



The students creative thinking on environmental pollution material using video-assisted problem based learning model

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Article Information	Abstract
<p>Keyword: Problem-based learning; Videos; Creative thinking; Environmental pollution</p> <p>Kata Kunci: Pembelajaran berbasis masalah; Video; Berpikir kreatif; Pencemaran lingkungan</p>	<p>The ability to think creatively has an important role in 21st century learning. This study aims to determine the effect of applying the video-assisted Problem Based Learning (PBL) model on the creative thinking skills of class VII students of SMP Negeri 1 Sekampung Udik on environmental pollution material. The research sample was selected by purposive sampling technique. The design of this study used a quasi-experimental design with a non-equivalent control group design. The type of data taken is quantitative data and qualitative data. Quantitative data in the form of mean values of pretest, posttest, and N-gain ability to think creatively tested using the Independent Sample t-Test with a significance level of 5% obtained Sig. (2-tailed) 0.00 < 0.05. Qualitative data in the form of a questionnaire on student responses to the use of the video-assisted PBL model. The results showed that the N-gain value for the experimental class was 0.57 in the "medium" category and the control class was 0.29 in the "low" category. These results indicate that there is a significant effect of using the video-assisted PBL model on students' creative thinking abilities in environmental pollution material. Student responses showed a positive response with an average score of 71.2% in the "good" category. Therefore, it can be concluded that the application of the video-assisted PBL model has an effect on the creative thinking abilities of students.</p>
<p>History: Received : 06/09/2023 Accepted : 16/02/2024</p>	<p><i>Abstrak.</i> Kemampuan berpikir kreatif memiliki peranan penting pada pembelajaran abad 21. Penelitian ini bertujuan untuk mengetahui pengaruh penerapan model Pembelajaran Berbasis Masalah (PBL) berbantu video terhadap kemampuan berpikir kreatif siswa kelas VII SMP Negeri 1 Sekampung Udik pada materi pencemaran lingkungan. Sampel penelitian dipilih dengan teknik purposive sampling. Metode penelitian ini menggunakan quasi eksperimen dengan bentuk desain penelitian non-equivalent control group design. Data kuantitatif berupa rerata nilai pretest, posttest, dan N-gain kemampuan berpikir kreatif yang diuji menggunakan uji Independent Sample t-Test dengan taraf signifikansi 5% didapatkan nilai Sig. (2-tailed) 0,00 < 0,05. Data kualitatif berupa tanggapan peserta didik pada penggunaan model PBL berbantu video. Hasil penelitian menunjukkan bahwa nilai N-gain kelas eksperimen mencapai 0,57 dengan kategori "sedang" dan kelas kontrol mencapai 0,29 dengan kategori "rendah". Hasil tersebut memperoleh terdapat pengaruh yang signifikan penggunaan model PBL berbantu video terhadap kemampuan berpikir kreatif siswa pada materi pencemaran lingkungan. Respon peserta didik terhadap pembelajaran menunjukkan respon yang positif dengan rata-rata nilai 71,2% dengan kategori "baik". Dengan demikian, disimpulkan bahwa penerapan model PBL berbantu video berpengaruh terhadap kemampuan berpikir kreatif siswa.</p>

A. Introduction

The educational paradigm has changed in 21st century learning, where learning is no longer focused on the results obtained, but on the learning process to form the competence of students who have higher-order thinking, creative, collaborative and communicative skills (Tjandra, 2020). Thinking style is an important dimension in the learning process which states that thinking is a mental activity that can formulate or solve problems faced in life (Heong, 2020). The ability to think creatively has an important role in life because creativity is a general ability to create something new, as the ability to provide new ideas that can be applied in problem solving (Munandar, 2014).

The ability to think creatively of students in Indonesia is relatively low, according to the results of Global Creativity Index (GCI) research in 2015 the country of Indonesia is ranked 115 out of 139 countries with an index of 0.202 so that teachers do less activities that lead students to think creatively. The survey conducted by the Martin Prosperity Institute assesses a country's creativity index based on three indicators, namely technology, talent and tolerance (Florida et al., 2015). Low creative thinking ability has an impact on the difficulty of students in solving a learning problem. The ability to think creatively greatly influences students in solving problems in everyday life including researching, checking and evaluating the truth in solving problems (Suharsono et al., 2021).

Success in the learning process in schools will never be separated from the ability of educators to apply learning models that are oriented towards increasing student involvement effectively in the learning process. The application of the right learning model aims to create active and pleasant learning conditions so that students can achieve maximum learning results and achievements (Sa'adah et al., 2022).

One way that can be used to improve and develop students' creative thinking skills is to use a PBL model. The PBL model is an innovative learning model where learning conditions in the classroom can run actively and creatively so that students can focus on solving the problems they face in their own way according to the knowledge, abilities and skills possessed by students (Ningrum & Marsinun, 2022).

The PBL model is a learning model that emphasizes problems as a starting point for learning. This is in accordance with the opinion of Arends (2012) that the essence of PBL is to expose students to authentic and meaningful problems for students and encourage students to carry out investigation and discovery activities. PBL aims to help learners be able to deal with real-life situations and learn how adults play a role (Arends, 2012). The problems given will make students become independent learners so that

they are able to solve complex problems faced (Hernawati et al., 2016).

Creative thinking is the ability to think based on available data or information, find many possible answers operationally, creativity can be formulated as the ability to think or give ideas smoothly, flexibly, and authentically, and be able to elaborate an idea (Munandar, 2004). Creative thinking can also be interpreted as a whole series of cognitive activities used by humans in accordance with certain problems, objects and conditions. Someone who thinks creatively will use their intelligence, imagination, insight and ideas when facing a problem. In addition, someone who thinks creatively will solve problems by coming up with new ideas and being able to create something new (Birgili, 2015).

One of the subjects that can develop students' creative thinking skills is science subjects. Environmental pollution material is science material, especially biology, this material is much related to environmental problems in everyday life, so this material is more contextual for students, and there are also many simple ideas/solutions that can be offered to be solved both on a small and large scale (Rosma, 2016).

One of the learning media that can attract students' learning interest and develop students' creative thinking skills in the learning process is video media. Video is one of the audio-visual media that is widely developed for learning purposes because it can improve learning outcomes. Audio visual media can display elements of images (visual) and sound (audio) simultaneously when communicating messages or information (Hardianti & Asri, 2017).

Based on the results of an interview with one of the science teachers at SMP Negeri 1 Sekampung Udik, it was found that the PBL model had never been applied in learning and students had never been given questions to test creative thinking skills. So researchers tried to test students by giving questions through questionnaires in February 2023. The result is that 88.2% of students have not provided the right answer explanation in accordance with the indicators of creative thinking through the problems given in the problem.

Responding to the problem of the lack of creative thinking level of students in class VII, it is necessary to use technology in the form of learning media. The use of technology in the learning process makes the material delivered easy to understand. One of the uses of technology used is in the form of videos related to the material taught, so that it can provide stimulus to students to be able to bring out their potential and can grow students' creative thinking skills in solving problems.

Several studies that have been conducted previously show that the PBL model affects the creative thinking ability of students. Research

conducted by Elizabeth & Sigahitong (2018) that learning with the PBL model affects the creative thinking ability of students on static fluid material. In addition, research on the use of video media conducted by Herlina et al. (2020) shows that the PBL model using audio-visual media can improve student learning outcomes. Judging from the average in the experimental class using the PBL model using audio-visual media has met the maximum completeness criteria (MCC) in learning on respiratory system material. Furthermore, research conducted by Nofida & Arif (2020) shows that the implementation of the audio-visual media-assisted PBL model is carried out very well, as well as the influence of the audio-visual media-assisted PBL model on the creative thinking ability of grade VII students at SMP Negeri 1 Mlarak.

The opinions of some of the researchers above can be concluded that the PBL model is a learning model that focuses on students to be able to solve problems given by educators. This model certainly requires students to be able to think creatively and be able to find problem solutions provided by educators, so that in the learning process there is not only one direction but becomes two directions, namely from educators and students resulting from their interaction in learning activities when students solve problems and educators as facilitators. With the help of video media can also improve the learning outcomes of students. Based on the description above, the purpose of this study is to determine the effect of using the video-assisted PBL model on the creative thinking ability of grade VII students of SMP Negeri 1 Sekampung udik on environmental pollution material and find out the students' responses to the use of video-assisted PBL models. The hope of researchers is that all students use the ability to think creatively in everyday life so that they can solve the problems faced and be able to create something new.

B. Material and method

This study uses a Quasi Experimental Design research design with the Non Equivalent Control Group Design method (Sugiyono, 2019). The population in this study was all students of SMPN 1 Sekampung Udik class VII, addressed at Sekampung Udik, East Lampung Regency. The 2022/2023 school year, which is in April-May. The sample in this study was taken from the population with purposive sampling techniques, class determination as a sample in this study was reviewed based on the results of evaluation and student activities during the learning process. So that class VII B was obtained as an experimental class of 31 students and class VII C as a control class of 30 students. The types of data taken in this study are quantitative data to measure students' creative thinking skills and qualitative data from questionnaires of student responses to video-assisted PBL models. The Table 1 is quasi-experimental research designs (Sugiyono, 2016).

Table 1 Quasi-experimental research design

Group	Pretest	Treatment	Posttest
E (Class VII B)	O1	X1	O2
C (Class VII C)	O3	X2	O4

(Source: Sugiyono, 2016)

Description: O1= experimental class pretest; O3 = control class pretest; X1 = Learning with video-assisted PBL models; X2 = Learning by discussion method; O2= experimental class posttest; O4 = posttest control class.

From this population, two classes were taken, namely class VII B with 31 students and class VII C with 30 students to be used as research samples. Class VII B as an experimental class by applying a video-assisted PBL learning model and class VII C as a control class by applying the discussion learning method. In this study using test instruments. Test instruments are used to measure students' creative thinking skills with essay question types. Before being given to students, the question instrument in the feasibility test uses a validity test to show the levels of validity or validity of an instrument (Arikunto, 2013). So that 12 points of essay questions on environmental pollution material were obtained. Then proceed to test the reliability of the question and obtained a result of 0.89 with very high criteria.

Research data in the form of data on the results of students' creative thinking abilities, the first step is to calculate the N-gain value. N-gain is the difference between pretest and posttest values (Nismalasari et al., 2016). Furthermore, prerequisite tests will include normality and homogeneity tests, then proceed with hypothesis tests using the Independent Sample T-test. After giving a posttest in the experimental class, a questionnaire of students' responsibility for the video-assisted PBL model on environmental pollution material will be given.

C. Results and discussion

Based on the results of research that has been carried out at SMPN 1 Sekampung Udik, results can be seen in Table 2. Based on the results, it can be seen that the creative thinking ability of students in the experimental class is higher than that of the control class. This is because in class learning experiments are carried out using a video-based PBL model. This can affect the improvement of students' creative thinking skills.

Based on Table 2, the decision making obtained from the normality and homogeneity test for the research result test is Sig. > 0.05 which means that the data is normally distributed and the data variance is homogeneous, so that for the hypothesis test using the Independent Sample t-Test test, the test results are Sig. (2-tailed) $0.00 < 0.05$ meaning that there is a significant influence on the application of the video-assisted PBL model on the creative thinking ability of students. This is in accordance with the opinion of

Ningrum & Marsinun (2022), one way that can be used to improve and develop students' creative thinking skills is by applying the PBL learning model in classroom learning, the PBL model is a problem-based learning model, students will be faced directly with problems so that students will look for existing information or data to solve the problems faced.

Table 3 shows that each indicator of creative thinking ability has different values between experimental and control classes. In the experimental class, the value of each indicator of creative thinking ability was superior to the value in the control class.

The indicator that experienced the most significant increase in the experimental class was the flexibility indicator, this is because students have been able to answer questions with varied answers

and analyze problems through different points of view, this causes students' flexible thinking skills to increase so that they are able to answer the questions presented appropriately. In line with Zufahmi (2019), flexibility indicators of students' abilities are seen in activities to express different ideas to solve problems and determine the factors that cause problems. This is because during the learning process, educators emphasize to students that each student is allowed to express their own creative ideas. The application of the PBL model in experimental classes is carried out by presenting real problems to students. These conditions help students build their own knowledge. Through the problems given by educators, students can bring up creative ideas that are owned to find solutions to the problems given.

Table 2 Results of creative thinking ability

Class	N-gain	Test Normality	Test Homogeneity	Test Independent Sample t-Tes
E	0,57	Sig. 0,40 > 0,05	Sig. 0,09 > 0,05	Sig. (2-tailed) 0,00 < 0,05
K	0,29	Sig. 0,16 > 0,05		

Description: E= Experiment, K= Control

Table 3 The results of the N-gain analysis of creative thinking ability in experimental and control classes

Indicator	N-gain Experimental Class	N-gain Control Class
Fluency	0,58 (Medium)	0,32 (Medium)
Flexibility	0,73 (High)	0,26 (Low)
Originality	0,59 (Medium)	0,29 (Low)
Elaboration	0,49 (Medium)	0,29 (Low)

The use of audio-visual media and PBL learning models for science subjects greatly supports the process of delivering information from teachers to students because audio-visual media has the ability to explain something complicated, complex and difficult that cannot be explained when using only image media or words (Purbarani et al., 2018).

The results of research conducted by Putri et al. (2022) also show that students' creative thinking skills increase through the application of PBL models with the help of audio-visual learning media. The improvement of students' creative thinking ability can be seen through individual test results given at the final stage of learning. The PBL model trains students to be able to solve problems and provide solutions to these problems in the learning process which is carried out in accordance with the syntax of the PBL model as explained below.

The orientation stage towards the problem, students are directed to see videos about the phenomenon of environmental pollution through the youtube link that has been given. At the time of video playback, students do not just watch, but students analyze the video so as to get information to answer the questions presented at student worksheets. This is in line with the research of Herdiawan et al. (2019) in the first phase, namely at the stage of orientation of

students to problems, flexibility is trained when students understand the problems presented, after that students are required to find answers to solve problems.

Furthermore, at the stage of organizing students to learn, it is done by grouping students to facilitate collaboration activities between students. The existence of groups in this second stage, students are asked to find solutions or convey their ideas smoothly (fluency) and try to think of ways to work on problems given to students through worksheet (flexibility) (Telaumbanua, 2022).

The next stage is to guide the investigation. The task of students at this stage is to look for allegations of the problems contained in the video, the characteristics of the polluted environment, factors that cause pollution, the impact of pollution and students will make posters containing efforts that can be made to overcome environmental pollution problems based on the videos that have been observed. This is in line with the research of Yulianingtiyas et al. (2016) that at this stage students can add their creative ideas in problem solving. This activity will help students to develop aspects of creative thinking skills including fluency, originality and flexibility.

Stage four is to develop and present the work. Based on the results of Elizabeth & Sigahitong (2018) research in the phase of developing and presenting works, the development of students' communication skills can be optimized. In addition, in this phase, students practice presenting their work better. This is also in line with the research of Puspitasari et al. (2012) that the delivery of investigation results and problem solutions can improve fluency skills and elaboration skills, namely adding or detailing an idea so that in more detail, the ability to think elaboration appears in the question and answer session after the presentation.

The final stage is to analyze and evaluate the problem-solving process. Students at this stage are trained to compile conclusions based on the results of discussions that have been carried out between students. In line with the results of Nurcholis et al. (2013) research in this fifth stage students are trained to think fluency and flexible thinking.

The selection of learning models and media used in the learning process certainly affects the learning outcomes and creative thinking ability of students. In the experimental class, students feel challenged in learning activities because students are given real problems through video media that require students to formulate problems and find solutions to the problems given, so that students' creative thinking skills will appear in solving these problems.

Unlike the control class, the use of a scientific approach with discussion and lecture methods has not been able to improve learning outcomes and bring out the creative thinking ability of students optimally. Based on the results of classroom research when delivering subject matter assisted by Power Point (PPT) media students feel bored and less active in learning, when researchers ask students randomly there are still students who cannot define environmental pollution based on their own knowledge.

The ability to think creatively of students can be seen from the results of environmental pollution material tests which are grouped into four indicators of creative thinking, namely as follows:

The first creative thinking indicator is Fluency, students on this indicator are required to think fluently, so that students are able to spark many ideas or answers. In accordance with the first PBL stage, namely the orientation of students to problems, at this stage students are faced with several environmental problems so that students are required to think fluently in order to be able to understand all the problems presented.

The second indicator is Flexibility, in this indicator students are required to think flexibly, so that students are able to produce varied answers. The development of flexible thinking skills because in the video there are several polluted soil conditions so that

students can see a problem from different perspectives.

The third indicator is Originality, in this indicator students are required to think originally, so that students are able to produce answers with new ideas. This stage will help students develop their original ideas in problem solving. This activity will help students develop aspects of originality.

The fourth indicator is Elaboration, in this indicator students are required to be able to elaborate, so that students can develop or detail an idea so that it is more detailed. In accordance with the fourth stage of the PBL model, namely developing and presenting works.

Based on the answers of students on the indicators of creative thinking ability, it can be concluded that students have been able to achieve all four indicators of creative thinking ability. This is in line with Adiilah & Haryanti's (2023) research that the application of the PBL model is proven to have a significant effect on students' creative thinking skills in science learning. The results of data on student responses to the video-assisted PBL model on environmental pollution material that had been filled in by 31 students. The student response questionnaire consists of 20 statements with 4 types of statement indicators that must be answered using the Likert scale with four answer choices, namely Strongly Agree (SS), Agree (S), Disagree (TS) and Strongly Disagree (STS). The results of the analysis of the questionnaire screening are presented in Table 4.

Table 4 Results of questionnaire of student responses to video-assisted PBL learning

Indicator	Percentage	Category
Joy/Feeling	76,3%	Good
Interest	73,7%	Good
Attention	68,3%	Good
Involvement	66,5%	Good
Average	71,2%	Good

Based on the results of the questionnaire of student responses to learning using the assisted PBL model, the video shows a positive response from students to the learning model and assisted media used in the learning process, especially on environmental pollution materials. This is in line with the research of Yulianingias et al. (2016) stated that the application of the PBL model is more fun, interesting, and makes students easier to understand and dare to express ideas and ideas, increase students' insight in everyday life and establish good communication between students and then students with teachers. The characteristics of the PBL model are more directed at group discussion activities to exchange information, where in this case all group members contribute so that students are required to be more active in learning activities (Nurfatonah et al., 2021).

In line with Heong's research (2020) the PBL model is an approach applied in learning that aims to help students to argue and communicate well, besides that PBL encourages students to be able to work together in groups so that students can share ideas and be able to solve problems given by educators. The PBL model also has a positive influence on students' thinking skills to analyze problems and the most appropriate decisions to find answers to a problem.

D. Conclusion

Based on the results of the research conducted, it can be concluded: There is an influence of the use of the video-assisted PBL learning model on the creative thinking ability of grade VII students of SMP Negeri 1 Sekampung Udik on environmental pollution material, this can be seen from the value of Sig. (2-tailed) < 0.05 then H₀ is rejected and H₁ is accepted, which means there is a significant difference between the experimental class and the control class and the questionnaire of student responses to PBL learning Berbantu Video obtained an average score of 71.2% in the Good category. So that learning using the video-assisted PBL model gets positive responses and impacts from students.

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