



Application of media notion to improve students' critical thinking through TaRl learning at SMAN 6 Malang

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Abstract

This research was motivated by students' low critical thinking ability in Geography subjects at SMA Negeri 6 Malang. This study aims to improve students' critical thinking skills using a project-based learning model based on TaRl learning strategies. This type of research is classroom action research. The subjects of this study were students of grade X-I SMA Negeri 6 Malang. The instruments used in this study were interview sheets, observations, test questions, and documentation. Data collection techniques consist of interviews, observations, tests, and documentation. Data analysis in this study used quantitative and qualitative data analysis. The result of this study is to improve students' thinking processes with a problem-based learning model based on Tarl learning strategies assisted by media notion in class X-I SMA Negeri 6 Malang. This is shown from the analysis of each cycle, showing a significant improvement so that students' thinking processes can develop.

Keywords: *Critical thinking; project-based learning model; notion; TaRl.*

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INTRODUCTION

The learning process in the classroom must aim to improve student learning. Learning must pay attention to the potentials of individuals, both cognitive, affective, and psychomotor possibilities. These three domains are the main concerns in developing national education goals (Winarti et al., 2022). Efforts that schools can make to realize the goals of national education are carried out through educational institutions known as schools. The school has an academic plan using the current updated curriculum, namely the independent curriculum. This independent curriculum has the purpose of students as the primary foundation in learning. It is a curriculum that frees students and teachers to make learning in schools' fun with the aim that students and teachers are free to be creative. One of the subjects developed in the school is Geography education. According to Sari (2023), geography education, teaching with strong scientific axiology, needs to be used as an essential subject starting at the elementary school level to improve children's spatial abilities, environmental awareness, disaster education and mitigation, and contemporary abilities in geography. One of the objectives of Geography is to have basic skills for logical and critical thinking, curiosity, inquiry, problem-solving, and skills in social life (Widiastuti et al., 2023).

Based on the initial observations of researchers in grade X 1 SMAN 6 Malang, the problem is that classroom learning shows that the learning process does not emphasize students' critical thinking skills. This is demonstrated by the geography material in the hydrology sub-discussion, in that only a few students ask questions. The questions students ask are limited to the memory level, whose answers can be obtained in textbooks and the internet. Teachers used discovery learning, where the teacher gives questions, and students answer the questions and cannot explain with sentences alone. Students have not been able to provide the correct arguments in answering questions asked by the teacher using assessment discussions carried out in class also have not gone well because when one student makes a presentation, no other students respond, refute, or give questions to the answers provided by their friends. The importance of critical thinking skills in geography learning is intended so that learning is not only limited to knowledge in the classroom, but more than that, students can sort information from various sources, foster students' curiosity about problems that occur around them, and study them in depth so that geography learning will be more meaningful.

Critical thinking is an organized process that allows students to evaluate the evidence, assumptions, logic, and language underlying the statements of others (Rismayanti et al., 2022; van Harling & Martono, 2023). The ability to think critically can also train students' thinking power to be more rational towards geography lessons in the hydrology sub-discussion, which has many problems with water on the surface of the earth so that it has a clear point of view and does not readily believe in something that is not yet clear the truth.

Efforts to overcome students' lack of critical thinking skills can be made by increasing student involvement in the learning process to train and develop their thinking skills (Restuti et al., 2021; Muali et al., 2018; Darmayanti, 2023; Haerazi et al., 2020; Al-Zou'bi, 2021). Thus,

geography learning in the classroom can be more meaningful. The project-based learning (PJBL) method uses media notions students can know well (Ismail et al., 2018). The model also involves teaching at the right level (TaRl) approach. This approach helps the learning model determine a learning approach focusing more on students' abilities than their grade level. Thus, this approach can help teachers design learning according to the achievement stage of each student, especially in improving numeracy and literacy skills to improve critical thinking skills. Meishanti & Fitri (2022) stated that PJBL with the TaRl Approach is a learning technique in the way the teacher presents a series of activities that are guiding and exploring so that a thinking process occurs that relates the knowledge of each student and his experience with the new knowledge being learned. Thus, the new knowledge is not informed". With this TaRl approach, teachers divide students according to their abilities and learning styles so that students can work together with the same skills in the learning process.

Learning media notion is a media application aimed at increasing productivity. Learning using learning media will increase student understanding (Hasanah et al., 2023; Darmayanti et al., 2022; Astuti et al., 2022). This application is intended to create notes or notes with a simple appearance. Still, in its development, this application can also be done to increase work productivity and support collaboration with other users. Its simple appearance will make operating it easier for you and your teammates. This learning media contains things that students do in the learning process in class, and the media includes assignments and materials that are very much that students can access using their respective students' *smartphones*. This media is straightforward for students to use anywhere and anytime while students have an internet connection. By using this media, students can learn anywhere and anytime without complications.

This study fulfills the gap that PJBL with the TaRl approach could be a new alternative method to increase student critical thinking, which is always a problem in the classroom. This method aims to improve classroom learning and students' critical thinking skills in geography learning in grade X 1 SMAN 6 Malang. This research is also different from others because it is based on a web-based notion--the web notion is only used for administrative purposes. So, students can look for answers on the web. This classroom action research also describes how teachers overcome obstacles in applying PJBL with the TaRl approach to improve students' critical thinking skills in geography learning in grade X 1 SMAN 6 Malang. In addition, it also describes how to enhance students' critical thinking skills after applying PJBL techniques with the TaRl Approach in geography learning in grade X-1 SMAN 6 Malang.

METHOD

This research was carried out in class X-1 of SMA Negeri 6 Malang in the 2023/2024 school year with a total of 34 students consisting of 14 male and 20 female students. The type of research used in this study is classroom action research. Classroom action research has a significant role in improving the quality of learning if appropriately implemented. Mulyasa

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(2011) states that classroom action research is "efforts to improve the learning process or solve problems faced in learning." The research design refers to the Kemmis and McTaggart model (Wiriaatmadja, 2012), which consists of 4 stages: planning, action, observation, and reflection. The steps for implementing the action can be seen in the image visualization below:

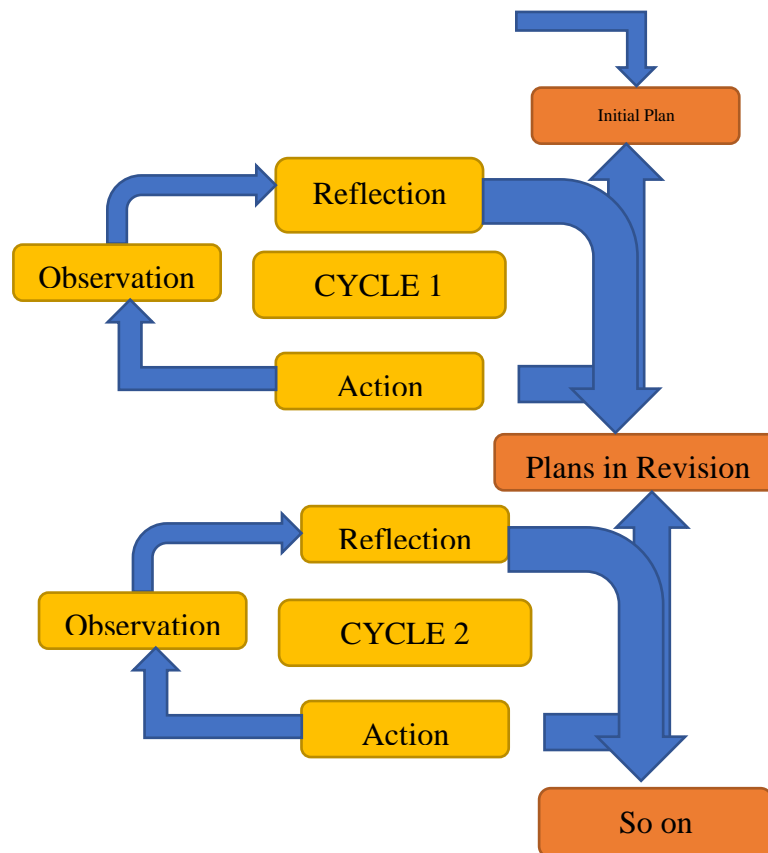


Figure 1. Adopted from Kemmis and Mc Taggart Spiral Model
Source: Wiriaatmadja (2012)

Based on the research procedure above, researchers developed it as follows:

- 1) Pre-research observations are carried out to find out what problems occur in class as a reference for implementation in preparing plans.
- 2) Researchers prepare plans based on the results obtained from pre-research. Plan activities to prepare an action plan for class X-1 SMAN 6 Malang: partner researchers and teachers. Initial Plan of Action Observation Reflection Cycle I Observation Action Reflection Cycle II Revised Plan And so on compile modules and LKPD, determine learning steps using PJBL techniques with a TaRI approach under the material to be delivered and follow data collection tools to make it easier for researchers to see the results of the actions that have been taken and process data.

- 3) Furthermore, the action stage was carried out, namely the application of PJBL techniques with the TaRl Approach in class X-1 SMAN 6 Malang based on plans that had been made previously by researchers and partner teachers. Action will last until critical thinking skills in learning Geography using PJBL Techniques with the TaRl Approach reach the saturation point (stable).
- 4) At the observation stage, activities were carried out to observe, see, and record (record and record) the processes, results, influences, and problems that arose while applying PJBL techniques with the TaRl approach in class X-1 SMAN 6 Malang. The results that have been recorded and documented will be obtained and become the basis for reflection on the success of the actions that have been taken and become improvements in preparing the following action plan.
- 5) The method used is the classroom action research method, where this research method improves the learning process that is considered not good. The process of this method is to provide behavior to students in each cycle. In each cycle, the development is seen until the value is stable. Researchers use the project-based learning model with the TaRl approach so that students can start thinking critically with this model.
- 6) The last stage is reflected where, at this stage, the researcher evaluates the actions taken. It aims to see the results of implementing activities and discover the shortcomings and advantages of the learning process to be further improved in the learning plan at the next stage.

This research data is qualitative, namely, description data obtained from activity observation sheets, and quantitative data, namely material mastery data obtained from the average value of pretest, posttest, and field observations. The scores obtained will be tested for validity using student value data validation tests and data reliability tests so that the data obtained can be correct (van Harling & Martono, 2023). The data acquired will be processed into the results of class action research so that the data will support this research.

RESULTS AND DISCUSSION

Based on research conducted in class X-1 SMAN 6 Malang City conducted in cycle I to cycle IV, it can be described in the following value Tabel 1.

Table 1. Data on the condition of students' critical thinking skills

Name	Value Per Cycle							
	Cycle I		Cycle II		Cycle III		Cycle IV	
	Pre-test	Posttest	Pre-test	Posttest	Pre-test	Posttest	Pre-test	Posttest
AR	60	55	57	60	73	77	76	85
AZ	53	54	59	64	72	77	82	83
AJT	40	57	69	66	70	78	82	81
AND	43	57	53	60	72	75	81	81
AC	49	54	51	69	74	77	81	80
AH	52	55	69	64	73	78	78	84

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Name	Value Per Cycle							
	Cycle I		Cycle II		Cycle III		Cycle IV	
	Pre-test	Posttest	Pre-test	Posttest	Pre-test	Posttest	Pre-test	Posttest
BRK	58	51	52	69	75	79	82	85
CD	49	53	60	60	70	80	77	81
DG	60	51	65	60	71	78	83	84
DNA	53	53	53	64	73	76	75	83
DM	56	52	56	64	72	80	78	81
ERA	58	60	61	65	73	80	82	82
ERP	41	55	51	69	71	77	81	83
FHR	47	50	50	63	72	78	75	82
GEP	59	54	57	62	74	80	81	82
GP	56	54	62	61	73	79	80	83
HA	47	54	61	68	73	79	77	81
IZ	53	56	60	67	73	78	83	85
IH	60	56	54	60	75	80	82	84
L	50	55	65	67	75	78	81	85
MA	52	60	64	70	70	76	76	81
MUF	59	59	65	67	72	78	80	85
MDF	47	58	51	69	72	78	83	83
MFI	57	51	70	70	75	77	78	82
RS	59	55	53	66	73	80	79	83
RV	53	57	68	64	71	78	82	82
RK	48	59	55	62	75	77	75	80
RA	50	56	52	69	71	78	75	85
SPZ	60	54	56	60	70	80	80	82
SD	49	51	58	67	70	80	82	85
TH	52	57	57	66	71	77	80	81
VDS	56	52	58	61	71	79	78	85
YUU	41	54	69	66	72	78	82	81
YK	42	54	56	61	72	80	75	83

Table 1 shows that each cycle's pretest and posttest values experience significant differences, as seen from the average values. This means that students' initial ability before treatment is lower than that of students after treatment. Giving behavior to students in each cycle will create value saturation by providing the same behavior to value saturation.

In the PJBL model, researchers first plan research with the PJBL model with a notation-assisted TaRl approach carried out by researchers as follows: The first step is to conduct diagnostic tests on class X-1 to determine the student's ability. Researchers developed ATP and CP for PJBL models on hydrosphere dynamics material in inland water submeter in the second step. In the third step, researchers develop teaching modules by the PJBL model with the help of TaRl for learning purposes to improve critical thinking skills. In the fourth step, researchers make pre-test and posttest questions that refer to students' essential indicators of thinking. In the last step, the researcher made a media notion corresponding to the PJBL syntax. Using

PJBL with a systematic flow can make this classroom action research run well (Agung & Sutji, 2022; Ismail et al., 2018). This PJBL syntax must be designed properly and correctly so that classroom action research can be carried out.

Second, implementing classroom action research to improve student thinking with the TaRI rocky PJBL model using media notions went smoothly. In the first cycle, the teacher uses the PJBL model, in which the first syntax students plan what projects will be carried out based on problems in the school environment; in this first cycle, the test results still do not show that students' critical thinking has not progressed, this happens because students still cannot develop answers. This cycle of new students makes a project, namely water filtering, where students begin to think creatively because they can find problems by doing this project, but still have not significantly increased students' thinking in class X-1. Cycle 3 students began to observe the project's results, namely water filtering and how the soil can drain dirty surface water into clean. In this cycle, the test results showed a significant increase in critical thinking. Cycle 4: in this cycle, students begin to make conclusions on the project's results. The test results show an outstanding improvement in answering the test with developing answers. Learning using accurate visualization causes classroom learning to feel real. Learning by using this visualization can cause students to understand the material quickly (Widiastuti et al., 2023; Hasanah et al., 2023; Darmayanti et al., 2022; Astuti et al., 2022).

Third, there are several obstacles experienced by researchers when conducting research, including 1) The method used by the teacher still feels unfamiliar to students. Hence, students need time to adjust to the method used. 2) when students get used to learning using the PJBL method, the problem is that the classroom atmosphere becomes chaotic and not conducive. 3) Students are lazy to find and read various information about the material being discussed before learning. Efforts to overcome obstacles that arise in learning include 1) Teachers must increase the capacity of teacher knowledge by attending training so that teachers can apply the knowledge gained. 2) The teacher must be able to condition and divide the focus among all students in the class so that no more students are chatting during the learning process. 3) Teachers must force students to read before learning so that the question-and-answer process during learning will run smoothly.

The results of observing the percentage of student activity based on indicators of students' critical thinking ability can be seen in Figure 2.

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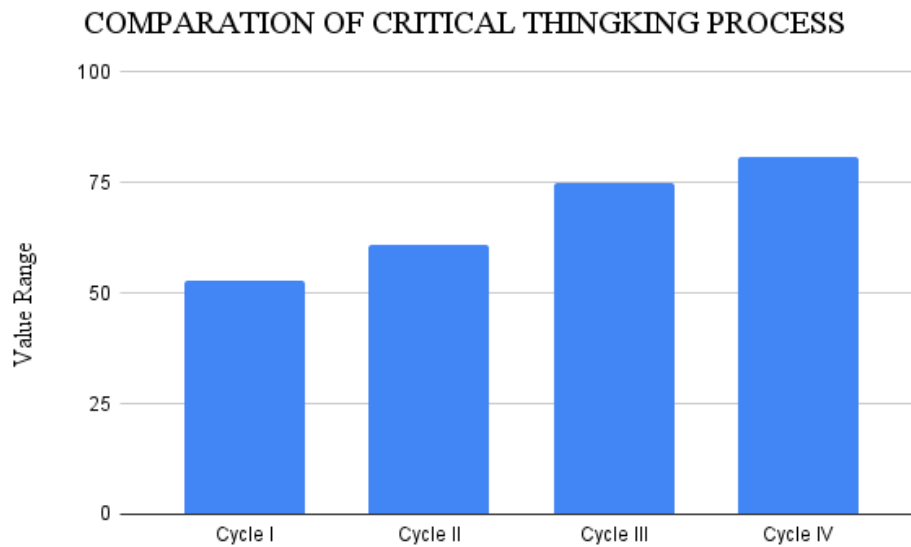


Figure 2. Average score of student learning activities

In cycle I, students' critical thinking skills still fall into the sufficient category with a percentage of 53%. This can be seen based on the learning process of answers and questions given by students through pretest and posttest that have not shown good critical thinking skills. In this cycle, the indicators of pretest and posttest questions by the material being discussed are that students still lack critical thinking, provide answers to questions asked by themselves category are not good, are active in answering questions given by teachers in classes are enough, answering questions from teachers using their sentences in categories are lacking, sentences used to answer questions can be understood in categories are enough Well, draw conclusions from the material discussed on the category enough. Critical thinking skills are still low because students are still carried away with learning habits that use this lecture method. Teaching in cycle 1 uses PJBL learning, where students start their projects by writing down tools and materials. Based on Winarti et al. (2022), in this first cycle, they experienced less ability to think critically because, at this early stage, it was still carried away by old habits. Cycle 1 is indeed felt to experience changes in learning patterns, so students are still carried away by old learning.

In cycle II, students' critical thinking skills seemed to have improved and entered the excellent category with a percentage of 61%. Indicators formulate questions according to the material being discussed, be active in the learning process, and answer questions in the pretest and posttest using their sentences. The answers given are reinforced with clear arguments, and the sentences used can be understood into the category quite well. While the indicator answers questions asked by the theme during the discussion, makes definitions with its sentences, and can give real examples of the material being discussed, it still falls into the sufficient category. The data illustrates that critical thinking skills have improved by using the student water

filtration project in this second cycle planning tools and materials and working on this project then researchers use the TaRI approach, where researchers distinguish student learning styles according to their levels such as there are children who like audio, visual and so on learning styles, then the teacher tells students to group according to the same ability, however, the results achieved have not been maximized, and thus researchers take further action. According to Rismayanti et al. (2022), in this second cycle, students can adapt to learning new models. This PJBL model is very good for improving students' critical thinking, by using this model students can solve problems by making products.

In cycle III, students' critical thinking skills again experienced a significant improvement and entered the very good category with a percentage of 75%, in this cycle students began to work on their projects using LKPD provided by researchers In LKPD there are several question triggers. Related to water filtration projects, with the help of media notions, in this cycle, students begin to be able to think critically about problems in the environment by making products of water filtration. Some indicators included in the outstanding category are formulating questions according to the material being discussed, being active in the learning process in class, answering pretest and posttest questions using their sentences, the sentences used can be understood, and concluding the material discussed. While the indicators that fall into the excellent category are giving suggestions and criticisms to the group, the answers given are reinforced with clear arguments, can provide real examples of the material being discussed, and indicators of making definitions with their sentences still fall into the sufficient category. According to Hayati & Setiawan (2022), in this third cycle, students begin to develop with this learning model, and students start to be able to think critically with arguments that can support that the fourth cycle must be calculated to find out their development. Based on the data obtained from these observations, researchers and partner teachers decided to re-cycle to find out whether students' critical thinking skills would be the same, increase, or decrease.

In cycle IV, students' critical thinking skills improved but not significantly and entered the excellent category with a percentage of 81%. In this cycle, all indicators have been included in the sound and outstanding categories. In this cycle, students begin to present the results of their projects, where they find solutions to problems in the surrounding environment where they can think critically with the help of this project using media notions. Students who think critically in class X-1 are classified as good at improving thinking by answering *pretest and posttest questions*. According to Sari (2023), in this fifth cycle, students can think critically well, thanks to the learning model applied. Based on these findings, it shows that the data on student's critical thinking skills have been saturated or at a steady increase so that the action of applying the PJBL method with the TaRI approach assisted by media notion is ended. The following is a graph of students' improvement in critical thinking skills in each cycle in Figure 3.

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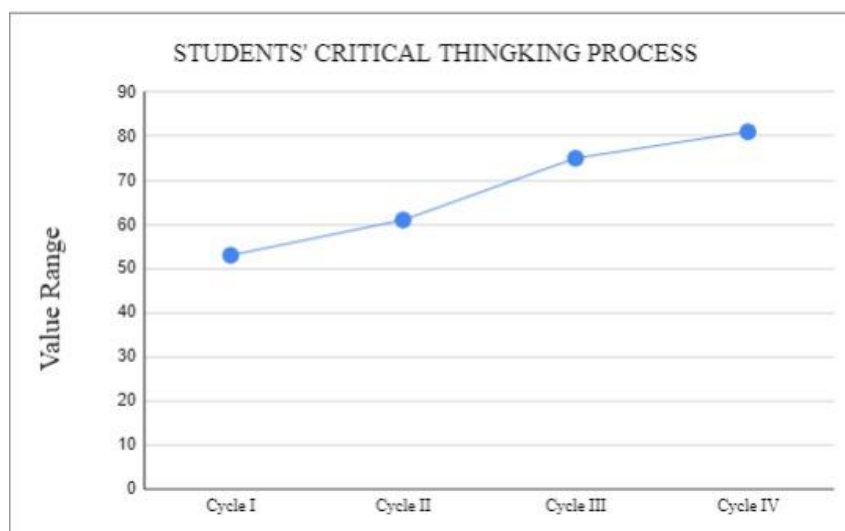


Figure 3. Average student learning activity.

Applying media notion with the PJBL model using the TaRl approach carried out by researchers to improve critical thinking skills does not all go well. There are several obstacles during the action. Teachers and students cause these obstacles. Especially in the early cycle, teachers and students are not familiar with the application of this model, and the next block is that students are not conditioned when doing their water filtration projects. Still, researchers can handle students calmly and calmly. Based on van Harling & Martono (2023), learning using a suitable model can improve critical thinking. Learning using PJBL can improve students' critical thinking so that students in the next education can follow learning with students' higher-order thinking processes. Research The actions of students do not all go smoothly. Still, the teacher can overcome these obstacles little by little through reflection activities carried out by the teacher and observers.

CONCLUSION

Based on the description and reviews of the research results above, it can be concluded that implementing media notion with the PJBL model is assisted by the TaRl approach. Still, the strategy can improve the critical thinking skills of grade X-1 students of SMA Negeri 6 Malang. This is shown from the results of data analysis of students' critical thinking skills, reaching an average score of 81.54, where this average score is good in critical thinking students in class. Based on the results of this study, it is expected that more students' abilities can be developed through a learning model that is very effectively used in the learning process. This research is only limited to hydrological material, so in the subsequent investigation, it is recommended to examine other geography subjects more deeply to improve the quality of student learning in class.

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