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Application of the Project Based Learning Model Assisted by Talking Sticks to Improve Students' Creative Thinking Abilities in Science Subjects

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Abstrak
Tujuan penelitian yaitu untuk mengetahui peningkatan kemampuan berpikir kreatif siswa melalui penerapan model PjBL berbantuan Talking Stick. Metode penelitian yaitu kuantitatif eksperimen dengan desain pre-experimental design (pra-eksperimen desain). Penelitian dilakukan di SDN 01 Kaleo, SDN 02 Kaleo, dan SD Inpres Kaleo dengan jumlah total 69 siswa. Pengambilan sampel menggunakan teknik Nonprobability Sampling: sampling purposive. Teknik pengumpulan data menggunakan tes objektif dan tes subjektif yang akan dianalisis dengan menggunakan rumus N-gain. Berdasarkan hasil analisis data bahwa terdapat peningkatan kemampuan berpikir kreatif siswa dengan rata-rata 0,41 pada katagori sedang setelah diterapkan model PjBL berbantuan Talking Stick di kelas V SD mata pelajaran IPA materi Siklus air.

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Abstract
The aim of the research is to determine the increase in students' creative thinking abilities through the application of the PjBL model assisted by Talking Stick. The research method is quantitative experiment with pre-experimental design. The research was conducted at SDN 01 Kaleo, SDN 02 Kaleo, and SD Inpres Kaleo with a total of 69 students. Sampling used the Nonprobability Sampling technique: purposive sampling. Data collection techniques use objective tests and subjective tests which will be analyzed using the N-gain formula. Based on the results of data analysis, there was an increase in students' creative thinking abilities with an average of 0.41 in the medium category after implementing the PjBL model with the help of Talking Stick in class V elementary school in science subjects on the water cycle.

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1. INTRODUCTION

In the 21st century, the challenge for the development of the Indonesian nation is to face revolution 4.0 where everyone is required to have scientific and technological skills. It is necessary to form a generation that is skilled at solving problems, thinking creatively, likes discussing, working together, and can communicate their ideas effectively(Dewi et al., 2017; Siahaan et al., 2017; Zubaidah, 2016).Assessment and Teaching of 21st Century Skills (ATC21S) categorizes 21st century skills into 4 categories, namely way of thinking, way of working, tools for working, and skills for living in the world (4). The way of thinking category consists of one of them, namely creativity. A person's creativity will emerge if they have the ability to think creatively, so students need to have the ability to think creatively in facing the 21st century(Sudarmin et al., 2020).

The ability to think creatively is a person's ability to be able to create, manipulate, differentiate things that can provide good benefits in life(Nurjanah et al., 2021). Students' creative thinking abilities must be developed in each individual so that they can overcome problems in more varied and better ways(Erisa et al., 2021). Science learning in elementary schools occupies a strategic and important position, because science education in the 21st century is oriented towards developing students' intelligence abilities in learning so that they can solve problems in

everyday life in a meaningful, relevant and contextual way. Students who have the ability to think creatively will be able to provide many ideas and problem solving solutions(Ningsih et al., 2021). Creative thinking skills are needed in the process of implementing science learning.

The problem that often occurs in elementary schools is the lack of implementation of learning models that involve active students directly, such as carrying out practice, experiments and discoveries, so that there is no place for students to develop creative thinking abilities, giving practice questions that tend to measure abilities in the Low category. Thinking Skill – Moderate of Thinking Skill, students tend to get bored during the learning process, students' attention is quickly diverted by the commotion outside the learning class.

Based on the facts above, it is necessary to implement 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 students with stimulus to improve their creative thinking abilities. The project-based learning model requires students to make independent decisions(Amamou & Cheniti-Belcadhi, 2018; Choi et al., 2019).

PjBL is a model that trains students to design and complete projects so that students can be trained to make decisions and solve problems in the learning process that will have an impact on students' lives(Amiruddin et al., 2021; Domenici, 2022; Erviana et al., 2022; Muliyati et al., 2020). The application of the PjBL model can improve students' creative thinking abilities in science subjects(Amri & Muhajir, 2022; Nurmantoro et al., 2022; Puspita et al., 2022). Based on one of the characteristics of elementary school children, namely learning while playing, the implementation of the PjBL model is assisted by the Talking Stick model in the application of the learning syntax. The Talking Stick model can create an enthusiastic and cheerful learning atmosphere(Suryaningsih, 2023). This Talking Stick model can also provide a stimulus for students to be more focused so that students can give the right answers(Suryaningsih et al., 2021).

Based on the description of several research results above, the novelty in this research is that at the "observation evaluation" stage of the PjBL model it will be combined with the Talking Stick model, where at this stage games will be played using sticks while singing, this is in accordance with one of the characteristics Elementary school children are "learning while playing" so that after making a project the students are refreshed by playing with sticks while singing. The PjBL steps assisted by Talking Stick are as follows:

1. The basic question determination stage, students choose a project topic and develop high-level questions.
2. In the project planning stage, students record information and create a project plan.
3. In the schedule preparation stage, students determine and explain the project completion schedule.
4. The stage of monitoring students and project progress, students divide tasks in groups and create projects
5. In the results assessment stage, students present and provide feedback on the project results
6. In the experience evaluation stage & playing talking sticks, students reflect and play talking sticks while singing.

Researchers want to see how students' creative thinking abilities in science subjects improve after implementing the PjBL model assisted by Talking Stick as described above.

2. RESEARCH METHOD

This research is a quantitative experimental research with a pre-experimental design. This research design only has one group, namely the experimental group which will be given a pre-test of creative thinking skills 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.

The population in this study was class V of elementary schools in Lambu sub-district, sampling used the Nonprobability Sampling Technique, samples were taken based on several criteria, namely, elementary schools that used the same curriculum; the same school accreditation; schools with state status; qualifications of teachers who teach; almost the same infrastructure; and the material taught is the same, based on this, 23 students were taken as samples from class V of

SDN 01 Kaleo, SDN 02 Kaleo with 25 students, and SD Inpres Kaleo with 21 students. The number of samples in this study was 69 class V SDN students.

Data collection techniques use; (1) Multiple choice tests and essays which will test the validity, reliability, level of difficulty and distinguishing power of the questions, and (2) Documentation in the form of a collection of photos when the research was carried out.

The data analysis technique uses the N-gain test. First, a normality test was carried out using SPSS 20 software with the Kolmogorov – Smirnov test at a significance level of 5%. Homogeneity test using SPSS 20 software with the Levene's Statistical Test option at a significance level of 5%. Find gain with formula(Lestari & Yudhanegara, 2017):

$$gain = skor\ postes - skor\ pretes$$

TallThe low level of improvement in students' abilities is expressed in a gain index (g) which is determined based on the criteria in Table 1.

Table 1.Gain value criteria (g)

Interval (g)	Gains
$(g) \geq \overline{X_g} + S_g$	Height Increase
$\overline{X_g}$- g -S_g << $\overline{X_g} S_g$	Medium Improvement
$\overline{X_g}$- ≤ gS_g	Low Increase

Information:

g : gain value

X_g: average student improvement

S_g: Standard deviation/standard deviation of gain data

If you get the gain value, the N-gain value will be calculated. Apart from being used for viewing enhancement student abilities, N-gain is used to provide information regarding student achievement. Formula used:

$$\text{N}-Gain = \frac{S_{post} - S_{pre}}{SMI - S_{pre}}$$

Information:

S_{pre} :pretest score

S_{post} :posttest score

SMI : Score Maximum Ideal, namely the maximum score that students will get if they answer questions perfectly.

Tallor low N-Gain value is determined based on the following criteria, which can be seen in table 2.

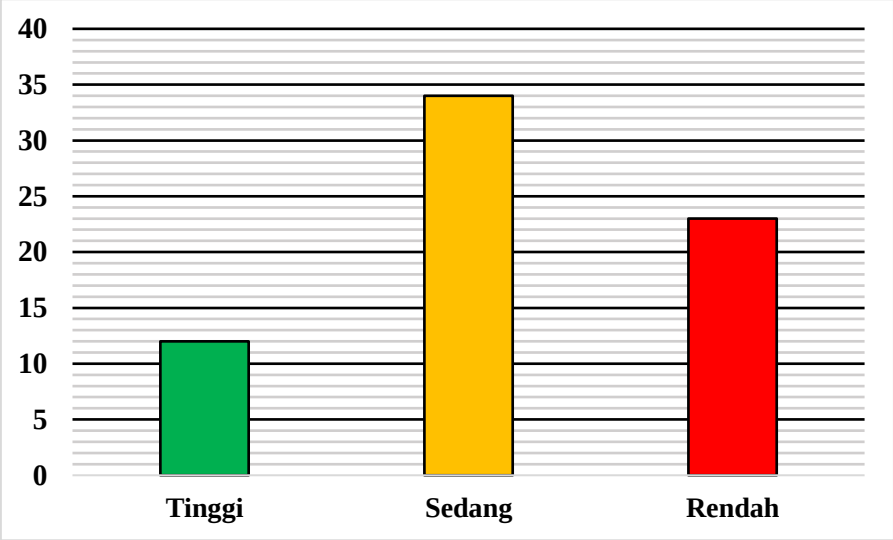
Table 2.N-Gain Value Criteria

Interval (g)	Gains
$N - gain \geq 0{,}70$	Tall
$0{,}30 \leq N - gain < 0{,}7$	Currently
$N - gain < 0{,}30$	Low

3. RESEARCH RESULTS AND DISCUSSION

3.1.Research result

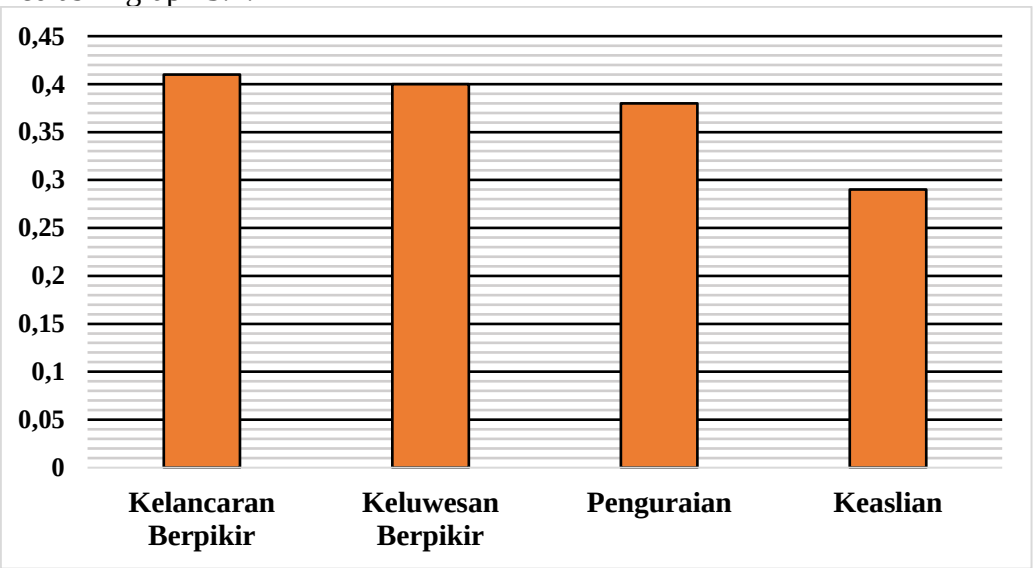
Based on the results of the data processing that has been carried out, the results obtained from the N-gain test for creative thinking abilities are as follows in graph 3.1.



Graph 3.1 Classification of Class V Students' Creative Thinking Abilities in Science Subjects

Based on graph 3.1, it is known that the number of students who experienced an increase in creative thinking abilities in the high category was 12 students, while in the medium category it was 34 students, and in the low category it was 23 students. The highest increase was in the medium, low and final categories in the high category. There are still students who have improved in the low category, but even though they are in the low category, these students still experience an increase in their creative thinking abilities. The average increase was 0.41 in the medium category.

The ability to think creatively has 4 stages, namely fluency of thinking, flexibility of thinking, decomposition and originality. Based on the results of the analysis of improvements at each stage of students' creative thinking in this research, results were obtained as in graph 3.2.



Graph 3.2 Classification of Increasing Stages of Students' Creative Thinking

Based on graph 3.2, it is found that the increase in the stages of creative thinking from the highest to the lowest respectively is fluency of thinking (0.41), flexibility of thinking (0.4), decomposition (0.38), and authenticity (0.29).

3.2.Discussion

a. Implementation of the Project Based Learning Model Assisted by Talking Stick

Learning by implementing the Project Based Learning model with the help of Talking Stick is carried out in 3 schools, namely SDN 01 Kaleo, SDN 02 Kaleo, and SD Inpres Kaleo. At each

meeting students are divided into several heterogeneous groups. Group division is carried out to accommodate students in discussing with friends. Active learning includes various ways so that students are active through activities that build group work(Syaparuddin et al., 2020). Students are always given activities to prepare and work on projects, the first meeting is the project of making a "Brochure Appeal to Maintain the Availability of Clean Water", the second meeting is "Classifying the Benefits of Water for Living Creatures", the third meeting is "Simulating the Process of the Water Cycle", the fourth meeting is "Identifying Drinkable Water", and the fifth meeting was "Making a Simple Water Purification Tool". Making projects aims to make students gain knowledge and be active in the learning process(Suryaningsih & Ramdani, 2023). Project creation always ends with each group presenting the results of the project that has been created. Students will be trained to have the ability to communicate scientifically through presentations(Isabela, Miftahus Surur, 2021). At the end of each meeting, a Talking Stick game is played to review students' understanding of the material they have studied. The questions given are open questions where the answers to the questions vary according to the student's ability to answer.

b. Increasing Creative Thinking Ability

Based on the results of data analysis show that there has been an increase in the creative thinking abilities of class V students in science subjects. Analysis of the calculation of creative thinking abilities through the application of the PjBL model assisted by Talking Stick has an average increase of 0.41, namely in the medium category.

This increase in students' creative thinking abilities occurs due to the application of the PjBL model which requires students to prepare and complete projects, strengthen and elaborate on the material trained through the application of the Talking Stick model at the end of meeting in learning process. Preparing, making, and presenting projects familiarizes students with being able to think fluently, explaining opinions, and being able to create new things or ideas. With this habit, students can train their creative thinking skills. Applying the PjBL model can foster creativity, responsibility, manage information, and produce a project(Dayana et al., 2021; Nahdiah & Handayani, 2021). The PjBL model is effective in improving students' creative thinking abilities(Hermita et al., 2023). The application of the PjBL model has a significant influence on students' creative thinking abilities in science subjects(Ningsih et al., 2021).

The application of the Talking Stick model as a support model that is integrated at the end of the implementation stage of the PjBL model is to create a cheerful learning atmosphere by playing with sticks while singing, (1) training students' attention to listen to the teacher's explanation; (2) encourage students to ask questions regarding material they have not yet understood; (3) train students' fluent thinking in answering questions from the teacher; (4) practice decoding students' explanations orally. Jamun et al., (2020)The Talking Stick model requires students to be more active and can create a pleasant learning atmosphere.Sabardila et al., (2019)there was an increase in student enthusiasm with the implementation of the Talking Stick model.Nilayanti et al., (2019)The Talking Stick model has a significant effect on students' creative thinking abilities.(Dania et al., 2023; Harahap & Panjaitan, 2019)recommends that teachers apply the Talking Stick model to improve students' creative thinking abilities. The application of the PjBL model with the help of Talking Stick can improve students' creative thinking abilities, especially in the science subject material on the water cycle for class V elementary school.

Improvement at each stage of creative thinking ability cannot be separated from the learning process based on PjBL syntax assisted by Talking Stick. The fluency of thinking stage experienced a very high increase compared to the other stages, this is because in the learning process students are accustomed to providing ideas for completing projects and discussing in groups and are trained in talking stick games, where students have to answer questions based on the ideas they have.

The second increase is in the flexibility of thinking stage, this is almost the same as the first stage, however at this stage some students still lack the courage to convey their problem solving solutions. The third improvement was at the decomposition stage, because at the flexibility of thinking stage there were still some students who did not dare to express their opinions, which resulted in students not being confident in describing a solution to a problem. The final increase was at the authenticity stage, this occurred because students still relied on the examples given by the teacher, some students were still insecure in expressing their opinions.

4. CONCLUSION

Based on the research that has been conducted, it can be concluded that learning using the PjBL model assisted by Talking Stick in class V can improve students' creative thinking abilities. The results achieved show that students' creative thinking abilities experienced an average increase of 0.41 in the medium classification. This research can be used as a reference for learning models and to create enjoyable science learning, as well as paying attention to the learning process of students who still lack self-confidence, so that they can be trained so that the creative thinking stage is fulfilled well at each stage. Based on the results of this research, further research can develop several teaching materials with PjBL syntax with the help of Talking Stick, so that readers can carry out the learning process without any guidance from the teacher.

5. THANK-YOU NOTE

To principals of SDN 01 Kaleo, SDN 02 Kaleo, and SD Inpres Kaleo who have given permission for research to be conducted at the schools they lead, class 5 homeroom teachers from the three schools who have supported, observed and assisted in the ongoing research process, students of the three schools who are always diligent and comply with research rules, and all parties involved in the ongoing research so that it can be completed well.

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