



## Literature Review: Efforts To Improve Creative Thinking Ability In Science Learning

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### ABSTRACT

**Purpose of the study:** This study aims to obtain information related to efforts to improve students' creative thinking abilities in science learning.

**Methodology:** The review method was chosen to obtain research journals with keywords in students' creative thinking abilities in science learning with Google Scholar reference sources. Twenty five journals were reviewed based on author (year), research design, creative thinking skills, and findings.

**Main Findings:** Based on a study of 25 articles, the application of the Project Based Learning (PjBL) learning model and the Problem Based Learning (PBL) learning model is an effort to improve creative thinking skills in science learning.

**Novelty/Originality of this study:** This research can contribute to the world of education, especially in evaluating science learning.

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## 1. INTRODUCTION

Twenty first century learning is learning by utilizing information and communication technology in all aspects of life [1-3]. The twenty first century is often referred to as the century of technology which requires a lot of capabilities and skills. In the current era, learning must emphasize changes from (1) learning patterns that previously focused on the teacher (teacher-centered learning) to focus on students (student-centered learning), seeking material information independently (self-directed learning), and recognizing one's own abilities, therefore learning activities like this are considered to train students' skills in various fields; (2) changing the pattern of a memorization activity into an activity to find and develop concepts independently, this will help students practice problem-solving skills and abilities, be creative, critical and think deeply; (3) changing individual learning patterns into cooperative learning groups, so that students are able to socialize well with their environment [4-6]. One of the skills that students must have in the 21st century is creative thinking skills.

Creative thinking skills are thinking processes that allow students to apply their imagination in generating new ideas, hypotheses, or experiments. Creative thinking skills tend to be how students can solve problems from various perspectives [7-9]. Creative thinking skills is a skill that can be trained by giving individuals the opportunity to think and then express the ideas that arise within them according to their interests and needs [10-12]. Creative thinking skills have a goal so that students can generate ideas or ideas that tend to be new or unique (Sari et al, 2016).

Creative thinking is very important for students because students can develop skills and knowledge to develop their business and discover new things and innovations. In solving this problem, many efforts have been made, including streamlining the learning system by training students to think creatively. This thinking ability is a process that is able to break down an idea that will arise from students, which will then become the fruit of

thought or new knowledge to answer questions that will arise [13-15]. This effort is realized in order to be able to create a nation's successor in accordance with the demands expected in the 21st century.

## 2. RESEARCH METHOD

This study uses the literature review method or literature review. Literature review is an activity that focuses on a specific topic of interest for critical analysis of the contents of the text being studied [16-18]. This literature review uses literature published in 2017-2023 which can be accessed in full text in pdf format and scholarly (peer reviewed journals) using Google Scholar. The journals reviewed are journals that meet the criteria in the form of research journal articles in Indonesian with the keywords creative thinking in science learning.

## 3. RESULTS AND DISCUSSION

Based on the results of a study of 25 articles, efforts to improve creative thinking skills can be done by applying learning models, approaches, methods or strategies. For more details, see table 1.

Table 1. Research on creative thinking in science learning

Author and Year	Title	Jurnal	Research result
Damayanti, C., Rusilowati, A., & Linuwih, S. (2017).	Pengembangan model pembelajaran IPA terintegrasi etnosains untuk meningkatkan hasil belajar dan kemampuan berpikir kreatif [Development of an ethnoscience-integrated science learning model to improve learning outcomes and creative thinking skills]	<i>Journal of Innovative Science Education</i>	The result of this study is that the ethnoscience integrated science learning model can improve student learning outcomes and students' creative thinking skills
Kumalasari, D., Milama, B., & Bahriah, E. S. (2017).	Model pembelajaran berbasis proyek terhadap kemampuan berpikir kreatif siswa pada materi koloid. [Project-based learning model for students' creative thinking skills in colloidal material.]	<i>Jurnal Riset Pendidikan Kimia (JRPK)</i>	The results of this study are classes that use project-based learning on students' creative thinking skills
Gunawan, B., & Hardini, A. A. T. (2018).	Penerapan Model Pembelajaran Project Based Learning Untuk Meningkatkan Hasil Belajar IPA dan Kemampuan Berfikir Kreatif Siswa Kelas V SD. [Application of the Project Based Learning Model to Improve Science Learning Outcomes and the Ability to Think Creatively for Class V Elementary School Students./	<i>JTIEE (Journal of Teaching in Elementary Education)</i>	The results of this study are that the application of the Project Based Learning learning model is proven to be able to improve science learning outcomes and students' creative thinking abilities
Hikmah, L. N., & Agustin, R. D. (2018).	Pengaruh Model Pembelajaran Project Based Learning Terhadap Kemampuan Berpikir Kreatif Siswa. [The Effect of Project Based Learning Learning Model on Students' Creative Thinking Ability.]	<i>PRISMATIKA: Jurnal Pendidikan Dan Riset Matematika</i>	The results of this study conclude that the Project Based Learning Learning model is able to make students more skilled in creative thinking
Margono, D., Arip, A. G., & Hindriana, A. F. (2018).	Implementasi Penggunaan Model Project Based Learning (PJBL) Dalam Pembuatan Pestisida Organik Untuk Meningkatkan Kreativitas Dan Hasil Belajar Siswa. [Implementation of the Use of Project Based Learning (PJBL) Models in Making Organic Pesticides to Increase Creativity and Student Learning Outcomes]	<i>Edubiologica Jurnal Penelitian Ilmu dan Pendidikan Biologi,</i>	The results of this study conclude that using the PjBL model it appears that teachers are able to carry out good learning and improve students' creative thinking
Fajrina, R. N. A. A., Handayanto, S. K.,	Peran model project based learning dalam kemampuan berpikir kreatif	<i>Jurnal Pendidikan: Teori,</i>	The results of this study conclude that the PjBL

Author and Year	Title	Jurnal	Research result
& Hidayat, A. (2018).	kelas XI IPA melalui materi fluida statis. [The role of the project based learning model in the ability to think creatively in class XI IPA through static fluid material.]	<i>Penelitian, Dan Pengembangan</i>	model can improve creative thinking skills
Dewi, S., & Kelana, J. B. (2019).	Meningkatkan Kemampuan Berpikir Kreatif IPA Siswa Sekolah Dasar Menggunakan Model Contextual Teaching and Learning [Improving Elementary School Students' Science Creative Thinking Skills Using Contextual Teaching and Learning Models]	<i>COLLASE (Creative of Learning Students Elementary Education)</i>	The results of this study conclude that the contextual teaching and learning model can improve students' creative thinking skills
Nury, N., Munawaroh, F., Hadi, W. P., & Rosidi, I. (2019).	Pengaruh Model Project Based Learning denan menggunakan Strategi Poster Session terhadap Kemampuan Berpikir Kreatif. [The Effect of the Project Based Learning Model using the Poster Session Strategy on Creative Thinking Ability.]	<i>Natural Science Education Research (NSER)</i>	The results of this study conclude that there is an effect of applying the project based learning model using the poster session strategy on students' creative thinking skills
Alhazizah, F., & Jalmo, T. (2019).	Pengaruh project based learning terhadap self-efficacy dan keterampilan berpikir kreatif [Effect of project based learning on self-efficacy and creative thinking skills]	<i>Jurnal Bioterdidik: Wahana Ekspresi Ilmiah</i>	The results of this study conclude that the project based learning model can improve students' creative thinking
Ariyani, E., Jalmo, T., & Yolida, B. (2019).	Pengaruh Model PjBL terhadap Kemampuan Komunikasi Sains dan Berpikir Kreatif Peserta Didik [The Effect of the PjBL Model on Students' Science Communication Skills and Creative Thinking]	<i>Jurnal Bioterdidik: Wahana Ekspresi Ilmiah</i>	The results of this study conclude that it can improve students' creative thinking
Wulandari, A. S., Suardana, I. N., & Devi, N. P. L. (2019)	Pengaruh Model Pembelajaran Berbasis Proyek Terhadap Kreativitas Siswa SMP Pada Pembelajaran Ipa [The Influence of Project-Based Learning Models on the Creativity of Middle School Students in Science Learning]	<i>Jurnal Pendidikan Dan Pembelajaran Sains Indonesia (JPPSI)</i>	The results of this study are able to make students more skilled in creative thinking
Tama, H. N., Jalmo, T., & Yolida, B. (2019)	Pengaruh Project Based Learning (PjBL) Terhadap Kemampuan Komunikasi Sains dan Berpikir Kreatif. [The Effect of Project Based Learning (PjBL) on Science Communication Skills and Creative Thinking.]	<i>Jurnal Bioterdidik: Wahana Ekspresi Ilmiah</i>	The result of this study is that PjBL is able to make students more skilled in creative thinking
Jalmo, T., & Yolida, B. (2019).	Pengaruh project based learning terhadap peningkatan kemampuan berpikir kreatif dan self-efficacy [The effect of project based learning on increasing the ability to think creatively and self-efficacy]	<i>Jurnal Bioterdidik: Wahana Ekspresi Ilmiah</i>	The results of this study are that the application of the Project Based Learning model has an effect on increasing students' creative thinking abilities.
Harahap, N. R., Ompusunggu, E., Marpaung, N., & Pulungan, S. E. (2020).	Penerapan Model Project Based Learning (Pjbl) Terhadap Kreativitas Siswa pada Materi Kemagnetan [Application of the Project Based Learning (Pjbl) Model to Student Creativity in Magnetism Material]	<i>INPAFI (Inovasi Pembelajaran Fisika)</i>	The results of this study conclude that Project Based Learning (PjBL) learning has an increase in student creativity and is effectively applied in

Author and Year	Title	Jurnal	Research result
Hasnunidah, N., & Sikumbang, D. (2020).	Pengaruh Model Project Based Learning (PjBL) Terhadap Kemampuan Berpikir Kreatif Peserta Didik. [The Effect of the Project Based Learning (PjBL) Model on Students' Creative Thinking Ability]	<i>Jurnal Bioterdidik: Wahana Ekspresi Ilmiah</i>	learning. The results of this study are able to make students more skilled in creative thinking
Siang, J. L., Sukardjo, M., Salenussa, B. J., Sudrajat, Y., & Khasanah, U. (2020).	Pengaruh model pembelajaran dan kemampuan berpikir kreatif terhadap hasil belajar IPA siswa SMP [The effect of learning models and creative thinking skills on science learning outcomes for junior high school students]	<i>JTP-Jurnal Teknologi Pendidikan</i>	The result of this research is that the learning model can improve the ability to think creatively on learning outcomes
Qomariyah, D. N., & Subekti, H. (2021).	Analisis kemampuan berpikir kreatif. [Analysis of creative thinking skills.]	<i>Pensa: e-jurnal pendidikan sains</i>	The results of this study conclude that the tendency of students' creative thinking competencies is in the creative category.
Ningsih, M. Y., Efendi, N., & Sartika, S. B. (2021).	Pengaruh Model Project Based Learning Terhadap Berpikir Kreatif Peserta Didik dalam Pembelajaran IPA. [The Effect of the Project Based Learning Model on Students' Creative Thinking in Science Learning.]	<i>Jurnal Inovasi Pendidikan Sains (JIPS)</i>	The results of this study concluded that students' creative thinking abilities were in the good category after the Project Based Learning model was applied.
Pratiwi, N., & Aslam, A. (2021).	Pengaruh Model Pembelajaran Picture And Picture terhadap Kemampuan Berpikir Kreatif Siswa di Sekolah Dasar. [The Effect of Picture And Picture Learning Model on Students' Creative Thinking Ability in Elementary Schools]	<i>Edukatif: Jurnal Ilmu Pendidikan</i>	The results of this study conclude that the Picture and Picture learning model can have an impact on improving students' creative thinking skills
Rajagukguk, K. P., Hasanah, N., & Lubis, E. L. S. (2021)	Pengembangan Media E-Learning IPA Berbasis Tematik Integratif Untuk Mengembangkan Kemampuan Berpikir Kreatif Siswa [Development of Integrative Thematic Based Science E-Learning Media to Develop Students' Creative Thinking Ability]	<i>Jurnal Sintaksis</i>	The results of this study conclude that e-learning media can improve students' creative thinking skills.
Krismanita, R., & Qosyim, A. (2021).	Analisis Kemampuan Berpikir Kreatif Pada Pembelajaran Ipa Berbasis Inkuiri Terbimbing. [Analysis of Creative Thinking Ability in Guided Inquiry-Based Science Learning.]	<i>Pensa: E-Jurnal Pendidikan Sains</i>	The results of this study are more effective in encouraging students' creative thinking skills in science learning
Sulastri, E., Supeno, S., & Sulistyowati, L. (2022).	Implementasi Model Problem-Based Learning untuk Meningkatkan Keterampilan Berpikir Kreatif Siswa Sekolah Dasar dalam Pembelajaran IPA [Implementation of the Problem-Based Learning Model to Improve Creative Thinking Skills of Elementary School Students in Learning Science]	<i>Edukatif: Jurnal Ilmu Pendidikan</i>	The result of this study is the application of the problem-based learning model to improve students' creative thinking skills
Ningrum, R., Rahman, T., & Riandi, R. (2022)	Penerapan STEM FROM HOME dengan Model PjBL untuk Meningkatkan Penguasaan Konsep dan Keterampilan Berpikir Kreatif Siswa	<i>PENDIPA Journal of Science Education</i>	The results of this study are able to make students more skilled in creative thinking.

Author and Year	Title	Jurnal	Research result
Imaroh, R. D., Sudarti, S., & Handayani, R. D. (2022).	SMP [Implementation of STEM FROM HOME with the PjBL Model to Improve Mastery of Concepts and Creative Thinking Skills for Junior High School Students] Analisis Korelasi Kemampuan Berpikir Kreatif dengan Model Problem Based Learning (PBL) pada Pembelajaran IPA. [Correlation Analysis of Creative Thinking Ability with Problem Based Learning (PBL) Models in Science Learning.]	<i>Jurnal Pendidikan Mipa</i>	The results of this study conclude that there is a significant relationship between the ability to think creatively and the application of the problem based learning (PBL) learning model.
Ishlahul'Adiilah, I., & Haryanti, Y. D. (2023).	Pengaruh Model Problem Based Learning Terhadap Kemampuan Berpikir Kreatif Siswa pada Pembelajaran IPA. [The Effect of Problem Based Learning Models on Students' Creative Thinking Ability in Science Learning.]	<i>Papanda Journal of Mathematics and Science Research</i>	The results of this study concluded that PBL can develop students' creative thinking abilities

Based on the table above, there are several research results which state that the PjBL learning model can improve students' creative thinking skills. According to Permatasari, project-based learning requires students to actively participate in solving problems with innovations that have been obtained through experience [43]. From this experience it is hoped that it will become a science that will educate students to think more creatively in learning.

In addition to the PjBL model, the Problem Based Learning (PBL) model can also improve students' creative thinking abilities in the science learning process. The Problem Based Learning (PBL) model supports the concept of knowledge in students with the ability to think creatively, critically think, communicate and students' ability to self-evaluate [44]. The Problem Based Learning (PBL) learning model is one of the learning models recommended in the 2013 curriculum.

The ability to think creatively is an important aspect in creating an innovation and finding ideas to solve a problem. Creative thinking can train students to develop many ideas and arguments, ask several questions [45]. According to Endang & Sulistyowati, students who have creative thinking skills will have a creative mindset, have more comprehension, as well as maximum learning outcomes, and be able to think divergently [46]. In other words, students who have creative thinking skills will have a high mindset and comprehension when compared to students who do not have creative thinking skills. So students who have creative thinking skills will be able to find ideas and solve problems, therefore creative thinking skills are needed to be owned in the learning process.

#### 4. CONCLUSION

Creative thinking skills should be grown in every education in Indonesia. With good creative thinking skills, it is hoped that it can support students' motivation in learning so that it has a positive impact on learning outcomes or captures learning because these skills invite students to solve problems from many different points of view. The ability to think creatively can be trained one of them by learning science. Based on a study of 25 articles, the application of the Project Based Learning (PjBL) learning model and the Problem Based Learning (PBL) learning model is the most widely used effort to improve creative thinking skills.

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