The Influence of the Recitation-assisted Problem Based Learning Model on the Creative Thinking Abilities

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Abstract: The aim of this research is to determine the effect of the recitation-assisted problem based learning model on the creative thinking abilities of class XI SMAN 6 Pekanbaru. The research was conducted in April-June 2023 class XI SMAN 6 Pekanbaru. The research uses a quasi-experimental type of pretest-posttest control design. Sampling using random sampling, obtained an experimental class at XI MIPA 4 and a control class at XI MIPA 6, namely 72 students. The data collection technique used was creative thinking test questions. The pretest research results for the control and experimental classes were 34.94 categorized as very less creative and 37.69 categorized as very less creative, and the posttest for the control and experimental classes was 68.22 categorized as quite creative and 77.72 categorized as creative. Parameters using the pretest normality test sig 0.061 and posttest 0.15 are normally distributed. The homogeneity test obtained by the pretest was sig 0.89 and the posttest was 0.67 meaning it was homogeneous. Hypothesis testing obtained sig 0.00 < 0.05, H1 was accepted. This shows that the problem based learning model assisted by recitation has a significant effect on the creative thinking ability of class XI SMAN 6 Pekanbaru.

Keywords: Creative thinking skills; Problem based learning; Recitation-assisted

Introduction

The curriculum contains a set of plans regarding bjectives, content, learning materials and guidelines for implementing learning to lead to educational goals. Educational objectives must have changes and results towards curriculum objectives (Huerta et al., 2022). The current curriculum aims to challenge 21st century abilities which apply Higher Order Thinking Skill instruments from the aspects of problem solving, creative thinking, communication skills and mastering the media. Students are needed to create something new in solving problems encountered both at school and in their environment (Abdurahman et al., 2023).

In the learning process, especially biological material, there are limitations for students in the scope of memorizing the material and obtaining a score below the KKM, namely 75. This is also reinforced by the results of students' initial creative thinking abilities, namely Fluency thinking, namely 52.86 less creative category; Flexibility thinking, namely 46.43 in the very less creative category; Original thinking, namely 45.00 very less creative category; and Elaboration thinking, namely 53.33 in the less creative category.

The low creative thinking ability of students requires a change in the learning model that is able to improve creative thinking, namely the Problem Based Learning model. This is in line with the research results Sabilu et al. (2022) that the use of the Problem Based Learning model has a significant effect on the creative thinking abilities of class XI students at Wangi-wangi High School, Southeast Sulawesi. In his research, the t-test obtained sig. 0.031 < 0.050 means H0 is rejected and H1 is accepted in the hypothesis test.

The learning model must be adapted by the teacher to the needs of the class, so that learning can be effective and efficient (Sari et al., 2023). The Problem Based Learning model can stimulate students' thinking in

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analyzing problems, formulating hypotheses, collecting data and presenting answers to solving problems (Hartati et al., 2022). Using the Problem Based Learning model will encourage students to be more creative, enthusiastic and curious. The syntax includes orienting students to problems, organizing students to learn, guiding individual and group investigations, developing and presenting work results, and analyzing and evaluating the problem solving process.

The learning process using models cannot be separated from methods, the methods used are expected to be able to achieve learning objectives in a real and practical way. The Problem Based Learning model has a weakness, namely that it does not include basic information or knowledge of the material being taught (Irfan, 2019). The weaknesses of the model can be covered by the use of a method in the form of recitations (assignments) which are able to cover basic information. When giving assignments, students will be responsible for the assignment and enrich their knowledge in order to achieve the expected learning goals (N. Anggraini et al., 2022).

According to Hikmawati et al. (2020), the recitation method provides students with the opportunity to obtain good knowledge results through working on questions and collecting work in completing assignments. Teachers need to pay attention to the phases in implementing learning using the recitation method. As for according to Dewantara et al. (2020) namely, there are 3 phases, namely, 1) assignment phase; 2) task implementation phase; and 3) the task accountability phase.

The material that students consider difficult is the body's defense system. The researcher analyzed the material from the syllabus, namely using the 2013 revised 2018 curriculum (Sanova & Malik 2023). The material on the body's defense system is in KD 3.14 Analyzing the role of the immune system and immunization on physiology in the body and KD 4.14 Carrying out a campaign on the importance of community participation in programs and immunizations as well as disorders in the immune system. This material has 3 meetings with each allocated time of 2 x 45 minutes. The immune system material is abstract, making it difficult for students to understand the material well (Uliyandari et al., 2021).

The researcher compiled the learning tools needed during the learning process, including: slabus, Learning Implementation Plan (RPP) adapted to the syntax of the Problem Based Learning model assisted by recitation of creative thinking skills, teaching materials and Student Assignment Sheets (Handayani et al., 2020). Therefore, this research aims to determine the effect of the recitation-assisted Problem Based Learning model on the creative thinking abilities of class XI SMAN 6 Pekanbaru.

Method

Place, Time and Type of Research

The research model used is a quantitative model, this model emphasizes research on quantitatively objective phenomena (Jumadi et al., 2021). This research method is an experimental method with a Quasy Experiment research type with a Pretest-Posttest Control Design. The research was carried out in class XI at SMAN 6 Pekanbaru in April-June 2023, even semester of the 2022/2023 academic year. The research design pattern is in Figure 1.

| KE | O1 | X1 | Q1 |
| KK | O2 | X2 | Q2 |

Figure 1. Research design

Description:
KE : Experimental Class
KK : Control Class
O1 : Pretest Creative Thinking Experimental Class
O2 : Pretest Creative Thinking Control Class
X1 : PBL & Recitation Model Treatment
X2 : Conventional Model Treatment
Q1 : Experimental Class Creative Thinking Posttest
Q2 : Control Class Creative Thinking Posttest

Research Population and Sample

The population in this study were students in classes XI MIPA 1, XI MIPA 2, XI MIPA 3, XI MIPA 4, XI MIPA 5 and XI MIPA 6. This population was chosen because they studied body defense system material in class XI at SMAN 6 Pekanbaru.

The sample was determined using a random sampling technique based on consideration of the results of daily tests on the normality test and homogeneity test (Permatasari et al., 2019). The samples obtained in this research were class XI MIPA 6 as the control class applying the conventional model with the lecture method and XI MIPA 4 as an experimental class applies the Problem Based Learning model assisted by recitation and trains creative thinking skills in the learning process.

Data Collection Technique

The data collection technique in this research was carried out using test sheets. This instrument applies indicators of creative thinking, fluent thinking, flexible thinking, original thinking and detailed thinking (Nurdian et al., 2023). The indicators and sub-indicators of creative thinking are described in table 1.

Table 1. Indicators of Creative Thinking

Indicator creative thinking	Sub indicator creative thinking
Fluently thinking	Determining many ideas, solving problems and answers
	Provide advice on problems
	Have relative answers according to the conditions faced
Flexible thinking	Have a variety of questions or answers that will be given
	Have a different perspective on the problem
	Able to change the way of thinking about the approach obtained
Original thinking	Able to form an expression that is unique and new
	Providing an unexpected way to express yourself
	Able to update certain combinations of parts or elements
Elaboration thinking	Develop, add and enrich an idea
	Detailing the details
	Expanding an idea

Data Analysis Technique

Researchers carry out calculations to answer the problem formulation and then test the hypothesis (Wulandari et al., 2018). The data analysis techniques used are prerequisite material tests, creative thinking ability tests.

Test Prerequisite Material
Normality Test

Statistical test to see whether the sample is normally distributed or not. Researchers carried out calculations using the SPSS ver 22 application. The formula is:

$$x^2 = \sum \left(\frac{f_0 - f_n}{f_n} \right) \tag{1}$$

Description:
X^2 = Chi kuadrat
F_0 = Frequency Data From Samples
F_n = The Expected Frequency In The Population
The formula for the normality test is:
- Value (Sig.) < 0,05 abnormally distributed
- Value (Sig.) > 0,05 normally distributed

Homogeneity Test

This test aims to see whether the two sample groups have homogeneous variance or not before and after learning (Oktaviani et al., 2023). Researchers carried out calculations using the SPSS ver 22 application. The homogeneity test was carried out using the rule, if the significance of the Based On Mean is > 0.05, then the variance between groups is homogeneous, and if the significance of the Based On Mean is < 0.05 then the variance between groups is not homogeneous. The formula is:

$$\text{Fcount} = \frac{Biggest\ variant}{Smallest\ variant} \tag{2}$$

Hypothesis Testing

When obtaining normally distributed and homogeneous data, the researcher then tested the hypothesis using the Independent Sample T-Test, with the following test criteria (Alvionita et al., 2020): If the sig value. (2-tailed) < 0.05, then H_0 is rejected and H_1 accepted. If the sig value. (2-tailed) > 0.05, then H_0 is accepted and H_1 is rejected.

Test Sheet

The results of the research that was carried out were based on indicators of creative thinking abilities and the results were analyzed using the Microsoft Office Excel application. The value criteria use the following formula:

$$K = \frac{JB}{BS} \times 100 \tag{3}$$

Description:
K = Completeness
JB = Number of Correct Answers
BS = Number of Questions

The graph based on category of completeness of creative thinking can be seen in table 2.

Table 2. Indicator Score of Creative Thinking

Score	Category
X ≤ X ≤ 49	Very less creative
50-59	Less creative
60-69	Quite creative
70-79	Creative
80-100	Very creative

Results and Discussion

Result

The research results obtained were based on normality tests, homogeneity tests and hypothesis tests, as well as creative thinking ability test sheets which included creative thinking indicators, namely: fluent thinking, flexible thinking, original thinking and elaboration thinking (Fahmi et al., 2023).

Normality Test

Researchers used the SPSS ver 22 application with the Kolmogrov-Smirnov test, obtained sig data. The pretest for the control and experimental classes were 0.150 and 0.061, and the posttest for the control and experimental classes were 0.053 and 0.053. Both data are normally distributed.

Homogenity Test

Researchers used the One Way Annova test with the help of the SPSS ver 22 application. The pretest and posttest data obtained were 0.897 and 0.674, meaning there was a homogeneous variance between groups.

Hypothesis Test

Researchers used the Independent Sample T-Test with the help of SPSS ver 22. The data obtained was sig. $0.00 < 0.05$. Reading the conclusion means that H_0 is rejected and H_1 is accepted.

Ability to Think Creatively Through Test

Researchers provide Pretest-Posttest questions that have been validated and contain indicators of creative thinking in the form of: fluent thinking, flexible thinking, original thinking and elaboration thinking. Results can be seen in table 3.

Table 3. Creative Thinking Abilities of Control Class and Experimental Class

Indicator	Control class		Experimental class	
	Pre	Post	Pre	Post
Fluenty thinking	35.42 (VLC)	70.14 (C)	44.44 (VLC)	79.86 (C)
Flexible thinking	39.58 (VLC)	68.75 (QC)	35.42 (VLC)	79.17 (C)
Original thinking	32.64 (VLC)	69.44 (QC)	34.03 (VLC)	77.08 (C)
Elaboration thinking	30.56 (VLC)	63.89 (QC)	36.11 (VLC)	75.00 (C)
Average	34.94 (VLC)	68.22 (QC)	37.69 (VLC)	77.72 (C)

Description: VLC (Very low creative); QC (Quite creative); C (Creative)

Researchers obtained data on the average pretest score for the control class and experimental class, namely 34.94, categorized as very less creative and 37.69 categorized as very less creative. The average Posttest score for the control class and experimental class was 68.22, categorized as quite creative and 77.72, categorized as creative.

Discussion

The test sheet provided contains indicators of creative thinking and the influence of the recitation-assisted Problem Based Learning model on creative thinking parameters, as follows:

Fluency Thinking

This aspect is shown in accordance with the sub-indicator of fluent thinking, namely, students answer questions through ideas, provide suggestions for problems and relative answers to the conditions they face. Fluent thinking is implemented in the syntax of orienting students to problems, the teacher carries out the assignment phase in the form of a poster (recitation) based on autoimmune problems and students answer autoimmune problems in the form of whatever the causes are, thus giving students the opportunity to explore the material well (Guo et al., 2020). Students provide ideas in the form of answers to cases of autoimmune causes and are presented as a phase of responsibility for tasks in the recitation method. This aspect was seen in students in Pretest research question number 1 regarding cases of autoimmune causes that occurred and students were able to provide answers to autoimmune causes, namely the body forms antibodies and fights against each other, these various answers are an implementation of sub-indicators of fluent thinking.

According to Anggraini et al. (2023) questions on indicators of fluent thinking certainly provide stimulation to students' way of thinking to form a variety of ideas they have. The ideas that students have refer to the students' higher level of understanding in the application of recitation. The learning process cannot be separated from student activities in the Posttest in the form of evaluations at each meeting, so that it will provide more understanding of the material Suryawati et al. (2020). The highest results were obtained at meeting 3, namely grouping factors that influence the body's defense system, students were able to group autoimmune diseases into autoimmune diseases correctly. This is because students in the learning process apply the syntax of the Problem Based Learning model assisted by recitations in the form of a resume for meeting module 3 which leads to learning objectives, while the control class uses the conventional model and does not create a resume, so they are not trained to think fluently (Suyono et al., 2016)

Flexible Thinking

Aspects of this indicator include variations in questions or answers, having diverse points of view, and being able to change the way of thinking about the approach obtained. Flexible thinking is implemented in syntax II, namely organizing students to learn and syntax III guiding individual and group investigations (Bachtiar et al., 2023). Carrying out recitations in the assignment implementation phase, students will be

trained to provide various points of view and ideas on Covid problems from module recitations. Students will answer the process of phagocytosis as one of the stages of the humoral mechanism (Akpur, 2020). This can be seen in the highest research pretest obtained in number 5 regarding the stages of the phagocytosis process to prevent antigens from entering the body and causing disease. Students have various answers to the sequence of the phagocytosis process according to their individual understanding. In line with opinion Bosawer et al. (2023) students optimally provide a variety of answers according to the 2nd and 3rd syntax of the Problem Based Learning model and according to the flexible thinking indicators.

In the learning process, students answered evaluation questions in the form of posttest meetings, the highest obtained in meeting 3 which presented questions about cases of accident victims suffering from HIV who were accidentally touched by the police, so that students optimally answered these questions as an implementation of flexible thinking. The aim of giving these questions is for students to get used to solving problems by applying indicators of flexible thinking, namely providing diverse ideas and points of view (Amri et al., 2022).

Original Thinking

The aspects of this indicator contain, being able to form a unique and new expression, providing unexpected ways of expressing oneself, and renewing the combination of certain parts or elements Hikmatiar et al. (2019) The application of the recitation method to original thinking can be seen in the task accountability phase, individual students will form a unique and new expression from the case of a child who was not given a vaccine or immunization. Students will demonstrate communication skills that arise from themselves on material about disorders or disorders of the body's defense system in the form of hypersensitivity. This leads to the highest research pretest achievement in question number 12 which presents a table regarding factors that influence the body's defense system, so that students will choose a combination of parts of the question and answer as a complete answer to that factor. This is in line with Nursilawati et al. (2020) that students are able to add unique and new ideas to the test questions.

In the learning process, of course students work on evaluation questions in the form of a posttest at each meeting. The highest score was obtained in meeting 3, question number 10 with the question of students correctly ordering abnormalities in the body's defense system. Increasing the grades obtained by students by optimally solving problems is an important part of learning. According to Santosa et al. (2023) stated that the Problem Based Learning model helps students in solving problems, and providing recitations as part of the original thinking indicators will provide better results than before.

Elaboration Thinking

Aspects of this indicator include developing, adding and enriching an idea, detailing details and expanding an idea. In the application of recitation, detailed thinking is found in the task responsibility phase. Students will detail the details of the answers to the case questions given Falah et al. (2024), the highest score was obtained in question number 14 with cases of symptoms of disorders experienced based on the correct symptoms. Detailed thinking is the lowest compared to other indicators, because some students are still less than optimal in enriching their ideas. The results obtained were lower than other thinking indicators because students still had difficulty adding, developing and enriching ideas on the questions given (Nita et al., 2021).

On research Praptiwi et al. (2021), the results obtained are low because students still find it difficult to develop ideas and enrich their own ideas. In the learning process, students answer evaluation questions in the form of posttests at each meeting. The highest score was obtained in meeting 2 in question number 14 with active smokers who are susceptible to disease so that students will answer the question correctly. Students are not used to questions that require detailing in their implementation, so they have limitations in developing their ideas (Saptenno et al., 2019).

The Influence of the Recitation-Assisted Problem Based Learning Model on Creative Thinking Abilities

In the learning process, researchers apply the Problem Based Learning model syntax with recitation method phases and creative thinking indicators. At the core activity stage, the first syntax is student orientation to the problem, the teacher provides a video case related to the learning objectives, this will stimulate students to ask several questions and answers as an implementation of indicators of fluent thinking (Megayani et al., 2019). In the second syntax, namely organizing students to learn, the teacher divides students into heterogeneous groups. The second syntax implements the first phase of recitation, namely the assignment phase, tasks given by the teacher related to learning objectives. The lecture given at meeting 1 was in the form of a poster about autoimmune which was linked to the learning material (Henriksen et al., 2020). Giving assignments, the teacher will give assignments by seeing that the students have sufficient time to complete the lesson. The recitation given is as in Figure 2.

Figure 2. Assignment phase (recitation)

Students as a group already understand what tasks will be carried out in LTPD and as an implementation of flexible thinking indicators (Riyansyah, 2023). In the third syntax, namely guiding individual and group investigations, the teacher directs students to work on LTPD and recitations using the Canva application as in Figure 3.

Figure 3. Task implementation phase (recitation)

In the task implementation phase, students work in groups and look for reference sources from various available sources (Karnilawati et al., 2023). In the fourth syntax, namely developing and presenting work results, students will present different recitations from each meeting and questions contained in the LTPD (Lesmana et al., 2019). The activities carried out in the task accountability phase are as shown in Figure 4.

Figure 4. Task accountability phase (recitation)

In this syntax, students are trained to think originally to develop ideas that are unique and new in learning. In the fifth syntax, namely analyzing and evaluating the problem solving process, teachers and students will solve problems that have been carried out in question and answer discussions in the previous syntax, so that problem solving can be applied in everyday life (Elizabeth et al., 2018).

Conclusion

Based on the analysis of the results and discussion, researchers can draw the conclusion that the use of the Problem Based Learning model assisted by recitation has a significant effect on the creative thinking abilities.

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