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## **The Effectiveness of the Problem Based Instruction Model with Videos on Critical Thinking Abilities of Senior High School 1 Mayong Students**

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### **Abstrak**

The ability to think critically is needed in the 21st century so that students must have the ability to think critically. This study aims to analyze the problem-based instruction model with effective video to think critically and analyze the problem-based instruction model. This study used pre-experimental design with one group pretest-posttest design. The sample of this study were students of class XI MIPA 3 and XI MIPA 4 Senior High School 1 Mayong which were determined using purposive sampling technique. The results of data analysis showed that students' critical thinking skills reached 92.5% completeness. On average, every aspect of students' critical thinking skills are in critical and very critical criteria and the average conservation value of students is honest, creative and humanist in good, good and very good criteria. The average N-gain in both classes is included in the criteria of medium and high. Based on the results of the study, it can be concluded that the problem-based instruction model with effective video is applied to senior high school 1 Mayong student towards critical thinking skills and problem-based instruction models with videos can improve the critical thinking skills of senior high school 1 Mayong students.

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## INTRODUCTION

The United Nations Educational Scientific and Cultural Organization (UNESCO) defines that one of the abilities students must possess in the 21st century is critical thinking skills (Sani, 2014). 2013 curriculum adjusts the needs of the 21st century that is students have learning and innovation skills that include the ability to think critically, be able to solve problems, be creative, innovative and able to communicate and collaborate (Kemendikbud, 2016). Students' critical thinking skills are needed in the learning process because they make students better master the material concepts so they are able to provide further explanations and provide alternative solutions to problems. Fachrurazi (2011) argues that mastery of critical thinking skills is not enough to be used as an educational goal only, but also as a fundamental process that allows students to overcome various future problems in their environment, therefore teachers cannot ignore the mastery of students' critical thinking skills.

Based on initial observations in Senior High School 1 Mayong, students tend to be passive when the learning process, the ability of students in deepening material is lacking because most students learn how to memorize, this can be seen from the average daily test scores where 40% of students have not reached the completion criteria minimum (KKM). Learning that is done has not provided students with experience in applying the material in daily life that causes students to find it difficult to develop critical thinking skills, for that requires a learning model that can improve students' critical thinking skills, namely problem-based instruction (PBI).

Problem-based instruction is a learning model that is characterized by problems that can be raised by students and teachers, and then students deepen their knowledge about what is known and how to solve problems in groups (Azizah et al., 2016). Learning that does not involve students actively can inhibit students' critical thinking skills and problem-solving skills so students need learning that presents phenomena that occur around students and provides real problems that challenge students to solve them, namely the problem-based instruction model (Dewi et al., 2017). The problem-based instruction model is characterized by the use of contextual problems, with PBI students are trained to develop their own knowledge, develop problem-solving skills and increase self-confidence, by giving problems students can better understand the concept so that it is not just memorizing concepts (Husnidar, 2014). The application of the PBI learning model makes students better understand the concepts being taught because students themselves find the concept (Fujiah et al., 2016). According to Arends (2001) the syntax of the problem-based instruction model is: 1) orienting students to the problem, 2) organizing students to learn, 3) guiding individual or group investigations, 4) developing and presenting the work and 5) analyzing and evaluating problem-solving processes.

In addition, besides the right learning model, the appropriate media is also very important. The immune system material in the 2013 curriculum syllabus requires students to understand the physiological processes in the body that are related to the role of the immune system that cannot be directly observed so that it requires a media that can support the learning process. The media used is video because a video is an audio-visual media that displays images and sounds that make students more interested in learning so that it can support the success of learning objectives. The need for videos to be implemented in Senior High School 1 Mayong is because the school system is full day and videos are rarely used. If the teacher only explains the

material, most students feel bored, students need the video to be more motivated to learn, which makes it easier for students to understand the material.

A video is an audio-visual based learning media that is easy for students to remember rather than just lectures. Videos have several benefits that are the video is a substitute for the surrounding environment that can show objects normally which cannot be seen directly by students then videos also encourage and increase students' motivation to keep watching (Azhar, 2011). Based on the results of the research of Hubeis (2007) the use of video media is very significant in increasing knowledge as indicated by an increase in knowledge scores after watching video shows. Saschia (2014) stated that videos can improve students' understanding and learning outcomes. The problem-based instruction model with immune system video media is expected to help students understand the immune system material and can improve critical thinking skills.

Semarang State University is a higher education institution that has a conservation-minded identity. Conservation in question is maintaining and implementing conservation values in life, through a problem-based instruction model with immune system video media that can be observed 3 conservation values that must be embedded in students, there are honesty, creative values, and humanist values. The purpose of this study was to analyze the problem-based instruction model with effective video applied to senior high school 1 Mayong students on the ability to think critically and analyze the problem-based instruction model with video can improve the critical thinking skills of senior high school 1 Mayong student

## **RESEARCH METHOD**

This research was conducted at Senior High School 1 Mayong in May 2018. The population in this study was all students of class XI MIPA Senior High School 1 Mayong. The sample in this study was class XI MIPA 3 and XI MIPA 4 students as the treatment class taken by purposive sampling technique. The independent variable in this study is a problem-based instruction model with immune system video media while the dependent variable is in addition to the ability to think critically as well as the conservation attitude that is expected to emerge during the learning process. The research approach used by Pre Experimental Design with the research design of One Group Pretest-Posttest was that both classes were given the same treatment and each was pretested before treatment and posttest after treatment (Sugiyono, 2015). There are two types of data in this study, there are primary data and secondary data. Primary data is in the form of increasing students' critical thinking abilities as seen from the N-gain analysis of the pretest and posttest values. Secondary data is in the form of student conservation attitudes.

## **RESULTS AND DISCUSSION**

### **Students' critical thinking skills**

Data on students' critical thinking skills were obtained from the posttest value. The percentage of completeness of students who get grades reaching KKM can be seen in Table 1

**Table 1** Results of students' critical thinking skills after learning a problem-based instruction model with video immune system in high school

Critical Thinking Ability	XI MIPA 3	XI MIPA 4
Numbers of students	36	35
The highest score	90	95
The lowest score	67,5	65
The average score	81,9	83,9
Students complete	34	32
Students do not complete	2	3
Numbers of students	36	35
Average completeness	92,5%	

The average percentage of the two classes for completing students' critical thinking skills after learning the problem-based instruction model with immune system video media in high school is 92.5% of students have met the  $KKM \geq 70$ . This means that the problem-based instruction model with effective video is applied to the ability critical thinking of high school students because it reaches the indicator of success in completeness reaching  $\geq 75\%$  of students who get a value of  $\geq 70$ .

The results of this study were in the opinion of Fujiah *et al.*, (2016) based on the results of his research that the application of the problem-based instruction model can improve students' critical thinking skills as evidenced by the students' critical thinking skills in very critical categories. Based on the research of Azizah *et al.*, (2016) students' critical thinking ability after problem-based instruction learning is better because this model is a learning model characterized by problems that can be raised by students or teachers, then students deepen their knowledge of what is known and how to solve problems in groups so that they can help each other so that they are able to collaborate in solving Ronald *et al.*, (2014) problem that learning with problem-based instructional strategies in groups can improve critical thinking skills and motivate students to learn in line with the opinion of Temuningsih *et al.*, (2017) states that students' critical thinking skills emerge when conducting group observations, linking indigenous knowledge with biological concepts.

The use of video was also very important during the learning process; students were very enthusiastic in solving problems based on the video that has been aired. The results of completeness of critical thinking skills were quite high because the problem solved is a problem experienced by students such as sneezing, immunization, smallpox, etc. related to the immune system as well as the problem aired through videos so students are very interested in the learning process, Haryoko (2009) stated that the application of audiovisual media can improve student learning enthusiasm as evidenced by the increase in learning outcomes. This can be seen in Table 2: improvement in students' critical thinking skills after learning using a problem-based model of modeling with immune system video media.

**Table 2** Increasing students' critical thinking skills (N-gain).

Class	Average Pretest score	Average Posttest score	N-gain	Criteria
XI MIPA 3	16,3	32,7	0,69	Medium
XI MIPA 4	17,7	33,5	0,71	High

The results of the analysis of increasing students' critical thinking skills (N-gain) were known that students of class XI MIPA 3 and XI MIPA 4 is included in the medium and high N-gain category, meaning that the difference between the pretest score and posttest score shows

a significant increase in line with Purwaningsih et al. (2012) research that the application of the problem-based instruction model can improve students' critical thinking skills. Fachrurazi (2011) also stated that students' critical thinking skills had increased after the application of problem-based learning models. The results of the study were clear that basically Senior High School 1 Mayong students have the potential for critical thinking skills. This potential is very unfortunate if it cannot be developed properly. According to Karakoc (2016), critical thinking skills in educational programs are very important, developing critical thinking skills is an important element for modern education approaches and models because the world is increasingly complicated and increasingly technical so that critical thinking skills are generally accepted as a very vital stage in every part of learning, through the application of problem-based instruction models for students to develop critical thinking skills and problem-solving abilities.

Immune system video is very helpful for the learning process with the proven increase in N-gain with medium and high criteria from class XI MIPA 3 and XI MIPA 4 in Senior High School 1 Mayong, this result is in line with Saschia's research (2014) after the use of video showed an increase N-gain of 0.6 has a moderate criterion, as well as in the study of Hubais (2007) showing that the use of video as an effective learning media is evidenced by the posttest score higher than the pretest. The results of the analysis of each aspect of critical thinking skills were obtained from the posttest value. The full results are presented in Table 3.

**Table 3** Scores for each aspect of critical thinking skills.

Aspects of critical thinking skills	XI MIPA 3 %	Criteria	XI MIPA 4 %	Criteria
Provide a basic explanation	64,93	Critical	78,57	Critical
Build basic skills	71,29	Critical	79,04	Critical
Conclude	89,53	Very critical	77,14	Critical
Give further explanation	84,87	Very critical	88,83	Very critical
Set strategy and technique	93,64	Very critical	82,44	Very critical

Based on Table 3, the average of each aspect of critical thinking skills of class XI MIPA 3 and XI MIPA 4 students have critical and very critical criteria. According to Ennis (2011) there are five aspects observed, from the five aspects there are three aspects which have very critical criteria, they are giving further explanation, arranging strategies and techniques and concluding. In the aspect of giving further explanation students get the highest average score in both classes because students are required to solve problems that are displayed on video by discussing and finding solutions to existing problems, through these activities students can develop the ability to identify terms and definitions so that thinking ability student critical is better than before, in line with the research of Andarani et al., (2012) that learning uses problems with the help of video influences students' cognitive aspects towards learning achievement.

The aspects of managing strategies and techniques were at very critical criteria in both classes because during the learning process students always solve problems on student discussion sheets in group discussions, with discussion students are encouraged to use their knowledge and experience to solve problems because problem-based instruction models are supported by several teaching methods including lecture, question and answer, discussion of discovery and problem-solving (Purwaningsih et al., 2012). In line with the opinion of Widarti et al., (2013), learning that links material to the real world will encourage students to think

critically and find their own concepts. PBI models always increase students to give conclusions so that after applying this model students have no difficulty in giving conclusions. Azizah et al., (2016) stated that the ability to conclude students 94.1% was in the high category after the application of the PBI model because students had obtained information from the results of experiments and analyze that they had done on their groups, making it difficult for students to give a conclusion.

In the aspect of providing a basic explanation and aspects of building basic skills, the scores of students of grade XI MIPA 3 and XI MIPA 4 were in critical criteria. This happens because students are trained to solve problems and presented the results of discussions in front of the class, students are required to actively participate in asking questions and responding to problem-based questions from the videos that are shown so students can develop critical thinking skills, especially in providing basic explanations. In Dewi's research et al., (2017) the aspect of providing a basic explanation of obtaining an average score of 71.93% with the category of mastery level classified as good after applying the problem-based instruction model in the learning process. The aspect of building basic skills is one aspect of critical thinking skills in the problem-based instruction model through analyzing problems based on videos that have been aired and reading material and problems on the discussion sheet, students are trained to develop abilities by considering whether learning resources can be trusted or not including indicators of aspects of building basic skills according to Ennis (2011).

#### Student Conservation Attitudes

Data on student conservation attitudes seen from the three observed values, namely honest values, creative values, and human values can be seen in Table 4.

**Table 4** Score of student conservation attitudes during the learning of problem-based instruction models with video in senior high

Students conservation value	XI MIPA 3 %	Criteria	XI MIPA 4 %	Criteria	Average Criteria per aspect	Criteria
Honest	69	Good	73	Good	71	Good
Creative	61	Good	67	Good	64	Good
Humanist	82	Very Good	84	Very Good	83	Very Good

Based on Table 4, it can be seen that the score for the conservation attitudes of students after learning the problem-based instruction model with videos is obtained by the average percentage score per value, which is honest, creative and humanist in the criteria of good, good and very good. This shows that the application of problem-based instruction models with immune system video is effectively applied to senior high school students to improve students' conservation attitudes. Afrizon et al., (2012) stated that the application of the problem-based instruction model has succeeded in improving the behavior of the characters observed especially honest and creative.

Growing honesty in students when the learning process is not easy but with activities such as problem-solving in the form of student discussion sheets, each group feels challenged to compete with other groups, besides the teacher has the role of supervising students and providing direction so that the model is problem-based instruction with video systems Immunity can improve student honesty. The honest value of conservation attitudes observed from 4 aspects, namely following the learning process is well observed when the teacher gives instructions and clarification of material during the discussion, actively participates in the class

during the learning process, collects assignments on time and is intolerant of negative actions when working on student discussion sheets. The difference in the scores of the two classes was because class XI MIPA 3 has less active participation in class than class XI MIPA 4. Tiurma (2012) stated that teachers must be willing to teach honesty in class, teaching honesty does require an example; teachers must reconstruct their mindsets to be free from injustice and dishonesty

Creative can be interpreted as a tendency to develop or introduce ideas, alternatives or opportunities that will be useful in solving problems. Creativity cannot be separated from the environment, in developing creativity each individual must do various forms of interaction with the environment to stimulate new ideas to emerge so that there are 3 aspects that are observed is being able to think right, respect the views of others and think from all directions. One aspect that was observed was able to think right when the teacher asked questions related to daily life, students were able to correctly answer the teacher's questions, and during the learning process, many students were enthusiastic to try to answer the teacher's questions. Based on Table 4, the creative value of class XI MIPA 3 was 61% with good criteria and class XI MIPA 4 was 64% in good criteria, both classes get scores that are not too high but still good criteria because creativity must be trained continuously so that embedded in students. Erik (2014) stated the lack of creative thinking skills because teachers rarely or even never do learning that leads to the ability to think creatively.

Humanist can be described as a person who has an attitude of self-knowledge, wise, aware of his limitations so that he often takes a reasonable and open attitude. Cooperation and responsibility are aspects that are observed during the discussion process to see humanist values in students after the problem-based instruction model is applied with immune system video. Grade XI MIPA 3 and XI MIPA 4 presentation scores were 82% and 83% both in very good criteria. This is because when the teacher has shown the video and divided the LDS, all groups are immediately centered on the video and enthusiastic about working on LDS so that unconsciously the value of cooperation and responsibility has been embedded in students. Sanusi(2013) said that the need to instill humanist values in education because this education tends to be seen as something pragmatic, not something that lives, consequently the practice of education especially in formal environments, such as schools, does not pay attention to the potential and humanity of students. As an example, often teachers prioritize the cognitive potential of students, even though students as humans have a variety of uniqueness and potential certain in him/her so that instilling humanist values in students is very important in education.

## CONCLUSION

The effective problem-based instruction model with video is applied to senior high school 1 Mayong students towards critical thinking skills because, as many as 75% of students get a value of  $\geq 70$  in a test of critical thinking skills, on average each aspect of students' critical thinking abilities is in critical and very critical criteria, and the average value of each student's conservation value, honest value, creative value, and human value during the learning process reaches well to very good criteria and the problem-based instruction model with video can improve critical thinking skills because it gets the N gain value with the criteria of moderate to high.

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