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# *The Influence of Creative Thinking and Learning Experience on Higher Order Thinking Skills*

## **Pengaruh Kemampuan Berpikir Kreatif dan Pengalaman Belajar terhadap Keterampilan Berpikir Tingkat Tinggi**

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### **Abstract**

Creative thinking is closely related to higher-order thinking skills. Higher-order thinking skills require knowledge and experience by students which developed critically and creatively. Creative thinking is a demand to complete an idea or alternative solutions to everyday life problems. This study is an ex post facto that aims to examine the effect of creative thinking skills on high-order thinking skills of seventh-grade students of Datok Sulaiman Palopo Junior High School. The sample was 76 students from 210, of which 10 students were selected from each class by systematic random sampling technique. The research instrument used is a test of creative thinking skills and a test of higher-order thinking skills. The results show that creative thinking and learning experience has a positive influence and are significant to higher order thinking skills.

**Keywords:** Creative Thinking; Higher Order Thinking; Learning Experience.

### **Abstrak**

Berpikir kreatif erat kaitannya dengan kemampuan berpikir tingkat tinggi. Dalam berpikir tingkat tinggi dibutuhkan pengetahuan dan pengalaman peserta didik secara kritis dan kreatif. Berpikir kreatif merupakan suatu tuntutan untuk menyelesaikan suatu ide atau alternatif solusi dalam permasalahan kehidupan sehari-hari. Penelitian ini merupakan penelitian ex post facto yang bertujuan untuk mengkaji pengaruh kemampuan berpikir kreatif terhadap keterampilan berpikir tingkat tinggi siswa. Sampel penelitian sebanyak 76 siswa yang diambil secara sistematis random sampling dari total populasi 210 siswa kelas VII di salah satu kota di Palopo. Instrumen penelitian yang digunakan yaitu tes kemampuan berpikir kreatif dan tes keterampilan berpikir tingkat tinggi. Hasil penelitian menunjukkan kemampuan berpikir kreatif dan pengalaman belajar berpengaruh secara positif dan signifikan terhadap keterampilan berpikir tingkat tinggi siswa.

**Kata Kunci:** Berpikir Kreatif; Berpikir Tingkat Tinggi; Pengalaman Belajar.

### **Introduction**

Mathematics learning in schools plays an important role in the development of students' thinking skills. Thinking is divided into 2 (two) levels, namely low-order thinking skills and high-order thinking skills. Learning mathematics requires high-level thinking skills to solve problems faced creatively and critically. The development of thinking skills, especially those that lead to high-order thinking skills, has become one of the priorities in education in Indonesia. Mathematics is a universal science that underlies the development of modern technology. Mathematics is also said to be the queen of science because in every field of science there is always a

connection with mathematics such as science, social studies, history, and others. Mathematics is very necessary for everyday life because human activities it has a relationship with mathematics.<sup>1</sup>

Higher order thinking skills are skills that can be trained. In this case, the teacher's role is as a facilitator who designs the learning process so that it can be a place for students to develop higher-order thinking skills. The emphasis of learning mathematics is no longer on the final result but rather on how the processes and stages of students' thinking in constructing their knowledge. Moreover, the teacher can provide questions or problems that are problem-solving and involve students actively in the learning process (student-centered).<sup>2</sup> Analysis, evaluation, and creative activities are rarely trained on students. During this time, students easily complete the practice questions in the Instructional Evaluation course because the types of practice questions given only involve memorizing or memorizing formulas, so when students are given practice questions that require more complex solutions they tend to find it difficult with the practice questions given.<sup>3</sup>

Higher order thinking skills are influenced by several factors, one of which is the ability to think creatively. According to de Bono (2007), students' creative thinking abilities allow them to find more alternative solutions or problem-solving. Although sometimes too many alternatives can make it difficult to achieve the final result, there are too many choices for students to reach compared to students who have not solved the problem. Creative thinking is very important for students. Creative thinking is the key to thinking about design, problem-solving, change and improvement, and new ideas.<sup>4</sup> higher order thinking skills based on creative thinking can produce benefits for someone in solving a complex problem so that people with higher order thinking skills who focus on creative thinking can solve problems by producing original solutions.<sup>5</sup>

The importance of developing creativity in mathematics is also found in the 2013 Curriculum. This is proven by the Government Regulation Number

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<sup>1</sup> Zakkina Gais and Ekasatya Aldila Afriansyah, "Anaslis Kemampuan Dalam Menyelesaikan Soal High Order Thinking Ditinjau Dari Kemampuan Awal Matematis Siswa," *Mosharafa: Jurnal Pendidikan Matematika* 6, no. 2 (August 24, 2018): 255-66, <https://doi.org/10.31980/mosharafa.v6i2.313>.

<sup>2</sup> Nina Agustyaningrum, "Mengembangkan Keterampilan Berpikir Tingkat Tinggi Dalam Pembelajaran Matematika SMP," *Journal of the Mathematics Education Study* 4, no. 1 (2015): 8.

<sup>3</sup> Siti Rohmi Yulianti and Ika Lestari, "Higher-Order Thinking Skills (HOTS) Analysis Of Students In Solving HOTS Question In Higher Education," *Perspektif Ilmu Pendidikan* 32 (2018), <https://doi.org/10.21009/PIP.322.10>.

<sup>4</sup> de bono, *Revolusi Berpikir* (Bandung: Kaifa, 2007).

<sup>5</sup> Flavia Aurelie Hidayat, "Students Creative Thinking Profile as a High Order Thinking in the Improvement of Mathematics Learning.," *European Journal of Educational Research* 10, no. 3 (2021), <https://doi.org/10.12973/eu-jer.10.3.1247>.

17 of 2010 in the 2013 Curriculum concerning Management and Implementation of Education, which states that the purpose of implementing primary and secondary education is to build a foundation for the development of students' potential to become more knowledgeable, capable, critical, creative, and innovative.<sup>6</sup>

Another factor that influences higher-order thinking skills is the learning experience. Edgar Dale's cone of experience shows the experience gained in using media from the most concrete (at the very bottom) to the most abstract (at the very top). Initially (1946) Dale enumerated the following categories of experience: (1) direct experience, intentional experience, (2) fabricated experience, (3) dramatic participation, (4) demonstration, (5) field trip, (6) exhibitions, (7) moving pictures, (8) radio recordings, still images (audio with visual images) (9) visual symbols, (10) verbal symbols. Dale claims that the classification is simple and quality.<sup>7</sup> Bruner's concept is described by Arsyad with an example of rigging learning. Direct experience is when students learn by directly making ties or knots with ropes. That way, students learn to understand the meaning of the word knot, which is understood directly by making a knot. While pictorial experience is when students learn to understand the word 'knot' through pictures, paintings, photos, or films that show the meaning of the word 'knot'. Students learn it through visual-based media. While at the symbol level, students read or hear an explanation of the word "knot".<sup>8</sup>

High-level thinking skills require knowledge and experience that students already have critically and creatively. A benchmark for measuring student learning outcomes using math problems related to higher order thinking. Learn about the importance of mathematics in managing thinking, reasoning, problem-solving, communication, the relationship of mathematical material to real-world situations, and the ability to use and utilize student technology.<sup>9</sup>

The results of research conducted by Ikhsan Faturohman and Ekasatya Aldila Afriansyah concluded that there was an increase in students' mathematical creative thinking skills using the Creative Problem Solving

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<sup>6</sup> Jayanti Putri Purwaningrum, "Mengembangkan Kemampuan Berpikir Kreatif Matematis Melalui Discovery Learning Berbasis Scientific Approach," *REFLEKSI EDUKATIKA* 6, no. 2 (September 9, 2016), <https://doi.org/10.24176/re.v6i2.613>.

<sup>7</sup> Pusvyta Sari, "Analisis Terhadap Kerucut Pengalaman Edgar Dale dan Keragaman Gaya Belajar Untuk Memilih Media Yang Tepat Dalam Pembelajaran," no. 1 (2019): 21.

<sup>8</sup> Azhar Arsyad, *Media Pembelajaran* (Jakarta: T Raja Grafindo Persada, 2013).

<sup>9</sup> Muhamad Arfan Andiyana, Rippi Maya, and Wahyu Hidayat, "Analisis Kemampuan Berpikir Kreatif Matematis Siswa SMP Pada Meteri Bangun Ruang," *JPMI (Jurnal Pembelajaran Matematika Inovatif)* 1, no. 3 (May 23, 2018): 239, <https://doi.org/10.22460/jpmi.v1i3.p239-248>.

model.<sup>10</sup> Furthermore, Asep Saifullah in his research concluded that HOTS type questions can significantly improve students' creative thinking skills in mathematics lessons compared to conventional practice questions.<sup>11</sup> Research conducted by Muhibatun Nisa concluded that there was a significant influence between the learning experience and students' positive attitudes in learning mathematics.<sup>12</sup>

The results of interviews conducted with one of the seventh-grade teachers of SMP Datok Sulaiman Palopo said that students who have high creative thinking skills tend to have high higher order thinking skills and students who have a learning experience in working on higher order thinking questions can have higher order thinking skills. skills in higher order thinking.

This study aims to examine creative thinking skills and learning experiences on higher order thinking skills. The difference between this study and previous research is that this study examines the ability to think creatively and learning experiences together on higher order thinking skills.

The results of this study are expected to be a reference for educators before improving students' higher order thinking skills, it is important to develop creative thinking skills and student learning experiences earlier

## Method

This research is ex post facto which aims to examine the effect of creative thinking and learning experiences on high-order thinking skills of seventh-grade students of SMP in Palopo South of Sulawesi. This research was conducted in March of the 2020/2021. The population in this study was 8th grade as many as 7 classes selected 10 students from each class. Total of 70 students using a systematic random sampling technique.

The research instrument used was a written test to measure creative thinking skills and higher order thinking skills as well as a questionnaire to measure students' learning experiences. According to Baer (quoted from Febrianti, Djahir, and Fatimah, 2016), there are 4 indicators of creative thinking ability namely fluency, flexibility, originality, and elaboration<sup>13</sup>.

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<sup>10</sup> Ikhsan Faturohman and Ekasatya Aldila Afriansyah, "Peningkatan Kemampuan Berpikir Kreatif Matematis Siswa Melalui Creative Problem Solving," *Jurnal Pendidikan Matematika*, 1, 9 (2020).

<sup>11</sup> Asep Saifullah Kamali, "Pengaruh Soal Tipe HOTS Terhadap Berpikir Kreatif Siswa," *Cakrawala Pedagogik*, 2, 3 (2019), <https://doi.org/10.51499/cp.v3i2.110>.

<sup>12</sup> Muhibatun Nisa, "Pengaruh Pengalaman Belajar Terhadap Sikap Positif Siswa Dalam Pembelajaran Matematika Di SMP NU Dukuhjati Krangkeng-Indramayu," *Journal of Mathematical Science and Mathematics Education*, 1, 1 (2019).

<sup>13</sup> Yeyen Febrianti, Yulia Djahir, and Siti Fatimah, "Analisis Kemampuan Berpikir Kreatif Peserta Didik Dengan Memanfaatkan Lingkungan Pada Mata Pelajaran Ekonomi

Widaya's opinion (quoted from Fatimah and Pahlevi, 2020) suggests that there are 3 indicators of higher order thinking skills namely analyze, evaluation, and synthesis <sup>14</sup>. The indicators of learning experience according to Nisa (2019) are described by changes in behavior, value change, experience, attitude, and skills <sup>15</sup>.

Data analysis with descriptive and inferential analysis. Descriptive data analysis includes mean, median, standard deviation, variance, range, maximum value, and minimum value. Inferential data analysis includes prerequisite tests, normality test and linearity test, and hypothesis testing using simple linear regression analysis and regression analysis multiple linear.

## Results and Discussion

### a. Students' creative thinking ability

Data on students' creative thinking abilities were obtained from the results of the creative thinking ability tests given to students. The results of the creative thinking ability test of seventh-grade students of SMP Datok Sulaiman Palopo are as follows:

Table. 1 Descriptive Data of Creative Thinking Ability Test

No.	Variable	Statistical Scores
1	Many Samples	70
2	Average	38.11
3	median	36
4	Standard Deviation	15.49
5	Variance	240.21
6	Range	64
7	Minimum Value	11
8	Maximum Value	75

*Source: Primary data analysis results (2021)*

Based on Table 1 above, it is found that the average value of the students' creative thinking ability test results is 38.11, which means that the creative thinking ability of class VII students is still very low, the median or data concentration is 36, the maximum value is 75 and the minimum value is

Di SMA Negeri 6 Palembang," *Jurnal Profit*, 1, 3 (n.d.), <https://doi.org/10.36706/jp.v3i1.5561>.

<sup>14</sup> Siti Fatimah and Triesninda Pahlevi, "Pengembangan Instrumen Penilaian Berbasis HOTS (Higher Order Thinking Skills) Pada Kompetensi Dasar Menerapkan Sistem Penyimpanan Arsip Sistem Abjad, Kronologis, Geografis, Nomor, Dan Subjek Di Jurusan OTKP SMKN 1 Bojonegoro," *Jurnal Pendidikan Administrasi Perkantoran (JPAP)*, 2, 8 (2020).

<sup>15</sup> Nisa, "Pengaruh Pengalaman Belajar Terhadap Sikap Positif Siswa Dalam Pembelajaran Matematika Di SMP NU Dukuhjati Krangkeng-Indramayu."

11, the standard the deviation or distribution of the students' creative thinking ability data is 15.49, and the variance is 240.21, meaning that the student's creative thinking ability data is very spread out from the mean and one another. The data on the results of creative thinking skills are further categorized into five categories.

Table 2. Category of Creative Thinking Ability

<b>Skor</b>	<b>Frequency</b>	<b>Percentage</b>	<b>Category</b>
81-100	0	0	Very creative
66-80	5	7	Creative
56-65	3	4	Quite creative
41-55	24	34	less creative
0-40	38	55	Not creative
Sum	70	100	
Mean		54.29	Not creative

Source: Primary data analysis results (2021)

Based on Table 2 above, of the 70 seventh grade students of SMP Datok Sulaiman Palopo, 5 (7%) students have creative thinking skills in the creative category, 3 (4%) students have creative thinking skills in the moderately creative category, 24 (34%) students who can think creatively are in the less creative category, and 38 (55%) students who can think creatively are in the category of not creative.

b. Students Learning Experience Ability

Learning experience data was obtained by distributing learning experience questionnaires to class VII students of SMP Datok Sulaiman Palopo. The following are the results of the learning experience questionnaire for seventh-grade students of SMP Datok Sulaiman Palopo:

Table 3. Descriptive Data of Student Learning Experience

<b>No</b>	<b>Variable</b>	<b>Statistical Scores</b>
1	Samples	70
2	Average	79.81
3	median	80
4	Standard Deviation	2.67
5	Variance	7.14
6	Range	12
7	Minimum Value	73
8	Maximum Value	85

Source: Primary data analysis results (2021)



Based on Table 3 above, it is obtained data that the average value of the student learning experience questionnaire is 79.81, which means that the learning experience of class VII students is still moderate, the median or data concentration is 80, and the maximum value is 85 and the minimum value is 73, the standard deviation or the distribution of student learning experience data is 2.67, and the variance is 7.14, meaning that the student learning experience data is not too spread out from the mean and one another.

Table 4. Frequency Distribution of Student Learning Experiences

No	Interval	Frequency	Percentage (%)	Category
1	$x \geq 83,82$	5	7	Very low
2	$81,15 \leq x < 83,82$	15	21	Low
3	$78,48 \leq x < 81,15$	30	43	Currently
4	$75,81 \leq x < 78,48$	15	21	Tall
5	$x < 75,81$	5	8	Very high
Sum		70	100	
Mean		42.86		Currently

Source: Primary data analysis results (2021)

Based on Table 4. above, the data obtained that, 5 (7%) students are in the very high category, 15 (21%) students are in the high category, 30 (43%) students are in the medium category, then 15 (21%) students are in a low category, and 5 (8%) students are in the very low category.

c. Students' Higher Order Thinking Skills Ability

Data on students' higher-order thinking skills were obtained by distributing 5 questions in the form of essay tests to seventh-grade students of SMP Datok Sulaiman Palopo. The results of the test for the creative thinking ability of seventh-grade students of SMP Datok Sulaiman are as follows:

Table 5. Descriptive Data of Higher Order Thinking Ability

No	Variable	Statistical Scores
1	Samples	70
2	Average	51,99
3	median	50
4	Standard Deviation	17,02
5	Variance	289,69
6	Range	71
7	Minimum Value	16



Based on table 5. above, the data shows that the average high-order thinking ability of students is 51.99, which means that the higher-order thinking skills of class VII students are still very low. The standard deviation or data spread of students' higher order thinking skills is 17.02, and the variance is 289.69, meaning that the student learning experience data is very spread out from the mean and one another.

The data on the results of the high-order thinking ability test for seventh-grade students of SMP Datok Sulaiman Palopo are categorized into five categories. Based on this categorization, the frequency distribution value of students' higher order thinking skills is obtained as follows:

Table 6. Frequency Distribution of Students' Higher Order Thinking Skills

Skor	Frequency	Percentage	Category
$0 \leq Y < 55$	37	53	Very low
$55 \leq Y < 65$	12	17	Low
$65 \leq Y < 80$	18	26	Currently
$80 \leq Y < 90$	3	4	Tall
$90 \leq Y \leq 100$	0	0	Very high
Sum	70	100	
Mean		52.86	Very low

*Source: Primary data analysis results (2021)*

Based on Table 6 above, it is obtained data that, 37 (53%) students who have high-order thinking skills are in the very low category, 12 (17%) students are in a low category, 18 (26) students are in the medium category, 3 (4%) students who are in the high category, and no students who have high order thinking skills are in the very high category.

#### d. Inferential statistical analysis

The inferential statistical analysis aims to test the hypotheses that have been formulated. Previously, the classical assumption test was carried out, namely the normality test, linearity test, and hypothesis testing. The results of the Kolmogorov Smirnov normality test showed that creative thinking ability data (X1) is  $0.07 > 0.05$ , learning experience data (X2) is  $0.85 > 0.05$ , and higher order thinking skills data (Y) is  $0.19 > 0.05$ . It can be concluded that the data on creative thinking ability, learning experience, and higher order thinking skills are normally distributed.

Based on the significant value on Deviation from linearity of  $0.087 > 0.05$ , which means creative thinking ability (X1) has a linear relationship with higher order thinking skills (Y). While the significant value in Deviation from linearity is  $0.28 > 0.05$ , which means that the learning experience (X2) has a linear relationship with higher order thinking skills (Y).

According to the results of the hypothesis 1 test, the data obtained sig value  $0.00 < 0.05$ , which means  $H_0$  is rejected and  $H_1$  is accepted, which means that there is an influence between creative thinking skills on higher-order thinking skills. Then obtained R Square of 0.57 so it is interpreted that creative thinking ability has a 57% contribution effect on the high-level thinking skills of seventh-grade students of SMP Datok Sulaiman Palopo and 43% is influenced by other factors. This is in line with the research of Soraya Djamilah and Iin Ariyanti who said that the ability to think creatively is included in the HOTS category. HOTS allows students to have analytical competence, think critically, solve problems, increase creativity, and produce innovation.<sup>16</sup>

The results of the hypothesis 2 test resulted in the value of sig  $0.00 < 0.05$  means that  $H_0$  is rejected and  $H_1$  is accepted, meaning that there is an effect of learning experience on the high-level thinking skills of seventh-grade students of SMP Datok Sulaiman Palopo. Then obtained R Square of 0.28 so that it is interpreted that the learning experience has a 28% contribution effect on the higher-order thinking skills of seventh-grade students of SMP Datok Sulaiman Palopo and 72% is influenced by other factors. In real situations of learning mathematics, teachers need to provide HOTS questions according to a tiered learning experience from easy to difficult and not stuck with something that everything has to be "difficult". HOTS questions can be designed with gradations of difficulty level and can be developed for a variety of mathematical materials.<sup>17</sup>

The results of the hypothesis 3 test, showed that the value of sig  $0.00 < 0.05$  then  $H_0$  is rejected and  $H_1$  is accepted, meaning that there is an influence of creative thinking ability and learning experience on high-level thinking skills of seventh-grade students of SMP Datok Sulaiman Palopo. Then the Adjusted R square of 0.62 is obtained so that it is interpreted that creative thinking skills and learning experiences have a contribution effect of 62% on high-order mathematical thinking skills of seventh-grade students of SMP Datok Sulaiman Palopo and 38% is influenced by other factors outside the ability to think creatively and learning experience.

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<sup>16</sup> Soraya Djamilah and Iin Ariyanti, "Pelatihan Pembuatan Soal Berpikir Kreatif untuk Mengembangkan HOTS Siswa bagi Guru Matematika SMP," n.d., 8.

<sup>17</sup> Fitraning Tyas Puji Pangesti, "Menumbuhkembangkan Literasi Numerasi Pada Pembelajaran Matematika Dengan Soal Hots" 5 (2018): 10.

Asep Saifulloh Kamali (2019) found that the HOTS type questions can significantly improve students' creative thinking skills in learning mathematics compared to other exercises<sup>18</sup>. Meanwhile, in this study, creative thinking skills and learning experiences have a significant influence on students' creative thinking skills.

### Conclusion

From this study, it can be concluded that: 1) The average value of the creative thinking ability of seventh-grade students of SMP Datok Sulaiman is 38.11 (54.29%) with the highest score of 75 and the lowest score of 11. This indicates that the student's creative thinking ability is in the non-creative category, 2) The average value of student learning experience is 79.81 (43%) with the highest score of 85 and the lowest score of 73. This shows that the student's learning experience of higher order thinking skills is in the medium category, 3) The average value of higher order thinking skills is 51.99 (53%) with the highest score of 87 and the lowest score of 16. This indicates that the students' higher order thinking skills are in the very low category, 4) Based on the results of simple regression analysis, it shows that there are effects of students' creative thinking skills on higher order thinking skills, 5) There is a significant influence between learning experience on of students' higher-order thinking skills, 6) There is an influence between creative thinking skills and learning experiences on the higher-order thinking skills of seventh-grade students of SMP Datok Sulaiman Palopo.

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<sup>18</sup> Kamali, "Pengaruh Soal Tipe HOTS Terhadap Berpikir Kreatif Siswa."

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