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LITERATURE REVIEW: STUDENTS' CREATIVE THINKING SKILLS THROUGH DISCOVERY LEARNING MODEL

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Abstract (English)
Many studies have focused on using the Discovery Learning model to improve students' creative thinking skills. To support researchers and educators in the field of mathematics education, it is imperative to identify these studies, assess their progress, and summarize in general to provide appropriate advice. This study aims to determine the effect of the Discovery Learning model on students' mathematical creative thinking skills from 2018-2024. This study analyzed 23 journal articles obtained through Google Scholar. The research method used is Systematic Literature Review (SLR). The results of this SLR show that most of the studies examining students' creative thinking skills through Discovery Learning were conducted in 2023, mainly focusing on SMP/MTS. The most widely used method is quantitative. This study can be concluded that 1) the Discovery Learning learning model significantly improves students' creative thinking skills on fluency, flexibility, originality, and elaboration indicators with a moderate to high level of improvement, 2) this model can be used for various levels of education and mathematics topics, and can be combined with other methods such as HOTS questions, e-modules, and Geogebra to improve learning outcomes.

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Key Words
Creative thinking skills, Discovery Learning, SLR.

1. Introduction

Thinking ability is an important aspect that must be possessed by students in the 21st century. The four competencies are critical thinking, creativity, communication, and collaboration. In the 21st century, mathematics learning aims to prepare students to answer the challenges of life and face the demands of the times. One important aspect that must be prepared by students is to improve creative thinking. Creative thinking can also be referred to as a process used when a person comes up with or finds a new idea. Creative thinking involves students' ability to generate and articulate ideas to overcome challenges and explore various solutions. It includes the ability to seek innovative and original approaches, strategies, and concepts to solve problems effectively (Putri & Alberida, 2022).

Students' mathematical creative thinking ability can be measured by various indicators. There are four indicators of creative thinking ability proposed by Munandar (Hidayah et al., 2021) including: 1) fluency, which relates to the ability to provide a variety of responses when faced with a question, 2) flexibility, which reflects the skill to articulate an explanation for a picture, story, or situation, 3) elaboration, which signifies the ability to describe the specific steps needed to solve a problem, and 4) originality, which indicates the ability to design innovative solutions to overcome challenges. Meanwhile, according to Rahayu (Hidayah et al., 2021) there are 5 indicators of creative thinking, namely fluent thinking, flexible thinking, originality, elaboration, and evaluation.

In research (Mulyadi, 2024), it can be concluded that the level of students' creative thinking skills is still low. This was clearly demonstrated by the eighth grade students of SMPN 2 Ujungjaya for the year 2023-2024, which amounted to 25 people. The findings show that these new students have a satisfactory level of creative thinking, especially in terms of originality. However, the indicators of flexibility, fluency and elaboration suggest that there is still significant potential to improve their creative thinking ability. Therefore, it is imperative to continue focusing on improving these abilities.

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Various studies have explored the ways in which the Discovery Learning model encourages mathematical creative thinking. The Discovery Learning model is a way of learning in which students are not given all the information at once. However, they are invited to organize, develop their own knowledge and skills to solve a problem (Ritong et al., 2021).

Several studies conducted by previous researchers have investigated how Discovery Learning can improve students' mathematical creative thinking. For example, (Purnama et al., 2019) in quantitative research it can be concluded that there is a significant effect of Discovery Learning on improving mathematical creative thinking skills at MTS Al-Bukhary. The results showed that the application of the Discovery Learning learning model can improve students' understanding of mathematical concepts and creative thinking skills. Meanwhile, research conducted by (Simbolon et al., 2023) can be concluded that there is an effect of the Discovery Learning learning model on creative thinking skills and the effect is 92.3%.

Each of these studies is still conducted separately, showing students' ability to think creatively after the application of the Discovery Learning model. On the other hand, there is a need to monitor this development by identifying, categorizing, and analyzing the various existing studies. This can be done through a Systematic Literature Review (SLR). However, there are still few studies that use Systematic Literature Review (SLR). Therefore, this research will discuss mathematical creative thinking skills using the Systematic Literature Review (SLR) method. This research aims to identify, classify and evaluate various research results from 2018-2024. This research is expected to provide complete information about the effectiveness of the Discovery Learning model and its influence in mathematics learning practices in Indonesia.

2. Method

This research uses the Systematic Literature Review (SLR) method. All research relevant to this topic will be identified and analyzed using Systematic Literature Review (SLR). The stages of the Systematic Literature Review (SLR) can be seen from Figure 1 (Dasusmi et al., 2023).

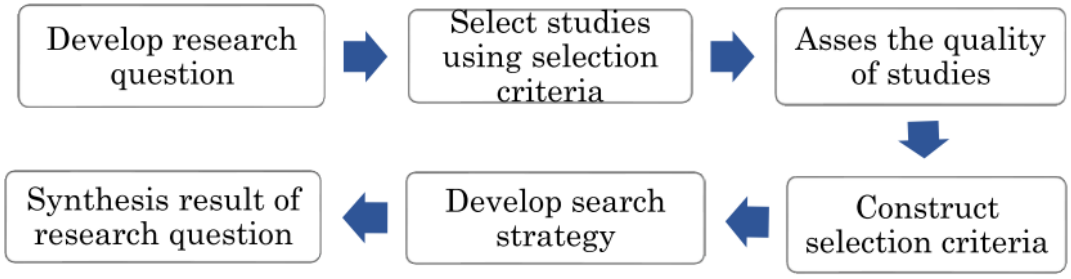

Figure 1. Stages of Systematic Literature Review (SLR)

2.1 Literature Search

The literature search process on Google Scholar and Publish and Perish. The search was conducted using the keywords “Creative Thinking Skills” and “Discovery Learning”.

2.2 Inclusion Criteria

The next step is to select the literature based on the predetermined inclusion and exclusion criteria. These criteria play an important role in determining the suitability of literature for the Systematic Literature Review (SLR) review process (Dasusmi et al., 2023). Articles that fit the inclusion criteria will be included in this study. A description of the criteria is presented in Table 1.

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Table 1. Inclusion and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
Articles that do not discuss creative thinking skills or do not use Discovery Learning.	Articles that do not discuss creative thinking skills or do not use Discovery Learning.
Articles published by journals/prosiding from 2018-2024.	Articles published by journals/prosiding before 2018.
Research subjects at the SD/MI, SMP/MTS, and SMA/MA/SMK levels.	The research subjects were students at the tertiary level.
The research methods used are quantitative, qualitative, mix method, and PTK (Classroom Action Research).	Type of research literature review.

2.3 Data analysis

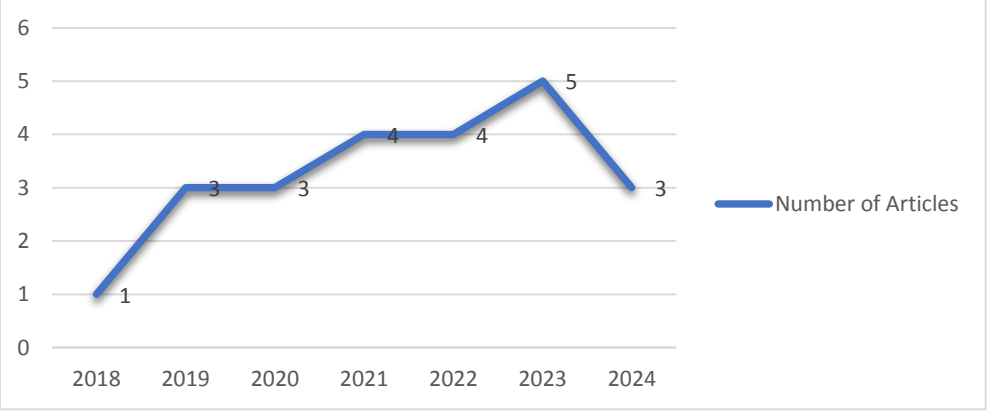
Articles that meet the established inclusion and exclusion criteria will undergo a thorough review process. Each article will be organized and evaluated based on publication year, education level, and research methodology. The publication year will be analyzed in the range of 2018 to 2024, while the education level will be classified into three categories: SD/MI, SMP/MTS, and SMA/MA/SMK. The research method category consists of quantitative, qualitative, mix method, and PTK. Then the research results of each article will be analyzed and conclusions made regarding creative thinking skills through the Discovery Learning learning model.

3. Result and Discussion

3.1 Result

From the literature search process, there are 23 articles that will be included in the analysis stage. The 23 articles consist of 20 national articles and 3 international articles. Based on the year of publication, articles on the Discovery Learning model and students' mathematical creative thinking skills were selected from the 2018-2024 timeframe. The most articles were in 2023, which amounted to 5 articles. While the least in 2018 which amounted to 1 article. The year of publication and the number of articles on the Discovery Learning learning model on creative thinking skills are shown in Figure 2.

Figure 2. Year of Publication and Number of Articles



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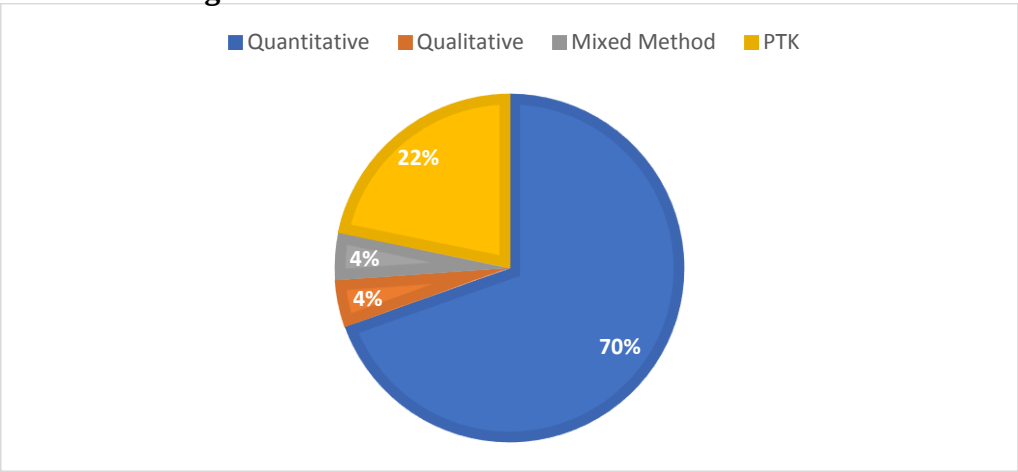
The Discovery Learning model is used at different stages of education to foster creativity in mathematics among students. The number of articles corresponding to each level of education is presented in Table 2 below.

Table 2. Education Level and Number of Articles

Education Level	Number of Articles
SD/MI	3
SMP/MTS	13
SMA/MA/SMK	7

The classification of articles is also based on research methods, namely qualitative, quantitative, mixed methods, and PTK. Figure 4 below illustrates the various research methods.

Figure 4. Research Methods and Number of Articles



Based on the figure above, it can be seen that many studies of creative thinking skills through the Discovery Learning learning model from 2018-2024 used quantitative research methods, namely 84%. Based on the figure above, it is known that qualitative research methods are 5%, mixed method research methods are 5%, and PTK research methods are 6%.

3.2 Discussion

Based on the analysis of 23 articles, various research results were found. Research with quantitative methods, for example research by (Kholifah et al., 2024) the results show that there is an increase in students' creative thinking skills because the discovery learning process itself allows students to think more creatively. The t-test results in this study $t_{hitung} = 18{,}738 > 2{,}086 = t_{tabel}$The n-gain test obtained 0.6690 in the experimental class with $\alpha = 0.05$. From the acquisition of these tests, it can be concluded that the use of discovery learning models in learning can improve creative thinking skills. In addition, the same impact was also found by (HS Sari & Silitonga, 2021) (Nurhayati & Wahyuni, 2020) (Malau et al., 2023) (Julianda et al., 2022) (Werdiningsih, 2019) (Riski et al., 2023) (Simbolon et al., 2023) (Ferawati & Suhendri, 2020)(Aisyah et al., 2024)(Sohilait, 2021)(Hutauruk et al., 2023)(Ritong et al., 2021)(Ayuningtyas et al., 2019)(Rosmawati et al., 2024)(Jatisunda et al., 2020).

The test results show that incorporating discovery learning into personalized education significantly improves and fosters creative thinking skills. Research using qualitative methods, namely research conducted by (Purnama et al., 2019) can be concluded that the use of the Discovery Learning model can improve creative thinking skills at SMPN 4 Ngamprah.

Meanwhile, research using mixed methods, namely research by (Relitasari et al., 2018) by analyzing indicators of creative thinking skills, namely fluency, flexibility, originality, and elaboration, can also be concluded that Discovery Learning learning can improve creative thinking skills.

Research using the PTK method (Kartika & Yunandar, 2022) can be concluded that the implementation of Lesson Study for Learning Community on the Discovery Learning learning model has been proven to improve students' creative thinking skills. In addition, this approach can improve learning outcomes and students' creative thinking skills during learning by using the discovery learning model in cycle I and cycle II (Astuti et al., 2023). Research by (Aminah, Yahya, Devilla, 2022) (Ridho & Setyawan, 2022) (DEA & RAHMAWATI, 2021) also had the same impact.

The results of several studies show that the Discovery Learning model has proven effective in encouraging students to engage in independent exploration, discover new concepts, and solve problems, all of which are important elements in the development of creative thinking skills. This method gives students the freedom and motivation to think flexibly and extend their thinking in a mathematical context, making it a relevant and effective option for creative learning at different levels of education. In addition, this method is also flexible to be applied at various levels of education, on various materials, and can be combined with other learning strategies for more optimal results. Discovery Learning can be an appropriate strategy for educators who want to encourage students to be more active, creative and innovative in facing the challenges of learning in the 21st century.

Therefore, based on the analysis of 23 articles, it can be concluded that creative thinking skills can be improved through the Discovery Learning model. In addition, this model also provides a positive effect in learning mathematics.

4. Conlusion

Based on the results of 23 articles using the Discovery Learning model to improve students' creative thinking skills from 2018-2024. The most publications are in 2023 which are dominated at SMP/MTS. The most widely used research method is quantitative method. These studies can generally be concluded that the Discovery Learning learning model can significantly improve students' mathematical creative thinking skills at various levels of education. The improvement can be seen from four main indicators: fluency, flexibility, originality, and elaboration, with the improvement category varying from moderate to high. Several studies have shown that this model can encourage active student engagement.

Discovery Learning can also be adapted for various levels of education and mathematics topics, and can be combined with other methods such as Problem Based Learning, HOTS (Higher Order Thinking Skills) questions, Scaffolding, e-modules, and Geogebra. The combination with other methods even strengthens students' self-efficacy and provides better results than using one method alone. Thus, Discovery Learning is a flexible, relevant, and effective learning approach to improve students' creative thinking and engagement.

Reference

Aisyah, N. A., Abdullah, A. A., Mubarrok, M. N., Adawiya, R., & Dyahsih, A. S. (2024). Penerapan Model Discovery Learning Berbasis Etnomatematika Berbantuan Geogebra terhadap Kemampuan Berpikir Kreatif Matematis. *Mathema Journal*, *6*(1), 2024.

Aminah, Yahya, Devilla, A. M. R. (2022). Peningkatan Kemampuan Berpikir Kreatif Melalui Model Pembelajaran Discovery Learning. *Didaktis: Jurnal Pendidikan Dan Ilmu Pengetahuan*, *22*(2), 197. https://doi.org/10.30651/didaktis.v22i2.11816

Astuti, Y. D., Purwandari, P., & ... (2023). Penggunaan model pembelajaran discovery learning

untuk meningkatkan hasil belajar dan kemampuan berpikir kreatif siswa kelas 5 pada materi volume kubus dan …. ... *Konferensi Ilmiah Dasar*, *4*, 1109–1118. https://prosiding.unipma.ac.id/index.php/KID/article/view/4546

Ayuningtyas, G. F., Kusumah, Y. S., & Hasanah, A. (2019). Comparison of Students ' Mathematical Creative Thinking Ability through Means-Ends Analysis and Discovery Learning Model. *1st International Seminar STEMEIF (Science, Technology, Engineering and Mathematics Learning International Forum)*, *June*, 701–710. https://proceedings.pgsd.ump.ac.id/index.php/stemeif/article/view/89

Dasusmi, K. J., Destami, L., Mardiana, M., Shobah, M. D., & Muhibbatuzzaeniah, M. (2023). Studi literatur: Model problem based learning (PBL) untuk meningkatkan kemampuan berpikir kritis matematis. *Griya Journal of Mathematics Education and Application*, *3*(2), 325–334. https://doi.org/10.29303/griya.v3i2.319

DEA, W. A., & RAHMAWATI, T. D. (2021). Penerapan Model Discovery Learning Untuk Meningkatkan Kemampuan Berpikir Kreatif Matematika Peserta Didik. *RANGE: Jurnal Pendidikan Matematika*, *2*(2), 141–148. https://doi.org/10.32938/jpm.v2i2.647

Ferawati, F., & Suhendri, H. (2020). Efektivitas Model Discovery Learning dan Problem Based Learning terhadap Berpikir Kreatif dan Kemampuan Pemecahan Masalah Matematika. *JKPM (Jurnal Kajian Pendidikan Matematika)*, *6*(1), 111. https://doi.org/10.30998/jkpm.v6i1.8311

Hidayah, N. C., Ulya, H., & Masfuah, S. (2021). Analisis kemampuan berpikir kreatif siswa sekolah dasar berdasarkan tingkat kemampuan matematis [Analysis of the creative thinking ability of elementary school students based on the level of mathematical ability]. *Jurnal Educatio FKIP UNMA*, *7*(4), 1368–1377. https://doi.org/10.31949/educatio.v7i4.1366

HS Sari, W. D., & Silitonga, I. (2021). Pengaruh Model Pembelajaran Discovery Learning Terhadap Kemampuan Berpikir Kreatif Siswa Kelas IV SDN 066050 Medan. *Bina Gogik*, *8*(3), 89–98.

Hutauruk, A., Lubis, E. Y., & Sinaga, S. (2023). Pengaruh Model Discovery Learning Terhadap Kemampuan Berpikir Keratif Matematis Siswa Pada Materi SPDLV Kelas VIII Di Smp Negeri 2 Rantau Utara. *NNOVATIVE: Journal Of Social Science Research*, *3*(2), 9716–9722.

Jatisunda, M. G., Suciawati, V., & Nahdi, D. S. (2020). Discovery Learning with Scaffolding To Promote Mathematical Creative Thinking Ability And Self-Efficacy. *Al-Jabar : Jurnal Pendidikan Matematika*, *11*(2), 351–370. https://doi.org/10.24042/ajpm.v11i2.6903

Julianda, N., Relawati, R., Defitriani, E., & Aisyah, A. (2022). Pengaruh Model Pembelajaran Discovery Learning Berbasis Proyek terhadap Kemampuan Berpikir Kreatif Siswa Kelas XII IPA SMA Negeri 8 Kota Jambi. *PHI: Jurnal Pendidikan Matematika*, *6*(2), 217. https://doi.org/10.33087/phi.v6i2.224

Kartika, Y., & Yunandar, R. (2022). Implementasi Lesson Study for Learning Comunity melalui Model Pembelajaran Discovery Learning untuk Meningkatkan Kemampuan Berpikir Kreatif Matematis. *Jurnal Pembelajaran Dan …*, *8*(1), 8–13. https://jurnal.ulb.ac.id/index.php/sigma/article/view/2759%0Ahttps://jurnal.ulb.ac.id/index.php/sigma/article/download/2759/2310

Kholifah, I. N., Firdaus, F., & ... (2024). Penerapan Pembelajaran Discovery Learning Dalam Berdeferensiasi Untuk Meningkatkan Kemampuan Berpikir Kreatif Siswa. *OPTIKA: Jurnal Pendidikan …*, *8*(2), 298–308. https://e-journal.uniflor.ac.id/index.php/optika/article/view/4387%0Ahttps://e-journal.uniflor.ac.id/index.php/optika/article/download/4387/2599

Malau, L. M., Siagian, A. F., & Simarmata, R. K. (2023). Pengaruh Model Pembelajaran

Discovery Learning Terhadap Kemampuan Berpikir Kreatif Siswa di Kelas IV SDN 122332 Pematang Siantar. *Jurnal Sains Student Research*, *1*(1), 232–245.

Mulyadi, E. (2024). Analisis Kemampuan Berpikir Kreatif Siswa SMP Pada Materi Relasi dan Fungsi. *Jurnal THEOREMS (The Original Research of Mathematics)*, *8*(2), 371–382. https://doi.org/10.31949/th.v8i2.7908

Nurhayati, N., & Wahyuni, R. (2020). Penggunaan Model Discovery Learning Berbasis Media Interaktif Terhadap Kemampuan Berpikir Kreatif Siswa Dalam Belajar Matematika. *Jurnal Ilmiah Pendidikan Matematika Al Qalasadi*, *4*(1), 31–36. https://doi.org/10.32505/qalasadi.v4i1.1748

Purnama, Y., Dwi Setianingrum, S., & Sylviana Zanthy, L. (2019). Analisis Kemampuan Berpikir Kreatif Dan Komunikasi Matematik Serta Kemandirian Belajar Siswa Smp Melalui Pembelajaran Discovery Learning. *Jurnal On Education*, *01*(03), 191–202.

Putri, Y. S., & Alberida, H. (2022). Keterampilan Berpikir Kreatif Peserta Didik Kelas X Tahun Ajaran 2021/2022 di SMAN 1 Pariaman. *Biodik*, *8*(2), 112–117. https://doi.org/10.22437/bio.v8i2.17356

Relitasari, P., Suyitno, A., & Suyitno, H. (2018). Efektivitas Model Discovery Learning Berbantuan Ice Breaking untuk Meningkatkan Kemampuan Berpikir Kreatif Matematis Materi Geometri. *Prisma, Prosiding Seminar Nasional Matematika*, *1*, 269–278.

Ridho, A. M. R., & Setyawan, F. (2022). Peningkatan Aktifitas dan Kemampuan Berpikir Kreatif Melalui Model Pembelajaran Discovery Learning Berbantuan E-Modul. *Action Research Literate*, *6*(2), 99–117. https://doi.org/10.46799/arl.v6i2.125

Riski, D., Wahyuni, R., & Novianti, N. (2023). Peningkatan Kemampuan Berpikir Kreatif Melalui Soal Tipe HOTS Dengan Model Pembelajaran Discovery Learning. *Asimetris: Jurnal Pendidikan Matematika Dan Sains*, *4*(1), 35–41. https://doi.org/10.51179/asimetris.v4i1.1986

Ritong, M. W., Rahmi, S. Y., & Siregar, W. M. (2021). Pengaruh Model Pembelajaran Discovery Learning Terhadap Kemampuan Berpikir Kreatif Matematis di MTS Al Bukhary Rantauprapat. *Al-Khawarizmi: Jurnal Pendidikan Matematika*, *2*(1), 7–12.

Rosmawati, E., Kania, N., Nurhikmayati, I., & Aminah, N. (2024). Increasing students' mathematical creative thinking abilities through the discovery learning learning model. *Jurnal THEOREMS (The Original Research of Mathematics)*, *9*(1), 54–65. https://doi.org/10.31949/th.v9i1.8784

Simbolon, E., Simanjuntak, R. A. B., Tambunan, H., Samuel Juliardi, S., Manik, E., & Panjaitan, S. (2023). Pengaruh Model Pembelajaran Discovery Learning Terhadap Kemampuan Berpikir Kreatif Matematis Siswa Pada Materi Himpunan. *Jurnal Literasiologi*, *9*(4), 105–113. https://doi.org/10.47783/literasiologi.v9i4.545

Sohilait, E. (2021). Pengaruh model discovery learning terhadap kemampuan berpikir kreatif matematis siswa. *Riemann: Research of Mathematics and Mathematics Education*, *3*(1), 35–41. https://doi.org/10.38114/riemann.v3i1.108

Werdiningsih, C. E. (2019). Pengaruh Model Pembelajaran Discovery Learning Terhadap Kemampuan Koneksi Matematis Siswa Kelas Vii Smp Muhammadiyah …. *Prosiding DPNPM Unindra 2019*, *0812*(80), 399–404. http://repository.upp.ac.id/id/eprint/208%0Ahttp://repository.upp.ac.id/208/2/BAB1-3 DESI.pdf