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Students' Creative Thinking Ability Through the Project Based Learning (PjBL) Model Assisted by Talking Sticks.

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ABSTRACT
Having the ability to think creatively is preparation for facing the 4.0 era. The application of the Project Based Learning model assisted by Talking Stick in science subjects can create an active learning atmosphere, create new ideas, be cheerful and enthusiastic so that it can improve students' creative thinking abilities. This research is a type of quantitative experimental research with a pre-experimental design. The research was conducted in class V at SDN 01 Kaleo, SDN 02 Kaleo, and SD Inpres Kaleo, totaling 69 students. The research instrument uses multiple choice tests and descriptions. Data analysis uses the Actual Completion Limit (BTA). After implementing the PjBL model assisted by Talking Stick, the classification of creative thinking abilities increased in the high category. There were no students in the pre-test while there were 14 students in the post-test. The creative thinking abilities of fifth grade students in the science subject water cycle material can increase after implementing the PjBL model with the help of Talking Stick. The development of a PjBL-based textbook with the help of Talking Stick for students' creative and critical thinking abilities is the idea for the development of this research.
***Keywords**: Creative Thinking Ability; Project Based Learning Model; Talking Stick Model; IPA*

ABSTRAK
Penelitian ini memiliki kemampuan berpikir kreatif merupakan persiapan untuk menghadapi era 4.0. tujuan dari penerapan model Project Based Learning berbantuan Talking Stick pada mata pelajaran IPA dapat menciptakan suasana belajar yang aktif, menciptakan ide-ide baru, ceria, dan semangat sehingga dapat meningkatkan kemampuan berpikir kreatif yang dimiliki siswa. Penelitian ini merupakan jenis penelitian kuantitatif eksperimen dengan rancangan pra-eksperimen desain. Penelitian dilakukan di kelas V SDN 01 Kaleo, SDN 02 Kaleo, dan SD Inpres Kaleo yang berjumlah 69 siswa. İnstrumen penelitian mengguanakn tes pilihan ganda dan uraian. Analisis data menggunakan Batas Tuntas Aktual (BTA). Setelah penerapan model PjBL berbantuan Talking Stick peningkatan klasifikasi kemampuan berpikir kreatif pada katagori tinggi pre test tidak ada siswa sedangkan post-test ada sebanyak 14 siswa. Kemampuan berpikir kreatif siswa kelas V pada mata pelajaran IPA materi siklus air dapat meningkat setelah diterapkannya model PjBL berbantuan Talking Stick. Pengembangan buku ajar berbasis PjBL berbantuan Talking Stick untuk kemampuan berpikir kreatif dan kritis siswa menjadi gagasan untuk pengembangan dari penelitian ini.
Kata Kunci: Kemampuan Berpikir Kreatif; Model Project Based Learning; Model Talking Stick; IPA.

INTRODUCTION

Era 4.0 requires everyone to have high-level thinking skills to be able to keep up with developments in science and technology. Training students in higher level thinking is the same as training students' productive, innovative, active and creative qualities (Amri & Muhajir, 2022; Nurhayati et al., 2019; B. D. Wicaksono & Prihatnani, 2019). Teaching of 21st Century Skills (ATC21S) states that one of the categories of ways of thinking includes creativity (Griffin & Care, 2015). One of the four 21st century skills is creativity (Kristiani et al., 2017). Creativity will emerge after the ability to think creatively (Sudarmin et al., 2020).

Erisa et al., (2021) Creative thinking abilities need to be developed since elementary education. Students have different levels of creative thinking abilities (Febriyanto et al., 2023). Science learning in elementary schools can be a forum for developing students' creative thinking abilities (Ningsih et al., 2021). The ability to think creatively is the ability a person has to be able to create new ideas or combine the ideas they have so that they become something different (Riyanti, 2020; Zakiah et al., 2020). Segundo-Marcos et al., (2023) The implementation of students' creative thinking skills can be used to solve problems or create new ideas in preparation for facing the 4.0 era. The practice questions and exams given to students are still classified as Low of Thinking Skill so that when given questions with a level of creative thinking students still find it difficult to understand and answer them. Students' attention is often diverted to things that happen outside the classroom, this happens because of the passive learning atmosphere. Students still tend to focus on the examples given by the teacher without thinking about new ideas that they can create themselves.

Based on several facts that have been stated, it is necessary to create an active learning atmosphere by implementing a collaborative learning model that can be used in all science learning topics, can be linked to students' understanding of concepts in everyday life problems, and is able to provide stimulus for students to improve their creative thinking ability skill.

The problem solving approach taken is by applying the PjBL model assisted by Talking Stick model to science subjects (Dermawan et al., 2022). PjBL is an innovative learning model that involves project work and guides students to design, solve problems, make decisions, carry out investigative activities, and provides opportunities for students to work independently (Amamou & Cheniti-Belcadhi, 2018; Choi et al., 2019; I. Lestari & Ilhami, 2022; Nisa, 2023; Suweni et al., 2023). The application of the PjBL model can improve students' creative thinking abilities in science subjects (Amri & Muhajir, 2022; Puspita et al., 2022; Riyanti, 2020).

The Talking Stick model is a model that prepares students to learn, trains students to understand material quickly, trains students to study diligently, trains oral skills, trains the ability to decipher explanations, and is confident in giving opinions with the help of a stick while singing (Fajrin, 2018; Novianti et al., 2019).

Therefore, through the application of the PjBL model which is supported by the Talking Stick model, there is a way to overcome the weaknesses of the learning approach in improving students' creative thinking abilities. So combining this model is one solution that can be developed sustainably to train students' creative thinking skills, especially in elementary science subjects.

METHODS

Type and Design

This research is a type of quantitative experimental research with a pre-experimental design type, This design is said to be a pre-experimental design because it is not yet established It's a serious experiment because there are still external variables involved influence the formation of the dependent variable (Sugiyono, 2016). In this research design, there is only one group, namely the experimental group, which will be given a pre-test of creative thinking abilities at the beginning of the meeting, then given treatment using the PjBL model assisted by Talking Stick and finally given a post-test of creative thinking abilities.

Data and Data Sources

This research has a population of class V elementary schools in Lambu District, the sample used is class V SDN 01 Kaleo, SDN 02 Kaleo, dan SD Inpres Kaleo with a total of 69 students. Sampling used the Nonprobability Sampling technique, Sampling used the Nonprobability Sampling technique, samples were taken based on several criteria, namely, SDNs that use the same curriculum; the same school accreditation; qualifications of teachers who teach; almost the same infrastructure; and the material taught is the same.

Data collection technique

Data collection techniques use objective tests and subjective tests which are first consulted with an Expert Validator, then tested for validity, reliability, distinguishing power and level of difficulty.

Data analysis

Data on the results of pre-test and post-test creative thinking abilities also went through normality and homogeneity tests with the help of SPSS 20 before BTA was determined and categorized based on high, medium and low classifications. The Actual Completion Limit (BTA) is used as the limit for passing the creative thinking ability test based on the initial ability test carried out, with the following formula:

$$\mathbf{BTA = \bar{X} + 0{,}25\ SD}$$

Information:

BTA : Actual Due Limit

$\bar{X}$: Average

0.25 : One quarter of the Standard Deviation

SD : Standard Deviation

The classification of creative thinking abilities in this research uses a scale S. Wicaksono, (2014) in table 1.

Table 1. Creative Thinking Ability Measurement Scale

Creative Thinking Ability	Category
Skor > $\bar{X}$ + SD	High
$\bar{X}$ - SD ≤ Skor ≤ $\bar{X}$ + SD	Medium
Skor < $\bar{X}$ - SD	Low

Information:

$\bar{X}$: Average value of students' creative thinking abilities
SD : Standard Deviation
Score : Student Creative Thinking Ability Result Score

RESULTS AND DISCUSSION

Application of the PjBL model which is supported by the Talking Stick model, there is a way to overcome the weaknesses of the learning approach in improving students' creative thinking abilities, Students' creative thinking abilities based on pre-test and post-test data can be seen in table 2.

Table 2. Students' pre-test and post-test creative thinking abilities

Score	Frekuensi	
	Pre-test	Post-test
8 – 20	19	3
21 – 33	22	6
34 – 45	8	14
46 – 56	10	12
57 – 70	8	17
71 – 80	2	5
81 – 93		12
Skor Max	73	93
Skor Min	8	15
Total	2334	3933
Average	33,82	57

Based on table 2, it shows that the creative thinking abilities of class V students in science subjects have changed. In the pre-test there were 41 students who got below the average score and 28 students got above the average score, while in the post-test it can also be seen that 35 students got below the average score and 34 students got scores above the average.

This creative thinking ability is measured using a 10-item multiple choice test and a 5-item essay, with four stages of creative thinking ability. Stages and indicators of creative thinking abilities can be seen in table 3.

Table 3. Stages and Indicators of Creative Thinking Ability

No	Stages of Creative Thinking	Indicator of Creative Thinking	Creative Thinking Sub Indicator
1.	Fluency of thinking	Have lots of ideas in a variety of different categories	Identify
			Conclude
2.	Flexibility of thinking	Has various problem solving solutions	Ability to give reasons
			Involves guesswork
3.	Elaboration	Able to add or elaborate on the details of an object, idea, or situation so that it becomes better	Generalize
			State an interpretation
			Determining the results of considerations based on consequences
4.	Originality	Able to express solutions to solve problems based on his own thoughts	Formulate a solution
			Constructing arguments

	Using arguments

Each stage of creative thinking ability has indicators and sub-indicators which are developed into test questions. In the first stage "Fluency of Thinking" students are trained by providing a problem for which a solution will be found through creating a project. Project-based learning requires students to practice problem management (Puspita et al., 2022). In the second stage, "Flexibility of Thinking," students are accustomed to planning how to work on projects that will be completed with group. The PjBL model can help students express ideas in a work product (Guo et al., 2020; Hermita et al., 2023). In the third stage, "Elaboration" students are trained when presenting project results and when playing Talking Stick where students will get open-ended questions whose answers are in accordance with the student's abilities and knowledge. At the presentation stage students will describe the results of the project that has been prepared (Suryaningsih & Ramdani, 2023). The Talking Stick model trains students to answer verbally questions asked by the teacher (Suryaningsih, 2023). The fourth stage "Originality" students are given several project examples and they will create the results of the project which are different from the examples but have the same meaning. for example, at the first meeting of the project, namely making a brochure about "An Appeal to Maintain Clean Water", students looked for examples of brochures on the internet to be developed by their respective groups, and as a result of the development, the aspects in the brochure had different images and different colors. different, and the words of appeal are different, some groups even insert regional languages.

The results of the BTA calculation to determine the student's graduation limit for their creative thinking abilities are as follows:

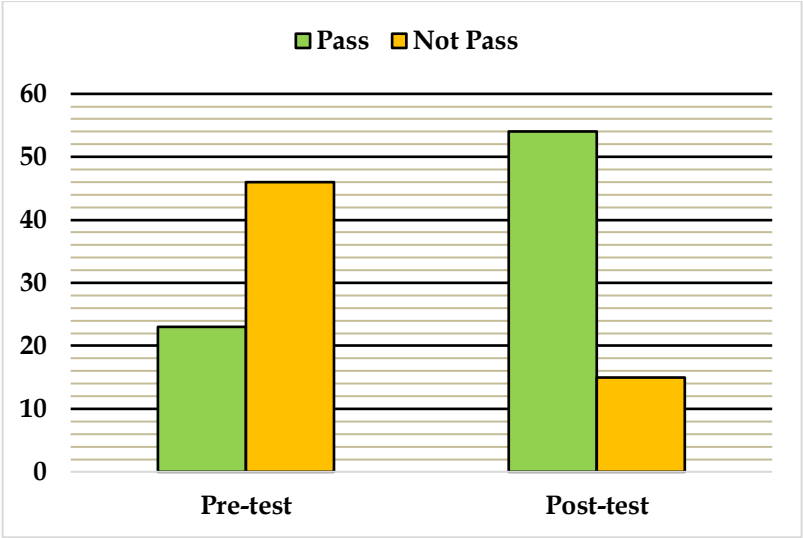
BTA $= \bar{X} + 0{,}25\ SD$

$= 33{,}82 + 0{,}25 \times 18{,}3$

$= 33{,}82 + 4{,}575$

$= 42{,}935$ rounded to 43.

Completeness of students' creative thinking abilities before implementing the PjBL model assisted by Talking Stick and after its implementation. The following is graph 1. Completeness of students' pre-test and post-test creative thinking abilities.



Graph 1. Completion of Creative Thinking Ability Pre-test and Post-test

Based on the graph above, the completeness of students' creative thinking abilities in the pre-test was 66.7%, while many students did not complete it, namely 33.3%. The percentage of completion on the post-test was 78.3% and for students who did not complete it was 21.7%. There was an increase in the completion of creative thinking skills by 31 students from only 23 students who completed it to 54 students who completed it, this happened after the implementation of the PjBL model assisted by Talking Stick in class V elementary school in the science subject Water Cycle.

Implementation of learning using the PjBL model with the help of Talking Stick directs students to be able to find and solve problems through preparing and working on a project which will then be presented and ends with strengthening the results of the lesson through playing with sticks. The PjBL model requires students to be more active independently and in groups so as to create interesting and meaningful learning (Erisa et al., 2021; Fahrurrozi et al., 2022; Mokambu, 2021). Nilayanti et al., (2019); Olivantina & Suparno (2018) Playing with sticks can attract interest so that students can calmly answer when the teacher confirms understanding of the lesson material.

Learning begins with the teacher asking several questions and displaying pictures, then dividing the students into several homogeneous groups, in groups the students will prepare a project related to solving the initial problem explained by the teacher. Some initial questions will provide students with a smooth thinking process in determining a project to solve existing problems. Trimawati et al., (2020) When someone solves and resolves problems then he will do it creatively and critically. The PjBL model can train students to think creatively (Dayana et al., 2021; Ningsih et al., 2021; Nurmantoro et al., 2022).

Students will present the results of the project that has been created, other groups will pay attention to the results of the group's project that is progressing with the note that, if there are similarities or differences in the results of the project, a question and answer session will be held and a statement given by the other group so that, it can be concluded that the project which one will be more successful and effective in solving a problem that has become a learning topic. This will increase knowledge of solving the same problem in a different way and have an impact on increasing the fourth stage of creative thinking, namely "originality". Surya et al., (2018) Project results will be explained in detail during the results presentation.

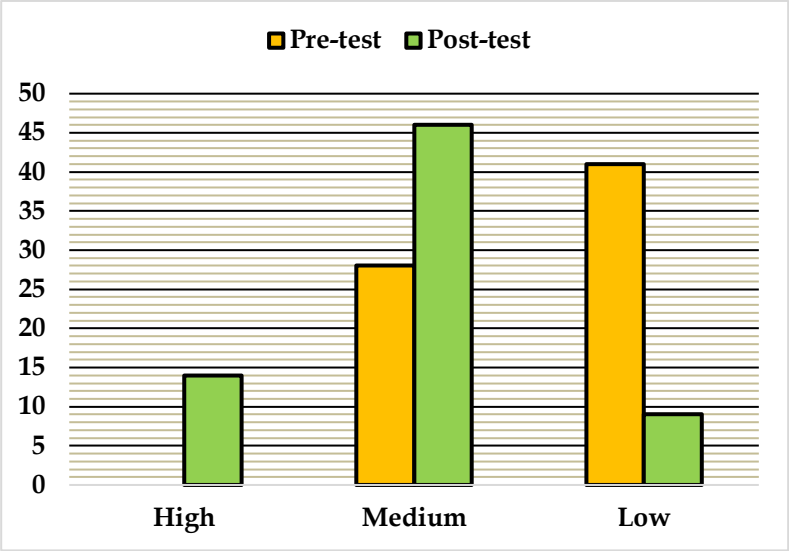
The final stage of learning is playing with sticks where the teacher has previously explained the playing procedures. At this stage students will give answers and responses verbally, if from the questions given by the teacher and there are friends' answers that do not match the student's opinion then the student will also give the answer according to him. Talking Stick will provide a cheerful and interesting atmosphere so that students will be calmer and the explanation of the answers given will be better (Harahap & Panjaitan, 2019).

Based on the classification of students' creative thinking abilities, it can be seen based on the following measurement scale:

Table 4. Categories of Students' Creative Thinking Ability

Creative Thinking Ability	Category
Skor > 78	High
36 ≤ Skor ≤ 78	Medium
Skor < 36	Low

Based on the creative thinking ability category, it can be seen that there are many groups of students who have high, medium and low creative thinking abilities both before the treatment (pre-test) and after being given the treatment (post-test).



Graph 2. Classification of Pre-test and Post-test Creative Thinking Ability Categories

Based on graph 2, it can be seen that after implementing the PjBL model assisted by Talking Stick, there were 14 students' creative thinking abilities that reached the high category. Students' initial creative thinking abilities are only in the medium and low categories.

Applying the PjBL model as the main model has various advantages, (1) training students to find and solve problems; (2) helping students express ideas in a project; (3) train students' confidence when making presentations and provide rebuttals according to understanding; (4) train students to prepare time estimates and be able to maximize work within the specified time.

The application of the Talking Stick model as a supporting model has several advantages, (1) training students' verbal decoding of answers; (2) train the authenticity of students' answers because the questions are open-ended, allowing students to have answers according to their understanding; (3) creating an interesting and cheerful learning atmosphere so that the learning process will feel comfortable.

The implementation of the PjBL model assisted by talking sticks turned out to have a positive influence on students' creative thinking abilities both in the learning process and student output (Dermawan & Andartiani, 2022). Initially, students' creative thinking abilities were in the medium category after the implementation of PjBL assisted by Talking Stick. There were several students whose creative thinking abilities reached the high category. Students who initially did not dare to express their opinions verbally were able to freely give oral answers after the implementation of the PjBL model assisted by Talking Stick. Students initially lacked a place to share ideas, but when implementing the PjBL model with the help of Talking Stick, it became a place for students to express their ideas. Project based learning is a model that helps student learn through projects (Sharma et al., 2020). İn the research for example in the first project students made a brochure calling for saving clean water, in the second project the project compiled and decorated a classification of the benefits of water for living creatures, the third project is water cycle simulation, the fourth is identification of drinking water, and

the fifth is a simple water purification project. At the end of the lesson the students were enthusiastic again by playing with sticks while singing and the students were enthusiastic about explaining the process and understanding gained during the lesson (Heong et al., 2011).

The great enthusiasm and enthusiasm of students during the learning process causes students' creative thinking abilities to increase, this is in accordance with the data obtained that as many as 11.6% of students experienced an increase in the completeness of their creative thinking abilities. The PjBL model provides a positive influence and improves creative thinking abilities (Febriyanti et al., 2020; E. S. Lestari, 2022; Puspita et al., 2022). The Talking Stick model is recommended to be applied to improve students' creative thinking abilities (Dania et al., 2023; Harahap & Panjaitan, 2019).

CONCLUSION

The creative thinking ability of class V students in the water cycle science subject can increase after implementing the PjBL model with the help of Talking Stick. The creative thinking ability of students which was originally only in the low category and is currently experiencing improvement, there are also those who reach the high category. The mastery of students' creative thinking abilities increased by 11.6% from the pre-test of 66.7% to the post-test of 78.3%. After implementing the PjBL model with the help of Talking Stick, there were no students in the high category of creative thinking ability classification, the pre-test while there were 14 students in the post-test. The creative thinking abilities of fifth grade students in science subjects on the water cycle can increase after implementing the PjBL model with the help of Talking Stick. The development of a PjBL-based textbook with the help of Talking Stick for students' creative and critical thinking abilities is the idea for the development of this research.

REFERENCES

Amamou, S., & Cheniti-Belcadhi, L. (2018). Tutoring in project-based learning. *Procedia Computer Science*, *126*, 176–185. https://doi.org/10.1016/j.procS.2018.07.221

Amri, A., & Muhajir, H. (2022). KETERAMPILAN BERPIKIR KREATIF PESERTA DIDIK MELALUI MODEL PROJECT BASED LEARNING (PjBL) SECARA DARING. *Didaktika Biologi: Jurnal Penelitian Pendidikan Biologi*, *6*(1), 21–29. https://doi.org/10.32502/dikbio.v6i1.4380

Choi, J., Lee, J. H., & Kim, B. (2019). How does learner-centered education affect teacher self-efficacy? the case of project-based learning in Korea. *Teaching and Teacher Education*, *85*, 45–57. https://doi.org/10.1016/j.tate.2019.05.005

Dania, R., Syaukani, & Andhany, E. (2023). PERBEDAAN BERPIKIR KREATIF MENGGUNAKAN METODE TALKING STICK DAN TALKING CHIPS SISWA SMP MUHAMMADIYAH KABANJAHE. *RELEVAN: Jurnal Pendidikan Matematika*, *3*(2), 201–205.

Dayana, R., Winarni, E. W., & Agusdianita, N. (2021). Pengaruh Model Project Based Learning (PjBL) Diorama Dalam Pembelajaran IPA Terhadap Kemampuan Berpikir Kreatif Siswa Kelas IV Sekolah Dasar. *JURIDIKDAS: Jurnal Riset Pendidikan Dasar*, *4*(1), 106–114.

Dermawan, D. D., & Andartiani, K. (2022). Worksheets Electronic Development of STEAM-Based to Improve Students ' Creative Thinking Ability. *Hipotenusa: Journal of Mathematic*

Society, *4*(1), 71–81. https://doi.org/10.18326/hipotenusa.v4i1.7213

Dermawan, D. D., Maulana, P., & Hartono Ikhsan, M. (2022). Peningkatan Motivasi dan Hasil Belajar Dengan Menggunakan Media Flanelgraf pada Siswa Sekolah Dasar. *Wiyata Dharma: Jurnal Penelitian dan Evaluasi Pendidikan*, *8*(2), 229–239. https://doi.org/10.30738/wd.v8i2.3726

Erisa, H., Hadiyanti, A. H. D., & Saptoro, A. (2021). Model Project Based Learning untuk Meningkatkan Kemampuan Berpikir Kreatif dan Hasil Belajar Siswa. *JPD: Jurnal Pendidikan Dasar*, *12*(1), 1–11. https://doi.org/doi.org/10.21009/JPD.012.01

Fahrurrozi, F., Sari, Y., & Fadillah, J. (2022). Studi Literatur : Pemanfaatan Model Problem Based Learning terhadap Kemampuan Berpikir Kritis dalam Pembelajaran PKn Siswa Sekolah Dasar. *Edukatif : Jurnal Ilmu Pendidikan*, *4*(3), 4460–4468. https://doi.org/10.31004/edukatif.v4i3.2795

Fajrin, O. A. (2018). Pengaruh Model Talking Stick Terhadap Hasil Belajar IPS Siswa SD. *Jurnal Bidang Pendidikan Dasar*, *2*(1), 85–91. https://doi.org/10.21067/jbpd.v2i1a.2353

Febriyanti, A., Susanta, A., & Muktadir, A. (2020). Pengaruh Model Pembelajaran Project Based Learning (Pjbl) terhadap Kemampuan Berpikir Kreatif dalam Pembelajaran Tematik Muatan Pelajaran IPA Peserta Didik Kelas V SD Negeri. *Jurnal Pembelajaran dan Pengajaran Pendidikan Dasar*, *3*(2), 176–183. https://doi.org/10.33369/dikdas.v3i2.14130

Febriyanto, B. F., Rahman, Yuliawati, Anggraeni, S. W., & Yonanda, D. A. (2023). Hubungan Kemampuan Berpikir Kreatif Dan Menulis Deskripsi Pada Siswa Kelas II Sekolah Dasar. *Jurnal Elementaria Edukasia*, *6*(3), 1519–1528. https://doi.org/10.31949/jee.v6i3.5647

Griffin, P., & Care, E. (2015). *Assesment and Teaching of 21st Century Skills*. Springer. https://doi.org/10.1007/978-94-017-9395-7

Guo, P., Saab, N., Post, L. S., & Admiraal, W. (2020). A Review of Project-Based Learning in Higher Education: Student Outcomes and Measures. *International Journal of Educational Research*, *102*(April), 101586. https://doi.org/10.1016/j.ijer.2020.101586

Harahap, H. H., & Panjaitan, A. M. (2019). Penerapan Model Pembelajaran Kooperatif Tipe Talking Stick Terhadap Kemampuan Berfikir Kreatif Matematika Siswa Di Smp Negeri 11 Padangsidimpuan. *EKSAKTA : Jurnal Penelitian dan Pembelajaran MIPA*, *4*(1), 10–18. https://doi.org/10.31604/eksakta.v4i1.10-18

Heong, Y. M., Othman, W. B., Yunos, J. B. M., Kiong, T. T., Hassan, R. Bin, & Mohamad, M. M. B. (2011). The Level of Marzano Higher Order Thinking Skillsamong Technical Education Students. *International Journal of Social Science and Humanity*, *1*(2), 121–125. https://doi.org/10.7763/ijssh.2011.v1.20

Hermita, N., Ramadhani, E., & Fakhrudin, A. (2023). Efektifitas Penerapan Model Project Based Learning terhadap Kemampuan Berpikir Kreatif Siswa Kelas V SDN 137 Palembang. *Education and Learning Journal*, *2*(2), 202–210.

Kristiani, K. D., Mayasari, T., & Kurniadi, E. (2017). Pengaruh pembelajaran STEM-PjBL terhadap keterampilan berpikir kreatif. *Seminar Nasional Pendidikan Fisika III*, *21*, 266–274.

Lestari, E. S. (2022). Media Pembelajaran PKn Berbasis Video Pada Siswa Kelas IV Sekolah Dasar. *JIKAP PGSD : Jurnal Ilmiah Ilmu Kependidikan Pengembangan*, *6*(1), 8–15.

Lestari, I., & Ilhami, A. (2022). Penerapan Model Project Based Learning Untuk Meningkatkan Keterampilan Berpikir Kreatif Siswa Smp: Systematic Review. *LENSA (Lentera Sains): Jurnal Pendidikan IPA*, *12*(2), 135–144. https://doi.org/10.24929/lensa.v12i2.238

Mokambu, F. (2021). Pengaruh model project based learning terhadap kemampuan berpikir kreatif siswa pada pembelajaran ipa di kelas V SDN 4 Talaga Jaya. *PROSIDING SEMINAR NASIONAL PENDIDIKAN DASAR "Merdeka Belajar dalam Menyambut Era Masyarakat 5.0," November*, 56–62.

Nilayanti, P. M., Suastra, I. W., & Gunamantha, I. M. (2019). Pengaruh Model Pembelajaran Talking Stick terhadap Kemampuan Berpikir Kreatif dan Literasi Sains Siswa Kelas IV SD. *Jurnal Pendidikan Dasar Indonesia*, *3*(1), 31–40. https://doi.org/10.22202/economica.2017.v6.i1.1941

Ningsih, M. Y., Efendi, N., & Sartika, S. B. (2021). Pengaruh Model Project Based Learning Terhadap Berpikir Kreatif Peserta Didik dalam Pembelajaran IPA. *Jurnal Inovasi Pendidikan Sains (JIPS)*, *2*(2), 42–51. https://doi.org/10.37729/jips.v2i2.1403

Nisa, A. (2023). Penerapan Model Project Based Learning untuk Meningkatkan Kemampuan Berpikir Kreatif Siswa di Sekolah Dasar. *Jurnal Riset Madrasah Ibtidaiyah (JURMIA)*, *3*(1), 1–7.

Novianti, I., Purwoko, R. Y., & Darminto, B. P. (2019). Model Talking Stick untuk Meningkatkan Keterampilan Siswa dalam Pemecahan Masalah. *Jurnal Education Mathematik*, *8*(1), 75–84.

Nurhayati, N., Angraeni, L., & Wahyudi, W. (2019). Pengaruh Model Problem Based Learning, Kemampuan Berpikir Kritis Terhadap Kemampuan Berpikir Tingkat Tinggi. *Edusains*, *11*(1), 12–20. https://doi.org/10.15408/es.v11i1.7464

Nurmantoro, M. A., Kamali, A. S., Sutarba, M. U., & Hernawan, I. (2022). Apakah Pembelajaran Berbasis Proyek dan Berbasis Masalah dapat Meningkatkan Penguasaan Konsep dan Kemampuan Berpikir Kreatif Siswa Madrasah. *Gema Wiralodra*, *13*(1), 304–311. https://doi.org/10.31943/gemawiralodra.v13i1.219

Olivantina, R. A., & Suparno. (2018). Peningkatan Kepercayaan Diri Anak Melalui Metode Talking Stick. *Jurnal Pendidikan Usia Dini*, *12*(November), 331–340. https://doi.org/https://doi.org/10.21009/JPUD.122 DOI:

Puspita, A. M., Utomo, E., & Purwanto, A. (2022). Model Pembelajaran Berbasis Proyek Mata Pelajaran IPA Kelas III Dalam Meningkatkan Kemampuan Berfikir Kreatif Siswa. *Tunas: Jurnal Pendidikan Guru Sekolah Dasar*, *7*(2), 55–65. https://doi.org/10.33084/tunas.v7i2.3194

Riyanti, R. (2020). Efektivitas Penggunaan Perangkat Pembelajaran Project Based Learning (PjBL) Terintegrasi STEM Berbasis E-Learning Untuk meningkatkan Kemampuan Berpikir Kreatif. *DWIJA CENDEKIA: Jurnal Riset Pedagogik*, *4*(2), 206–215. https://doi.org/10.20961/jdc.v4i2.45276

Segundo-Marcos, R., Carrillo, A. M., Fernández, V. L., & Daza González, M. T. (2023). Age-related changes in creative thinking during late childhood: The contribution of cooperative learning. *Thinking Skills and Creativity*, *49*(September), 101331. https://doi.org/10.1016/j.tsc.2023.101331

Sharma, A., Dutt, H., Naveen Venkat Sai, C., & Naik, S. M. (2020). Impact of Project Based Learning Methodology in Engineering. *Procedia Computer Science*, *172*(Juni), 922–926. https://doi.org/10.1016/j.procs.2020.05.133

Sudarmin, Sumarni, W., Mursiti, S., & Sumarti, S. S. (2020). Students' innovative and creative thinking skill profile in designing chemical batik after experiencing ethnoscience integrated science technology engineering mathematic integrated ethnoscience (ethno-

stem) learnings. *Journal of Physics: Conference Series*, *1567*(2), 1–7. https://doi.org/10.1088/1742-6596/1567/2/022037

Sugiyono, S. (2016). *Metode Penelitian Pendidikan Pendekatan Kuantitatif, Kualitatif, dan R&D*. Alvabeta.

Surya, A. P., Relmasira, S. C., & Hardini, A. T. A. (2018). PENERAPAN MODEL PEMBELAJARAN PROJECT BASED LEARNING (PjBL) UNTUK MENINGKATKAN HASIL BELAJAR DAN KREATIFITAS SISWA KELAS III SD NEGERI SIDOREJO LOR 01 SALATIGA. *Jurnal Pesona Dasar*, *6*(1), 41–54.

Suryaningsih, S. (2023). Perbedaan Self Confidence Siswa Melalui Model Problem Based Learning Berbantuan Talking Stick. *Jurnal Ilmiah Mandala Education (JIME)*, *9*(1), 862–869. https://doi.org/10.58258/jime.v9i1.4626/http

Suryaningsih, S., & Ramdani, N. (2023). PENERAPAN MODEL PROJECT BASED LEARNING PADA MATA KULIAH PEMBELAJARAN MATEMATIKA SD II MAHASISWA STKIP HARAPAN BIMA. *PENDIKDAS: Jurnal Pendidikan Dasar*, *04*(01), 53–58. https://doi.org/10.56842

Suweni, Dianasari, & Nurhabibah, P. (2023). Peningkatan Hasıl Belajar Model Project Based Learnıng Berbasıs Lapbook Kelas III SDN 1 Semplo. *Jurnal Elementaria Edukasia*, *x*(10), 1609–1618. https://doi.org/10.31949/jee.v6i4.7127

Trimawati, K., Kirana, T., & Raharjo, R. (2020). PENGEMBANGAN INSTRUMEN PENILAIAN IPA TERPADU DALAM PEMBELAJARAN MODEL PROJECT BASED LEARNING (PjBL) UNTUK MENINGKATKAN KEMAMPUAN BERPIKIR KRITIS DAN KREATIF SISWA SMP. *Quantum: Jurnal Inovasi Pendidikan Sains*, *11*(1), 36–52. https://doi.org/10.20527/quantum.v11i1.7606

Wicaksono, B. D., & Prihatnani, E. (2019). Profil Berpikir Kritis Matematis Mahasiswa dalam Menyelesaikan Soal Trigonometri Ditinjau dari Tingkat Kepercayaan Diri. *Mosharafa: Jurnal Pendidikan Matematika*, *8*(1), 71–82. https://doi.org/10.31980/mosharafa.v8i1.406

Wicaksono, S. (2014). "Eksperimentasi Model Pembelajaran Kooperatif Tipe Teams Games Tournament (TGT) Berbantu Media Audio-Visual Ditinjau Dari Kemampuan Komunikasi Matematis Pada Materi Segiempat." *Jurnal Pembelajaran Matematika*, *2*(9), 995-1007.

Zakiah, N. E., Fatimah, A. T., & Sunaryo, Y. (2020). Implementasi Project-Based Learning Untuk Mengeksplorasi Kreativitas Dan Kemampuan Berpikir Kreatif Matematis Mahasiswa. *Teorema: Teori dan Riset Matematika*, *5*(2), 286–293. https://doi.org/10.25157/teorema.v5i2.4194