mathematical thinking (Pramudito, 2021). Most people agree that mathematics is the most difficult subject in the classroom (Pramudito, 2022). Nonetheless, as it is the most crucial instrument for resolving issues in daily life, everyone should understand it (Henky Hendrawan et al., 2023). Even though the language of mathematics is actually a language of symbols that is strong, rigorous, accurate, abstract, and meaningful, learning difficulties in mathematics are typically caused by a lack of understanding of language and symbols, an inability to apply formulas, and a failure to understand the meaning and ideas of symbols (Senoaji, 2021).

Mathematics is one of the subjects taught in formal education institutions and is an important part of efforts to improve the quality of education (Senoaji et al., 2023). Mathematics lessons are lessons that cover many concepts. Concepts are abstract ideas that allow us to classify objects as examples or non-examples (Novita & Senoaji, 2022). Mathematical concepts are interrelated. The relationship between one material concept and another is proof of the importance of understanding mathematical concepts (Senoaji & Sari, 2023). Thus, students cannot understand the material if they have not understood the previous material or the prerequisites for the learning material. Due to the abstract nature of mathematics, many students still find it difficult (Seto et al., 2023). In fact, one of the causes of failure in learning mathematics is that students do not understand mathematical concepts or misunderstand mathematical concepts (Utomo et al., 2023). Misunderstanding of information when conveyed at one level of education can lead to misunderstanding of basic knowledge at a higher level of education (Utomo, 2023). This is because mathematics is an interconnected subject. Difficulties in learning are seen in problems that are not always easy to solve or find (Puspitoningrum, 2015). Problem solving is one of the abilities that students must master after studying. From a curriculum standpoint, one of the learning objectives is problem solving. The five key competency criteria of mathematical thinking processes in education are representation ability, problem-solving ability, reasoning ability, connection ability, and communicative communication ability (Puspitoningrum & Rahmayantis, 2018). Poor problem solving is a reflection of low student quality, which is brought on by this low capability. This is due to the fact that learning hasn't given kids the chance to practice problem-solving skills thus far (Wahdiniawati et al., 2014).

Solving problems is one of the mathematical skills that students need to possess. One of the learning objectives that students need to meet is the ability to solve problems. Problem-solving ability refers to a person's efforts to achieve goals because they do not have an automatic solution that can immediately solve the problem. A problem has a goal, namely what the problem solver is trying to get to achieve the goal (Pandiangan et al., 2023). Problem solving is an individual or small group activity that is most efficient when carried out cooperatively with free opportunities for discussion. The reality found in schools shows that students' problem-solving abilities are still relatively low (Marjoni et al., 2015). Students are less able to complete problem-solving questions. When the teacher asks students to solve problems, students are less able to solve them. This question is a problem that requires further thought to solve. In learning, teachers never orient students to everyday problems that are close to students' lives and do not pay attention to students' problem-solving abilities (Isnaida et al., 2022).

One typical way to think about problem solving is as a process, an objective, and a fundamental ability. The purpose of teaching problem solving is related to the causes behind it. According to this interpretation, problem solving is devoid of any unique content, procedures, or solutions. The solution to the problem is the primary concern, which is why mathematics is taught. The process of solving

problems involves pupils taking strategic steps, paying attention to procedures, and finally being able to locate answers to questions rather than just the answers themselves (Isnaida et al., 2022). In addition to the challenges associated with problem-solving skills, the capacity for creative thought can give rise to novel concepts or tangible products, either alone or in conjunction with preexisting elements, all of which are essentially distinct from previous forms. There are four characteristics of creative thinking abilities: originality (creating something new); fluency (smoothness, getting many ideas down); flexibility (changing perspectives easily); and elaboration (developing another idea from an idea). However, problems were also found with creative thinking abilities. Indonesian students still lack creativity and imagination. Students often express that mathematics is a difficult subject (Syahril & Yenita, 2021).

Students' creative problem-solving skills remain low, according to test results from earlier studies. This is due to the fact that the teaching strategy does not enhance students' problem-solving skills because it focuses more on teaching students how to answer questions than how to pose them. In addition, because there is no interaction between teachers and pupils, the learning process is teacher-centered and requires simply listening, which makes it less active and uses several senses. It is clear from this that students' mathematics creative problem-solving skills have not improved and are still low (Marjoni et al., 2015). Therefore, in order to improve students' low mathematical creative problem-solving skills, adequate learning is required. Students' creative mathematical problem-solving abilities can be improved by learning that can make students provide active, communicative responses and good activities in the learning process (Pandiangan et al., 2023).

Factors that influence students' creative problem-solving abilities in solving various problems, especially questions in the form of stories. Students have difficulty solving questions in the form of stories. Based on the results of an interview with one of the teachers, students' ability to solve problems in the form of solving story questions in everyday life is still low. It is easier for students to solve questions that only apply formulas without having to read story problems. They argue that students tend to be lazy about reading story problems, so they have difficulty solving the questions. And students really experience difficulties when they are given story questions. Other factors that influence creative problem-solving abilities are external and internal factors within the student, one of which is the student's intelligence quotient (IQ). A person's average IQ value can change; this change is influenced by the role of education and the influence of the environment on increasing intelligence (Isnaida et al., 2022). The IQ of students in this study can be classified into three categories: students with IQ below average (80–89), IQ average (90–109), and IQ above average (110–119). Various efforts have been made by the government to improve the quality of education in Indonesia. But the results so far are still not encouraging. IQ is not a complete measure of intelligence. IQ can be used to see creativity and the results of understanding students' problem-solving abilities, thus enabling teachers to design interesting activities in line with their students' abilities to solve a problem. So, it is very important for the teacher's ability to create questions as well as develop materials and creative problem-solving teaching materials for students to apply in everyday learning (Syahril & Yenita, 2021). This makes students accustomed to doing creative problem-solving on material that they find difficult to understand.

## METHOD

Quantitative research methodologies are employed in this study. Based on the positivist ideology, quantitative research methods are techniques used to study specific populations or samples, gather data with research tools, and analyze quantitative or statistical data in order to evaluate preconceived notions. Students made up the study's population. A sample is a portion of the population that is representative. Purposive sampling was used in this study, and a total of 100 students were involved. Written examinations, intelligence quotients (IQ), interviews, and documentation were all used in the data collection for this study. The story problem type was the test utilized in this study to assess students' capacity for creative problem-solving. The non-test instrument in this research is an interview guide, which consists of questions related to the answers given in the test of students' creative problem-solving abilities. The type of interview used in this research is an unstructured interview. To determine a person's level of intelligence, you can use a test instrument, which we usually know as the IQ test. Documents in this research include photos and videos of research activities, results of researchers' interviews with students, and test results of students' creative problem-solving abilities. In this research, the results of student data collection from the test instrument for students' creative problem-solving abilities were analyzed using descriptive statistics.

## RESULTS AND DISCUSSION

Based on the results of the research conducted, results were obtained that showed that the average score for students' overall creative problem-solving abilities was 59, which was centered in the medium category. It is known that creative problem-solving abilities in this research are divided into three groups, namely the high, medium, and low groups. This indicates that each student has a different level of creative problem-solving ability. This is in line with previous research, which shows that students' problem-solving abilities vary, giving rise to differences in the way they deal with problems, including students' creative problem-solving abilities. Problem-solving activities need to be increased in the learning process so that students' creative problem-solving abilities will be increasingly honed. Apart from that, the highest average score for the third indicator is identifying various ideas that can be a solution to the problem you want to solve, with a score of 67, which is classified as in the medium category. This means that most students can understand the parts of proving a story problem and distinguish between basic steps and conclusions. And for the other three indicators, two indicators have the same category, namely medium in the second and fourth indicators, and one indicator has a low category in the first indicator. This means that some students still make mistakes when testing their creative problem-solving abilities. The student's answer to solving question number three on the first indicator is a low indicator. The student has completed the question correctly, but there is still no information or writing down the information in the question. From the results of the interview, it is known that this happened because they just wrote the answer straight away, and there was no conclusion to this answer. This shows that students are able to solve questions on the indicator of identifying the information most relevant to the solution to the problem they want to solve, with an average score of 4 and a score of 49, belonging to the medium category.

The student's answer to completing question number 6 on the second indicator is the medium indicator. The student has answered the question correctly and has included the information he knows. At the end of the student's answer, they also include their conclusion, and the answer is in accordance with what was asked. This shows that students are able to solve questions based on the indicators of classifying the problem and connecting it with the information found. The average score is 5 with a score of 63, which is in the medium category. This is supported by the results of interviews conducted by researchers with students, obtaining information that students are confident with the answers given so that they can be sure that they can answer the questions with their own understanding. students' answers in solving question number 5 on the third indicator, namely the high indicator. The student has answered the question correctly, but they did not include the known information in the question. Based on interviews, it is known that this happens because students are not used to writing back the information in the questions. This shows that students are able to solve questions on the third indicator, namely identifying various ideas that can be a solution to the problem they want to solve, with an average value of 6 and a value of 67.3, which is in the medium category.

Students' answers in solving question number four on the fourth indicator, namely the medium indicator. The student has completed the question correctly, but there is still no information or has rewritten the information in the question. The calculations to find Pythagoras are correct, and at the end, the answer provides a solution, but the conclusion does not match what was asked for. This shows that students are able to solve problems based on the indicators of choosing different solutions that have the greatest potential to solve the problem. The average score was 4.6 with a score of 59, belonging to the medium category. From the results of the interview, it was discovered that this happened because the student was in a rush for time, so they immediately wrote down the answer and gave a lack of explanation. This shows that students are able to solve questions on the medium indicator well but are still not complete in presenting their answers. From the explanation above, the researcher concluded several things regarding creative problem-solving abilities in solving story problems based on high, medium, and low indicators, which have the same category, namely the medium category.

Intelligence is an individual's potential in the form of a certain measure of capacity for receiving and responding to stimuli from outside and within, which will be managed using reason (ratio) to determine reactions in their behavior. The intelligence quotient (IQ) influences an individual's intelligence in solving problems and needs to be solved appropriately. The results of the research show that the average value of intelligence quotient (IQ) as a whole is 98, which is centered on the average in the medium category, meaning that most students have a fairly good intelligence quotient (IQ). It is known that the intelligence quotient (IQ) of students in this study is divided into three categories,

namely high (above average), medium (average), and low (below average), taken from Wechsles' theory. This means that each student has a different intelligence quotient (IQ). Furthermore, the average creative problem-solving ability in story problems in terms of intelligence quotient (IQ) with a high category has an average value of 68. From these results, it can be seen that students in the high category are in the creative problem-solving ability category in the medium category, namely between 42 and 70. This means that students in the high category are still in the medium category in terms of their creative problem-solving abilities in terms of intelligence quotient (IQ) in identifying the information that is most relevant to the solution to the problem they want to solve, classifying problems and connecting them with the information found, identifying various ideas that can be the solution to the problem you want to solve, and choosing different solutions that have the greatest potential to solve the problem.

The average creative problem-solving ability in terms of intelligence quotient (IQ) has a medium average of 58.2. From these results, it can be seen that students in the medium category are in the medium creative problem-solving ability category, namely between 42.4 and 70.6. This means that students in the medium category are still in the medium category in terms of their creative problem-solving abilities in terms of their intelligence quotient (IQ) in identifying the information that is most relevant to the solution to the problem they want to solve, classifying problems and connecting them with the information found, and identifying various ideas that can be solved. Be the solution to the problem you want to solve, and choose different solutions that have the greatest potential to solve the problem. The average creative problem-solving ability in terms of intelligence quotient (IQ) has a low average of 45.7. From these results, it can be seen that students in the low category are also in the medium creative problem-solving ability category, namely between 46.2 and 70.6. This means that students in the low category are still classified as medium in their creative problem-solving abilities in identifying the information that is most relevant to the solution to the problem they want to solve, classifying the problem and connecting it with the information found, identifying various ideas that can be a solution to the problem they want to solve, and choosing different solutions that have the greatest potential to solve the problem.

The findings of the one-way variance analysis test indicate a significant value of 0.008, indicating that there is a relationship between students' IQ and their capacity for creative problem-solving. This indicates that among the variables that can enhance creative problem-solving skills is intelligence quotient, or IQ. The findings of earlier studies, which indicated that people with an intelligence quotient (IQ) could respond to inquiries based on the stages of problem-solving abilities, further support this. The outcomes of the students' work also demonstrate that they are able to meet all of the problem ability indicators. These indicators include the capacity to grasp the problem by outlining what is known and what is being asked, develop a solution, solve the problem, and double-check the solutions. The findings of additional studies, which show that IQ significantly improves pupils' capacity for problem-solving, further support this. The ability to understand, which is connected to the capacity to recognize patterns in an issue and the significance of these patterns for resolving the problem, can be represented by a student's IQ.

## CONCLUSION

According to the research findings, creative problem-solving ability is classified as being in the medium category, which means that the majority of students are able to classify the problem and make connections with the information they have found, identify different ideas that may be a solution to the problem they are trying to solve, and choose among several solutions that have the best chance of working. Based on the findings of the conducted research, scientists might make the following recommendations: Students are expected to be able to attempt to maintain and improve creative problem-solving abilities based on intelligence quotient after learning the level of these abilities based on solving story problems. This will help them deal with challenges and solve problems more effectively in their studies and in their daily lives. Being able to support, encourage, and educate pupils will enable them to have a high IQ and a strong desire to learn, which will prevent them from giving up quickly and from struggling in any circumstance. During learning activities, teachers should try to help pupils become more adept at addressing creative problems. It is advised to conduct further research on creative issue-solving skills based on intelligence quotient in word problem solving as it may be more beneficial for other abilities. And it is hoped that future researchers can research other soft skills that influence creative problem-solving abilities based on intelligence quotient in solving story problems.

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