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Profile of Junior High School Students' Creative Thinking Ability and Numerical Literacy in Solving Mathematical Problems

***Nasruddin, Jahring**
Mathematics Education Study Program, FKIP, USN Kolaka, Street Pemuda No. 339, Kolaka 93517, Indonesia

*Corresponding Author e-mail: nash.matematika@gmail.com

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Abstract

This study aimed to describe the profile of creative thinking abilities and mathematical numeracy literacy of junior high school students in solving mathematical problems. Students' creative thinking abilities in this study refer to aspects of fluency, flexibility, originality, and elaboration. Meanwhile, students' mathematical numeracy literacy refers to indicators of formulating problems systematically, reasoning, and solving problems. This type of research is qualitative descriptive research. The subjects of this study were class VIII students of SMP Negeri 1 Latambaga. The research instrument used was non-routine test questions given to students, and data processing was carried out qualitatively. The results showed that descriptively, the students' mathematical creative thinking abilities were in the quite creative category, whereas 40 students were in the quite creative category with an average score of 51.43. Meanwhile, from the numeracy literacy data, students are in the good category, where students who are in the good category are 40 students with an average score of 63.47. Based on these data, it can be concluded that students' mathematical numeracy literacy skills are more likely than the mathematical creative thinking abilities of class VIII students of SMP Negeri 1 Latambaga.

Keywords: creative thinking, numeracy literacy, mathematical problems

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INTRODUCTION

Mathematics is one of the subjects taught in school, so it cannot be denied that mathematics is a very important subject. Learning mathematics must be carried out in accordance with the objectives of learning mathematics that have been set. The purpose of learning mathematics is contained in the general objectives of the 2013 curriculum is to prepare students to have and master various abilities that contribute to social life and emphasizes that all levels in an educational unit must be able to develop students' academic potential, including the ability to think creatively (Nadjafikhah, et al, 2012; Mashuri , et al, 2019).

The ability to think creatively is defined as the ability to find and solve mathematical problems which include the components: fluency, flexibility, originality, and elaboration (Darwanto, 2019; Djidu, et al, 2021). The ability to think creatively can also be interpreted as the ability to create something new, or the ability to place and combine a number of different objects originating from human thought that are understandable, efficient, and innovative with various influencing factors. The factors that influence so that children's creativity can be realized requires encouragement within the individual or intrinsic motivation as well as encouragement from the environment or extrinsic motivation (Manurung, 2020; Hali, et al, 2023; Jurandi 2015).

According to Mursidik, et al. (2015) students' creative thinking abilities for the low category as a whole are in the unfavorable criteria. It can be seen from the activities of students who only imitate what the teacher does, without meaning and understanding so that in solving problems students think that it is enough to do what is exemplified, this causes students to lack the ability to solve problems with other alternatives which can be caused because students lack the flexibility ability is a major component of the ability to think creatively.

From the explanation above it can be seen that the ability to think creatively is very important and is learned from an early age. The ability to think creatively mathematically of students is shown by the OECD (2015) which shows the results of the 2015 PISA, the average mathematical ability of Indonesian students is 386 and is still below the average and occupies the 63rd position out of 72 countries and only 3.7% of the total number of students Indonesian who is able to solve the problem. Meanwhile, the ability to think creatively in the PISA study shows that the ability to think creatively in Indonesian students in solving problems is still low.

Mathematical creative thinking ability is the ability to find various new solutions to mathematical problems that are open and flexible but acceptable. One way to measure creative thinking ability is to give a written test that refers to indicators of creative thinking ability. This study refers to indicators of creative thinking, namely: fluency, flexibility, originality, and elaboration.

Based on the results of an interview with one of the eighth grade mathematics teachers at SMP Negeri 1 Latambaga said that there were several problems in learning mathematics, namely: there were some students who had not been able to solve problems, were unable to provide examples related to questions, changed story sentences into forms mathematics, students have not been able to make new questions related to learning, and are not able to draw conclusions from the problems they are looking for. This is also in line with research conducted by Rusida (2018) and Mairing (2013) which states that students' abilities in solving mathematical problems are also influenced by the students' thinking and reasoning abilities. Therefore, understanding a problem is shown by creatively organizing existing information and data by using certain concepts to get a solution.

Numerical literacy is the knowledge and skills to (a) use various kinds of numbers and symbols related to basic mathematics to solve practical problems in various contexts of everyday life and (b) analyze information presented in various forms (graphs, tables , charts, etc.) then use the interpretation of the analysis results to predict and make decisions (Weilin, et al. 2017; Nasruddin, et al, 2022). Numerical literacy is one of the ways to make mathematics easy and at the same time enables students to be able to collaborate, think critically and creatively, be able to communicate well, have character and be able to face the challenges of an increasingly global world with advances in science and technology (Haerudin, 2018; Ovan, et al, 2023). In simple terms, numeracy literacy can be interpreted as skills in applying the concept of numbers and arithmetic operations to solve problems (Sa'dia, 2021; Nasruddin, 2022).

Students who have numeracy literacy skills are able to think critically, creatively, logically, systematically, take initiative and are able to build cooperative networks effectively (Sukmawati. 2018). Numerical literacy can also form the character needed to answer the challenges of the globalization era due to the impact of science and technology development. Strengthening numeracy literacy is a must for both teachers and students. In this case, the teacher is only able to strengthen 21st century numeracy literacy learning with learning achievements in the creative, critical thinking, communicative, and collaborative stages including numeracy literacy (Faradiba, 2021). As for students, as we all know, numeracy literacy is currently used in the Minimum Competency Assessment (AKM) questions. The AKM set by the government is one part of the government's target to prepare students to face the 21st century, namely having critical, creative thinking skills and communication skills (Rohantizani, 2022).

Based on the results of research conducted by Arianingsih (2020) concluded that there is a significant relationship between mathematical literacy and the ability to think creatively mathematically in class VIII students of SMP Negeri 1 Arjosari. Furthermore, Sukmawati (2018) stated that there are at least two important reasons why mathematical literacy skills in mathematics learning need to be developed in the student environment because mathematics is mathematics is language and mathematics learning as social activity. Based on several relevant studies, the aim of this research is to describe the mathematical creative thinking abilities and numeracy literacy of students at SMP Negeri 1 Latambaga.

METHOD

This type of research is explanatory research with a qualitative approach. Explorative research with a qualitative approach referred to in this study is the researcher exploring and conducting in-depth analysis of the profile of creative thinking skills and numeracy literacy of junior high school students in solving mathematical problems.

According to Sugiyono (2016) the sample is part of the number and characteristics possessed by the population. What is obtained from the sample can be applied to the population. Thus, the sample taken must truly represent the population. Arikunto (2016) states that to determine the size of the sample if the subject is less than 100, it is better to take all of them so that the research is population research, if the subject is larger then 10-15% of the population can be taken. In this case what is taken is 15%.

The sampling technique in this study used the Cluster Random Sampling technique. The Cluster Random Sampling technique is a sampling technique in which random sampling is taken with existing cluster draws. Of the large population there are several clusters of research. Then formed based on homogeneous learning outcomes. The population is then clustered randomly to determine the sample to be taken. Where the selected sample consisted of two research classes, namely class VIIIa consisting of 27 students and class VIIIc consisting of 30 students.

The data collection technique in this study was by administering tests to students in class VIIIa and class VIIIb. The tests used in this research were creative thinking ability test instruments and students' mathematical numeracy literacy test instruments. The test referred to in this case is a set of stimuli (stimuli) given to class VIII students with the intention of obtaining answers that can be used as the basis for determining a numerical score.

To obtain test scores for students' mathematical creative thinking abilities and students' mathematical literacy tests, it is carried out with reference to the guidelines for scoring tests for students' creative thinking abilities and scores for students' mathematical literacy tests. Prior to use, the test instruments for creative thinking ability and numeracy literacy were first tested to find out the validity, reliability, level of difficulty, and discriminating power of the questions with the aim that the quality of the questions to be given had a better quality.

In detail, data analysis refers to the stages of qualitative data analysis by Miles (1992), which are as follows: 1) *Review the data,* Data obtained from various sources, namely from interviews, observations, short notes in the field and the results of assignments related to creative thinking and mathematical numeration were reviewed by reading repeatedly; 2) *The credibility of the data must be checked,* Data credibility really needs to be done usually with time triangulation techniques. This time triangulation technique is carried out by comparing the test result data obtained with the interview data. If a difference is found between the student's test results and the interview results, the meaning of the difference must be explained or the reason why the data is different; 3) *Data reduction stage,* The data obtained from creative thinking and mathematical numeration tests as well as from interview data were subjected to data reduction. In this case, data reduction is carried out to focus the data or select data obtained in the field. From the results of data reduction, apart from simplifying the data, the data is selected and grouped with other data that is deemed needed to answer the research questions; 4) *Stage of presenting data,* After the data has been reduced, the next step in analysis is data

presentation. In presenting data, researchers present data which is the result of the reduction stage. In this research, relevant data will be compiled with categorization at each stage according to the sequence of mental activities carried out by the research subjects. This is intended so that the information obtained can be easily concluded and has a certain meaning; and 5) *Conclusion Drawing Stage*, At this stage, the conclusions obtained are based on analysis of the data used. In this case, the data that has been presented is based on clear and predetermined categorization. At this stage, conclusions are drawn from data about students' creative thinking and mathematical numeracy profiles in solving mathematical problems.

RESULTS AND DISCUSSION

The results of the analysis of the variables of students' creative thinking abilities and mathematical numeracy literacy of class VIII students of SMP Negeri 1 Latambaga can be seen in Table 1 and Table 2 below, respectively.

Table 1. Categories of Mathematical Creative Thinking Ability

Category	Interval Value	Frequency	Percentage
Very creative	81≤ BKM ≤ 100	0	0%
creative	61≤ BKM < 81	9	15,79%
Creative Enough	41≤ BKM < 61	40	70,17%
Less Creative	21≤ BKM < 41	8	14,04%
Not Creative	BKM < 21	0	0%
Amount		57	100%

Based on Table 1, it can be seen that of the 57 students of class VIII SMP Negeri 1 Latambaga as the sample in this study, there were 40 students categorized as quite creative with an average score of 51.43. So it can be concluded that the ability to think creatively mathematically in class VIII students of SMP Negeri 1 Latambaga is included in the quite creative category. To make it more visually visible, the results of students' creative thinking ability tests are shown in Figure 1 below.

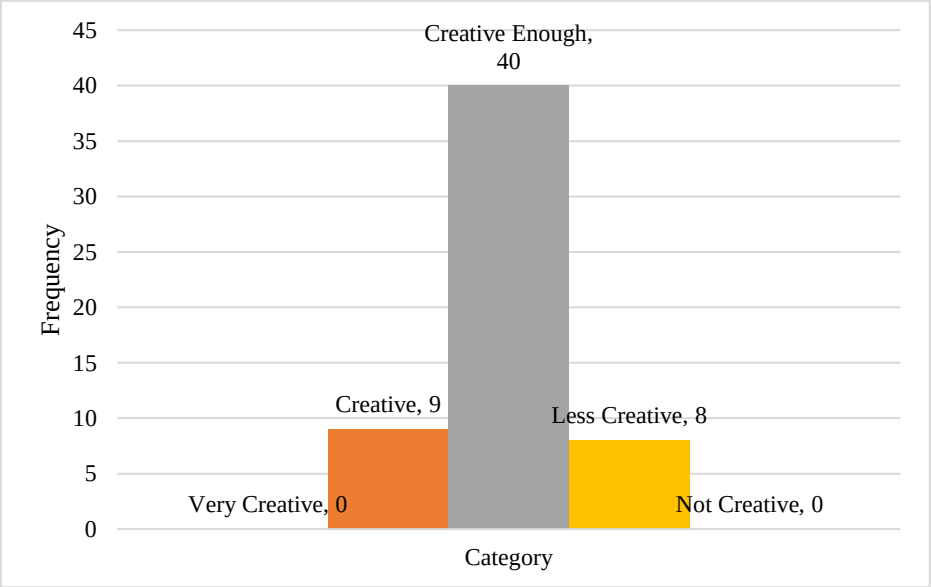

Figure 1. Categories of creative thinking

This is in line with the results of research conducted by Meika and Sujana (2017) that creative thinking is related to solving problems because solving problems requires abilities such as the ability to think divergently and the ability to generate and apply new ideas. Data regarding the numeracy literacy abilities of class VII students are shown in Table 2.

Table 2. Categories of Student Numerical Literacy

Category	Interval Value	Frequency	Percentage
Very good	81–100	0	0%
Good	61-80	40	70,18%
Currently	41-60	14	24,56%
Not enough	21-40	2	3,51%
Very less	0-20	1	1,75%
Amount		57	100%

Based on table 4 it can be seen that of the 57 students of class VIII MTs Negeri 1 Kolaka as the sample in this study, there were 40 students categorized as good with an average score of 63.47. So it can be concluded that the numeracy literacy of class VIII students of MTs Negeri 1 Kolaka is included in the good category. In order to be more clearly visible visually, the results of students' numeracy literacy abilities are presented in Figure 2 below.

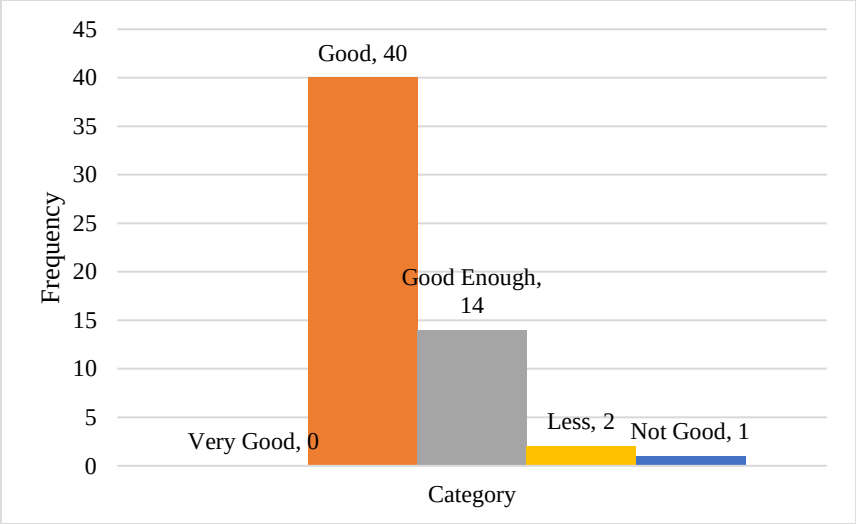

Figure 2. Categories of students' numeracy literacy

Based on the data analysis carried out, the discussion in this study is described which shows that the creative thinking skills of class VIII students of SMP Negeri 1 Latambaga from a total sample of 57 students obtained an average value of 51.43 and a standard deviation of 8.55. From Table 1, the distribution of creative thinking ability scores shows that students' creative thinking abilities are in the quite creative category. This is because students are given practice math problems that require a lot of completion so as to train students to think creatively. Therefore creative thinking is needed in solving math problems. This is in line with the results of research conducted by Meika and Sujana (2017) that creative thinking is related to solving problems because solving problems requires abilities such as the ability to think divergently and the ability to generate and apply new ideas.

Furthermore, from the analysis of data regarding the numeracy literacy of class VIII students of SMP Negeri 1 Latambaga, from a total sample of 57 students, an average value of 63.47 was obtained, and a standard deviation of 13.58 was obtained. Based on table 2, the distribution of numeracy literacy scores shows that the numeracy literacy of class VIII students is in the good category.

Based on the explanation above, it can be concluded that students' mathematical numeracy literacy is more dominant than students' creative thinking skills. So the results of this study are in accordance with several previous studies which stated that there was a significant influence between numeracy literacy on students' mathematical creative thinking abilities. This research is also supported by Arianingsih (2020), where in his research, it was concluded that

there is a significant relationship between mathematical literacy and students' mathematical creative thinking abilities.

CONCLUSION

Based on the results of the research and discussion previously described, which explained the ability to think creatively mathematically of students and the numeracy literacy of class VIII students of SMP Negeri 1 Latambaga, it can be concluded that students' mathematical numeracy literacy is more dominant than the ability to think creatively mathematically in class VIII students of SMP Negeri 1 Latamaga. This can be seen from the descriptive analysis of the numeracy literacy data for class students in the good category, where there are 40 students in the good category with an average score of 63.47. While students' mathematical creative thinking abilities are in the quite creative category, where students who have quite creative abilities are 40 students with an average value of 51.43.

RECOMMENDATION

Based on the research conclusions that have been described above, there are several suggestions that the author wants to convey, namely as follows:

1. For students, it is expected to improve creative thinking skills and numeracy literacy in learning mathematics. As for teachers, it is hoped that they can help students understand numeracy literacy and students' mathematical creative thinking abilities
2. For schools, it is hoped that they will pay more attention to students so that they can understand numeracy literacy to further improve students' creative thinking abilities.
3. For researchers, it is hoped that for further research it is expected to include other variables that may influence students' mathematical creative thinking abilities.

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REFERENCES

Alfiah, S., Mulyadi, M., & Apriyani, D. C. N. (2020). Hubungan antara literasi numerasi dengan kemampuan pemecahan masalah matematika siswa kelas VIII Smp Negeri 1 Pacitan Tahun Pelajaran 2019/2020. *Repository STKIP PGRI Pacitan*, 1-9. https://media.neliti.com/media/publications/352686-hubungan-antara-literasi-numerasi-dengan-85116d47.pdf

Arianingsih, L.C., Meifiani, N. I., & Apriyani, D. C. N. (2020). Hubungan antara literasi matematika dengan kemampuan berpikir kreatif matematik siswa kelas VIII Smp Negeri 1 Arjosari. *Repository STKIP PGRI Pacitan*, 1-7. https://ejournal.upi.edu/index.php/JER/index.

Arikunto. (2016). *Dasar-Dasar Evaluasi Pendidikan.* Jakarta: Rineka Cipta.

Budayasa, I, K., & Juniati, D. (2018). An Analysis of Statistical Reasoning Process of High School Students in Solving the Statistical Problem. *Journal of Physics: Conference Series. J. Phys.*: Conf. Ser. 1028 012125. https://iopscience.iop.org/article/10.1088/1742-6596/1028/1/012125/meta

Faradiba, S.S., Rahmawati, S. S., Nabila, I. A., Pradana, R. A. A., Robba, R. B., & Febriantika, R. B. (2021). Peningkatan kualitas pembelajaran di Sekolah Dasar melalui pendampingan berbasis literasi. *Jurnal Masyarakat Mandiri*, 3547-3556. http://journal.ummat.ac.id/index.php/jmm/oai

Djidu, H., Mashuri, S., Nasruddin, N., Sejati, A. E., Rasmuin, R., & AuraLa, A. (2021). Online learning in the post-covid-19 pandemic era: is our higher education redy for it?. *E-*

Saintika: Jurnal Penelitian dan Pengkajian Ilmu Pendidikan, 5(2), 139-151. https://journal-center.litpam.com/index.php/e-Saintika/article/view/479

Halil, N. I., Nasruddin, N., Sejati, A. E., & Sugiarto, A. (2023). Developing teaching material of research methodology and learning with 4D model in facilitating learning during the covid-19 pandemic to improve critical thinking skill: *Jurnal Hasil Peelitian dan Kepustakaan di Bidang Pendidikan, Pengajaran dan Pembelajaran*, 9(2), 541-554. https://doi.org/10.33394/jk.v9i2.7110

Jurandi, T. (2015). Efektivitas model pembelajaran kooperatif tipe TAI (team assisted individualization) terhadap hasil belajar matematika pada siswa kelas XI IA SMA Negeri 1 Wundulako. *Skripsi. Kolaka*: USN.

Manurung, A. S., Halim, A., & Rosyid, A. (2020). Pengaruh kemampuan berpikir kreatif untuk meningkatkan hasil belajar matematika di Sekolah Dasar. *Jurnal Basicedu*, 1291-1301. https://doi.org/10.31004/basicedu.v4i4.544

Marining, J. P., Budayasa, I. K., & Juniati, D. (2013) Perbedaan profil pemecahan masalah peraih medali osn matematika berdasarkan jenis kelamin. *Jurnal Ilmu Pendidikan Malang*, 18(2), 125-134. https://journal.um.ac.id/index.php/jip/article/view/3612

Mashuri, S., Jahring, J., & Nasruddin, N. (2019). Student teams achiement divions (Stad) dengan pendekatan relistic mathematics education (Rme) terhadap kemampuan pemahaman matematis. AKSIOMA: *Jurnal Program Studi Pendidikan Matematika*, *9*(4),909–916. https://ojs.fkip.ummetro.ac.id/index.php/matematika/article/view/2979 .

Moma, L. (2015). Pengembangan instrumen kemampuan berpikir kreatif untuk smp. Delta-Pi *Jurnal Matematika dan Pendidikan Matematika*. (Online), 4(1). 27-41. https://ejournal.unkhair.ac.id/index.php/deltapi/

Nadjafikhah, M., Yaftian, N., & Bakhalizade (2012). Mathematical creativity: Some definitions and characteristics. *Procedia - Social and Behavioral Sciences*, 285–291. https://www.sciencedirect.com/science/article/pii/S1877042811029855

Nasruddin, N., Herlina, H., Ulfayanti, U., & Miftchurohmah, N., (2022). The influence of thinkink talk write (TTW) learning model on critical thinking ability of class VII students of MTs Al-Ikhlas Mowewe. *Journal Pengkajian Ilmu dan Pembelajaran Matematika dan IPA IKIP Mataram*, 10(3), 803-810. https://ejournal.undikma.ac.id/index.php/prismasains/article/view/5700

Nasruddin, N., Jahring, J., Armin, A., & Marniati, M. (2022). Misconception analysis solving contextual problems of algebra using the four-tier class VII SMAN 1 Latambaga. *IOSR: Journal of Mathematics*, 18(4), 56–60. https://www.iosrjournals.org/iosrjm/papers/Vol18-issue4/Ser-2/H1804025660.pdf.

OECD. (2015). PISA 2015 *Draft mathematics Framework.* New York. Colombia University.

Ovan, O., Tasni, S., Nasruddin, N., Saputra, A., & Chairuddin, C. (2023). The analysis of algebraic problem solving ability on students of package B equivalency. *Journal of Mathematics and Applied Statistics*, 1(1), 1–8. https://ojs.inlic.org/index.php/mathstat/article/view/27.

Rohantizani, R., Marhami, M., Herizal, H., & Nuraina, N (2022). Minat siswa sekolah menengah atas terhadap literasi numerasi berbasis budaya Aceh. *Jurnal Ilmu Sosial dan Pendidikan*,1865-1872. http://dx.doi.org/10.58258/jisip.v6i1.2673

Sa'dia, H. (2021). Analisis Kemampuan Literasi Numerasi Ditinjau Dari Pengetahuan Metakognisi Siswa Dalam Menyelesaikan Soal Pisa Konten Space And Shape. *Skripsi. Surabaya*: UIN Sunan Ampel Surabaya. https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=Analisis+Kemampuan+Literasi+Numerasi+Ditinjau+Dari+Pengetahuan+Metakognisi+Siswa+Dalam+Menyelesaikan+Soal+Pisa+Konten+Space+And+Shape&btnG=

Sugiyono. (2016). *Metode Penelitian Kuantitatif. Kualitatif dan R & D.* Bandung: Alfabeta.

Sukmawati, R. (2018). Hubungan kemampuan literasi matematika dengan berpikir kritis mahasiswa. *Seminar Nasional Matematika dan Pendidikan Matematika,*1-9. https://publikasiilmiah.ums.ac.id/xmlui/handle/11617/10116

Syamsiah, N., & Rudyanto, H. E., (2015). Kemampuan berpikir kreatif dalam memecahkan masalah matematika open-ended ditinjau dari tingkat kemampuan matematika pada siswa Sekolah Dasar. *Journal Pedagogia*, 23-33. https://doi.org/10.21070/pedagogia.v4i1.69

Weilin, H., et al. (2017). Materi Pendukung Literasi Numerasi. Jakarta: Kementerian Pendidikan dan Kebudayaan. https://repositori.kemdikbud.go.id/11628/1/materi-pendukung-literasi-numerasi-rev.pdf