

Profile Of Students' Creative Thinking Skills And Science Literacy In Science Learning At SMP N 12 Pekalongan

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Abstract

Abstract: Based on the results of the PISA study in 2022, it shows that the literacy level of Indonesian students is still far from the global education average. PISA also examines students' creative thinking abilities which shows that only 5% of Indonesian students are considered proficient in creative thinking. This shows that the level of creative thinking ability of Indonesian students is at a very low score. This research aims to describe the profile of students' creative thinking skills and scientific literacy of class IX students at SMPN 12 Pekalongan in science learning for the 2023/2024 academic year. The research subjects were 25 students in class IX of SMP N 12 Pekalongan. The research method used is descriptive quantitative by collecting data using essay test questions which are explained based on indicators of creative thinking skills and scientific literacy. Data was analyzed using descriptive statistical analysis. The average research results for students' creative thinking skills were 47% so they were categorized as sufficient. Based on the indicators, fluency of 56% was categorized as sufficient, flexibility/flexibility of 44% was categorized as good, authenticity/originality of 48% was categorized as sufficient and detail/elaboration of 52% was categorized as sufficient. Scientific literacy results obtained an average of 36% so it is categorized as sufficient. Based on the indicator of the scientific knowledge aspect, the result was 52% in the sufficient category, the result for the understanding of science aspect was 52% in the sufficient category and the result for the attitude towards science aspect was 56% in the good category. The results of creative thinking skills and scientific literacy at SMP N 12 Pekalongan are still in the sufficient category, so it is necessary for teachers to analyze the profile of students' creative thinking skills and scientific literacy in science learning in order to improve their creative thinking skills and scientific literacy to be better or very good.

Keywords: Creative thinking; Scientific literacy; Science Learning

How to Cite:

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1. INTRODUCTION

Students are required to be able to compete and follow the flow of globalization and be able to innovate and be skilled in the learning process. With these demands, students must have the skills of 21st century learning skills which are known as the term 4Cs where one of them is creativity thinking skills, 4C skills are also closely related to science literacy skills. Because science literacy is a skill that is also needed in the 21st century (Pertwi et al, 2018). This is in line with the opinion of Suciati et al. (in Zuhara et al., 2019) who stated that, "one of the keys to success in facing the challenges of the 21st century is science literacy. Individuals who are literate in science are

expected to be able to use scientific information to solve problems in daily life.

The profile of creative thinking and science literacy of students can be known using assessment to find out the extent of students' science literacy and creative thinking skills. As has been done by the Organization for Economic Cooperation and Development (OECD) through the PISA program to find out students' knowledge abilities and scientific attitudes in daily life. The concept of an independent curriculum develops literacy skills as one of the components of assessment, so educators must be able to design and develop various assessment instruments that

are feasible to measure it (Syazali, M., & Putra, G. P. (2023).

Students' abilities related to creative thinking skills are able to adapt to the future through exploration, inquiry, discovery and problem-solving in the learning process (Sunaryo, Y, Puspita L et al, 2013,2018). Creative thinking skills also improve the knowledge skills to come up with and develop new ideas, new ideas as a development of pre-existing ideas and the skills to solve problems divergently (from various perspectives). Creative thinking skills include four aspects, namely: (1) fluency, (2) flexibility, (3) originality (originality of thinking), (4) elaboration (Putra, et al, 2016).

Science literacy is the ability of students to use scientific knowledge, identify questions and describe evidence based on conclusions to be able to understand and help make conclusions about nature and changes to nature due to human activities (PISA, 2010). The measurement of students' science literacy ability is measured from 3 aspects, namely aspects of science knowledge, understanding of science and attitudes towards science. Measuring science literacy is important to find out how much students are tired of the science concepts they have learned (Fuadi et al, 2020).

Previous science literacy research with the title "Science literacy profile of junior high school students in the city of Purwokerto reviewed from the aspects of content, process and science context (Mufida Noviana, 2017: 77-78) shows that the average percentage of science literacy skills of Purwokerto junior high school students is still low in 3 aspects of science literacy, namely the content aspect of 53.80%, the Process aspect of 44.038%, and the context aspect of 35.08% in the study of data collection with the answers of the student science literacy test. From the results of the students' answers, it can be a

clue about mapping students' abilities and quality in science learning (IPA).

The research on creative thinking skills is based on the previous research entitled "Profile of creative thinking ability and improvement of cognitive learning outcomes of junior high school students through a STAD-type cooperative learning model (Riski Mulyani and Yudi Kurniawan, 2014: 117-124) showing the achievement of aspects

Fluency of 5% high, 80% medium and 15% low, flexibility aspect of 55% very creative, 15% above average and 30% average, Originality aspect of 25% very creative, 35% above average and 40% average, elaboration aspect of 0% special, 0%, very creative, 15% very good above average, 30% above average and 15% average. Data collection in the study was carried out using pre-test and post-test tests. The results of the study show that the creative thinking ability is in the good category.

Research on science literacy and creative thinking based on a previous study entitled "Science Literacy and Creative Thinking Profile of Students of SMP Negeri 11 Pekalongan (Dianita Rokhmiati Ning, et al, 2020) described that science literacy skills with indicators of understanding phenomena were 53%, identifying scientific problems 53%, explaining scientific phenomena 57%, using scientific evidence 79% and applying science concepts personally, social and global by 64%. And when viewed from the ability to think creatively, students describe the fluency indicator of 49%, flexibility of 80%, originality of 75%, detail/elaboration of 56%.

Based on the problems that have been presented above to improve creative thinking skills and science literacy, students can use the level of inquiry learning model (S. Zulaichah, et al. 2019). The purpose of this study is to find out the profile of creative thinking skills and science literacy of students of SMP Negeri 12 Pekalongan. The results of this study are expected to provide information about the initial

ability of skills creative thinking and science literacy of students of SMP N 12 Pekalongan.

2. METHODOLOGY

This study uses a method in the form of quantitative descriptive, which aims to describe the achievement of the profile of creative thinking skills and science literacy of SMPN 12 Pekalongan students. The sampling technique using random sampling was carried out on grade IX students of SMP N 12 Pekalongan with a total of 25 students consisting of 10 boys and 15 girls. The instruments used are creative thinking test instruments in the form of questions with checklist answers and science literacy in the form of multiple-choice questions. The creative thinking test consists of 4 aspects, each of which has 5 questions so that the total number of questions is 20. Meanwhile, the science literacy test consists of 3 aspects of which the number of questions is 13. Each question is scored with a score of 1-4 with each criterion per indicator. Then the score of the student's answer is calculated on average. These results are then used to group students' creative thinking skills and science literacy. The criteria can be included in the predicate of very good to very poor according to the rules of Arikunto (2010) as follows: 81 – 100 % = Very good; 61 – 80 % = Good; 41– 60 % = Enough; 21– 40 % = Less; and 0-20 % = Very less. Then an average analysis of each indicator was carried out to find out the achievement of each indicator on students' creative thinking ability and students' science literacy.

3. RESULTS AND DISCUSSION

Research conducted in the 2023/2024 school year at SMP N 12 Pekalongan on grade IX students obtained an average result of 47% of students' creative thinking skills, including the sufficient

Tabel 1. Kategori Tingkat Kemampuan Berpikir Kritis Siswa

No.	Kategori	Persentase Skor (%)
1	Sangat rendah	$X \leq 24,95$
2	Rendah	$24,95 < X \leq 41,65$
3	Sedang	$41,65 < X \leq 58,35$
4	Tinggi	$58,35 < X \leq 75,05$
5	Sangat tinggi	$75,05 < X$

category. The description of the percentage of creative thinking skills can be seen in Table 1.

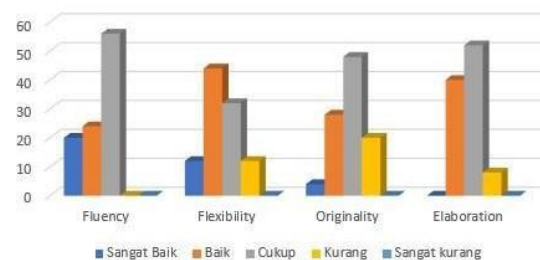


Figure 1. Description of the Percentage of Creative Thinking Skills Aspects

From Table.1 Description of the percentage of creative thinking skills aspects, information was obtained that the creative level of grade IX students of SMP N 12 Pekalongan in the fluency aspect was obtained a percentage of 56%, including the sufficient category. In the aspect of flexibility, a percentage of 44% was obtained, including the good category. In the aspect of originality, a percentage of 48% was obtained, including the sufficient category. In the aspect of elaboration, a percentage of 52% was obtained, including the sufficient category.

The description table of the percentage of creative thinking aspects shows information that the highest percentage of fluency is in the sufficient category, this illustrates that the ability to trigger many ideas, methods, suggestions, questions, ideas, solutions, or alternative answers smoothly in a certain time quickly and emphasized on the quality of grade IX students of SMP N 12 Pekalongan in general is still in the sufficient category. The Flexibility aspect has the highest percentage in the good category, this illustrates that the ability to think flexibly by considering various different

viewpoints and directions so that it is able to produce various different ideas in grade IX students of SMP N 12 Pekalongan is generally in the good category. The aspect of originality percentage is the highest in the sufficient category, this illustrates that the ability to think originally who is able to express new and unique ideas, think of different ways to express themselves and can produce different combinations in grade IX students of SMP N 12 Pekalongan in general is still in the sufficient category. The aspect of elaboration of the highest percentage in the sufficient category, this shows that the ability to add or detail detailed things of an object, idea and situation in grade IX students of SMP N 12 Pekalongan in general is still in the sufficient category.

Science literacy research for SMP N 12 Pekalongan students obtained an average result of 36% including the sufficient category, this can be seen in table 2 description of the percentage of science literacy

Tabel 2. Deskripsi Prosentase Literasi Sains

No	Aspek	Prosentase				
		Sangat baik	Baik	Cukup	Kurang	Sangat kurang
1.	Pengetahuan Sains	0	20	52	20	8
2.	Pemahaman Sains	0	32	52	16	0
3.	Sikap terhadap Sains	40	56	4	0	0
	Jumlah	40	108	108	36	8
	Rata-rata	13,3	36	36	12	2,7

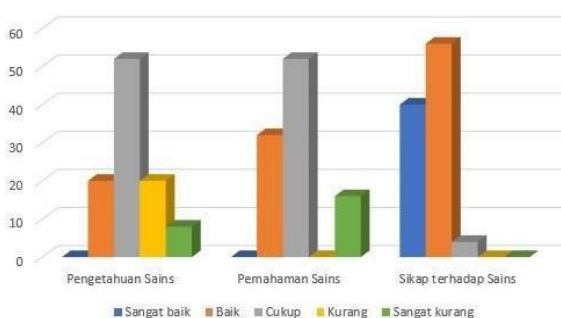


Figure 2. Description of Percentage of Science Literacy Aspects

From the table, information was obtained on every aspect of science literacy ability of grade IX students of SMP N

12 Pekalongan. In the aspect of science knowledge, a percentage of 52% was obtained in the sufficient category. The aspect of scientific understanding was obtained with a percentage of 52% in the sufficient category. The aspect of attitude towards science was obtained with a percentage of 56% in the good category.

From the aspect of science knowledge, the highest is the sufficient category, this illustrates that the science knowledge of grade IX students of SMP N 12 Pekalongan is generally still in the sufficient category. From the table, we also get information that there are still 8% of students whose science knowledge aspect is still very lacking. In the aspect of science understanding, the highest is the sufficient category, this illustrates that the science understanding of grade IX students of SMP N 12 Pekalongan is generally still in the sufficient category. From the table information was also obtained that there are still 16% of students whose science understanding aspect is still very lacking. In terms of attitude towards science, the highest is in the good category. This shows that the attitude towards science of grade IX students of SMP N 12 Pekalongan is already in the good category, there are even some students in the very good category.

The results of the study showed that there were differences in the ability of creative thinking skills and science literacy in students of SMP N 12 Pekalongan. Differences in students' ability in the level of creative thinking skills can be caused by several factors, namely factors from within students (internal factors) and factors from outside students (external factors):

A. Internal Factors

Internal factors that affect students' creative thinking skills are as follows:

1. Gender

A person's level of creativity can be influenced by gender. Boys tend to have better thinking skills compared to girls especially as childhood passes. Boys are usually required to be more independent and required to make original decisions than girls so that boys' creativity levels are better compared to girls

(Hurlock, 1990), but this gender does not affect creativity significantly because there are other factors considered (Okyanida et al, 2017)

2. Age

Age affects children's creativity in terms of language, drawing and personality (Okyanida et al, 2017). Imagination, curiosity, independence, risk-taking, and carrying out task commitments are also influenced by age (Okyanida et al, 2017). The older a person gets, the more independence he has, carries out risks and carries out duty commitments. However, age only affects children's creativity in terms of language, drawing and personality while in this study the creativity we tested was in the form of a written test with multiple choice without including drawing and personality indicators.

3. Cognitive learning outcomes and individual cognitive styles Students with high cognitive learning outcomes are able to remember facts, formulas, and meanings in learning materials and are able to applying theory in daily life (Okyanida et al, 2017). An individual's cognitive style is a way of receiving, organizing, processing, and describing a person's information. Individual cognitive styles are divided into two, namely impulsive and reflective cognitive styles. The characteristic of children with impulsive cognitive style is that they quickly respond to something without paying attention first so that the answer tends to be wrong, while the characteristics of children with reflective cognitive style are to consider many alternative solutions before responding so that the answer tends to be correct. Children with impulsive cognitive styles have low creative skills while children with reflective cognitive styles have high creative skills (Khamida et al, 2017).

4. Hasil psikomotor individu

Students with high psychomotor outcomes are able to design, design, combine and make solutions both in experiments and project creation Individual psychomotor results are directly proportional to creative skills so that students with high psychomotor outcomes have high creative skills (Okyanida et al, 2017).

B. External Factors

Meanwhile, external factors that affect students' creative thinking skills are as follows:

1. Learning models/strategies/approaches
The learning model can affect the level of creativity of students. Students who are taught using a student-centered approach tend to have a higher level of creativity than students who are taught with a teacher-centered approach. Student-centered learning accustomes students to actively think so that students' ideas or ideas can be channeled, but in a teacher-centered approach, students tend to be passive so that ideas or ideas are less channeled (Amtiningsih et al, 2016).

2. Family environment
The family environment affects students' high-level thinking because the family environment is the environment where students first gain knowledge, character formation and the formation of children's mindset. The better The family environment in supporting students will also be higher the level of student thinking. The magnitude of the influence of the family environment on higher-level thinking skills is 8.94% (Kurniawan & Enok Maryani, 2015). High-level thinking skills include critical, creative, logical, reflective, metacognitive abilities (Saregar et al, 2016).

3. School environment
The school environment affects students' higher-level thinking. The more conducive the school environment, the higher the student's high-level thinking. The magnitude of the influence of the school environment on higher-level thinking skills is 1.21% (Kurniawan & Enok Maryani, 2015). High-level thinking skills include critical, creative, logical, reflective, metacognitive abilities (Saregar et al, 2016), so creative thinking is also influenced by the school environment.

Students' science literacy skills are also influenced by internal and external factors. The internal factor of students' greater science literacy ability is influenced by study habits. Meanwhile, the external factor of students' greater science

literacy ability is influenced by family environmental factors. (Budiman, 2021). Other factors that can cause students' science literacy skills are interest in science, learning motivation, teachers' strategies in learning, and school facilities. (Hidayah et al, 2019).

4. CONCLUSION

The creative thinking ability of SMP N 12 Pekalongan students showed an average of 47% in the sufficient category, if studied per indicator of creative thinking ability in the fluency aspect of 56% in the sufficient category, the flexibility aspect of 44% in the good category, the originality aspect of 48% in the sufficient category and the elaboration aspect of 52% in the sufficient category. The science literacy ability of SMP N 12 Pekalongan students showed an average of 36% in the sufficient category, and if examined per indicator of science literacy ability, the aspect of students' knowledge in the sufficient category was 52%, the aspect of understanding science in the sufficient category was 52%, and the aspect of attitude towards science in the good category was 56%. The difference in creative thinking ability and science literacy is caused by 2 factors, namely external and internal factors.

6. REFERENSI

- Amtiningsih, S., Dwiastuti, S., & Sari, D. P. (2016). Peningkatan Kemampuan Berpikir Kreatif melalui Penerapan Guided Inquiry dipadu Brainstorming pada Materi Pencemaran Air. *Proceeding Biology Education Conference*, 13(1), 868–872.
- Arikunto, S. 2010. *Prosedur Penelitian Suatu Pendekatan Praktik*. Jakarta: Rineka Cipta.
- Budiman, A. (2021). *Profil Kemampuan Literasi Sains Siswa SMP Negeri se-Kecamatan Cigudeg Kabupaten Bogor pada Materi Suhu dan Kalor* (Doctoral dissertation, Universitas Pendidikan Ganesha)
- Fuadi, H., Robbia, A. Z., Jamaluddin, J., & Jufri, A. W. (2020). Analisis Faktor Penyebab Rendahnya Kemampuan Literasi Sains Peserta Didik. *Jurnal Ilmiah Profesi Pendidikan*, 5(2), 108–116.
<https://doi.org/10.29303/jipp.v5i2.122>
- Hidayah, N., Rusilowati, A., & Masturi, M. (2019). Analisis profil kemampuan literasi sains siswa SMP/MTs di Kabupaten Pati. *Phenomenon: Jurnal Pendidikan MIPA*, 9(1), 36-47.
- Hurlock, E. (1990). *Perkembangan Anak*. Jakarta: Erlangga.
- Khamida, A. N., Edy Bambang Irawan, & Hery Susanto. (2017). Berpikir Kreatif Siswa Impulsif. *Prosiding SI MaNIs (Seminar Nasional Integrasi Matematika dan Nilai Islami)*, 591-596.
- Kurniawan, T., & Enok Maryani. (2015). Pengaruh Lingkungan Keluarga dan Lingkungan Sekolah terhadap Keterampilan Berpikir Tingkat Tinggi Peserta Didik dalam Pembelajaran IPS. *JPIS, Jurnal Pendidikan Ilmu Sosial*, 209-216.
- Mijaya, N.P.A.P., A.A.I.A.R. Sudiarmika, and K. Selamat, Profil Literasi Sains SMP Melalui Model Pembelajaran Levels of Inquiry. *Jurnal Pendidikan dan Pembelajaran Sains Indonesia*.