

## The Potential of Reflective Learning Models for Improving Students' Critical Thinking Skills

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### Article History

Received : 02 – 06 – 2022

Revised : 18 – 07 – 2022

Accepted : 30 – 10 – 2022

### Keywords:

Reflective Learning Model,  
Critical Thinking Skills

### Article link



### Abstract

*Improving critical thinking skills is an important skill that needs to be developed in the 21st century which has the main goal of achieving science education. Critical thinking skills can be developed through ongoing training for students during the learning process. This study aims to see the potential of the Reflective learning model for improving students' critical thinking skills by using the Quasi-experimental method with the Pretest-Posttest control group design. The research subjects were 30 students in class VIII odd semester 2021/2022 at SMPN 12 Palangka Raya. The ability of students' critical thinking skills experienced a significant increase where students obtained an average score of 25.33%. The conclusion that can be drawn based on the analysis of research data states that the increase in students' critical thinking skills in science learning, especially in the material of the human digestive system by using reflective learning models, has experienced a significant increase. The reflective learning model has the potential to improve students' critical thinking skills.*

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### Introduction

Improving the ability to think critically is one of the important skills that need to be developed in the 21st century to achieve the main goals of science education. This is based on the quality of science education which currently generally does not show high relevance to the needs of society. In science education schools it seems as if it has no impact on ways of thinking and ways of living in social life (Herayati, L & Habibi, 2015). The current challenge is that the era of knowledge that is increasingly developing, dynamic, and increasingly advanced requires human resources who have high-level intellectual skills. This high intellectual skill is marked by the ability to reason that is carefully, logically, critically, creatively, and systematic and can also have attitude competence which is considered good in communicating through an idea and a way of solving a problem. To equip students' intellectual abilities can be developed through the educational process (Nawawi, 2016). Education will provide knowledge so that students can improve their skills or intellectuality. Education is an important indicator in life because basically through the education system students are expected to be able to change their behavior and attitude for the better, during the teaching and learning process (Puspita et al, 2020).

An important aspect that requires an emphasis on science learning is on students' critical thinking skills. Facing technological changes and current developments, critical thinking skills are needed. This is based on the competency standards of graduates of primary and secondary education units which state that students must be able to demonstrate critical and creative thinking skills in building and capturing information from the environment in solving the problems they will face (Nugraha, 2018).

Critical thinking can also be considered as the ability to think that is reflective and also reasonable which is focused on the way a person makes a decision about what to do and believes in it. These critical

thinking skills can be developed for students by conducting regular training during the teaching and learning process (Agustin et al, [2016](#)).

The ongoing learning process will of course require an appropriate and effective learning model to support the sustainability and success of the learning process. The learning model is of course related to the atmosphere during the teaching and learning process in the class, so that the more precise the learning model that will be used, the better the learning atmosphere will take place. Based on the problems above, the right model to use as an effort to improve students' critical thinking skills is to apply a reflective learning model. It is hoped that the use of reflective learning models will be able to improve students' critical thinking skills.

The reflective learning model was developed based on constructivist psychology theory and cognitive psychology theory. The reflective learning model is a learning model that presents a meaningful and in-depth learning process, where this model provides more opportunities for students to be able to reflect on things that happened both in the past, present, or in the future (Rais & Ariyani, [2019](#)). The implementation of this reflective learning is based on the application of a learning model that seeks a meeting between the educator's teaching model and the learner's learning model (Social cognitive perspectives), which emphasizes students as a teacher as well as a researcher (teacher as lianner and researches). This reflective learning model encourages students to be able to think creatively, question attitudes and at the same time encourage independence in students, so that reflective learning can be said to be a process of thinking continuously (Marnita: 2017). The purpose of this study was to determine the potential of the Reflective learning model to increase students' critical thinking skills.

## Methods

The type of method in this study is a quasi-experimental or so-called quasi-experimental, namely an experimental method that cannot control all the variables studied. The research was designed using two classes, one class was used as the experimental class and the other class was used as the control class. (Sugiyono, [2012](#)). The research design used was the Pretest-Posttest Control Group Design. The design consists of two groups, before the learning model is applied, they carry out an initial test (pretest) and a final test (posttest) after the reflective learning model is applied.

The research subjects were 30 students in class VIII odd semester 2021/2022 with 17 male students and 13 other female students who were held in one of the junior high schools (SMP) to be precise at SMPN 12 Palangka Raya, Jl. Karanggan. The research sample was selected by purposive sampling, which is a technique in taking samples from data sources by making certain considerations to get one class that has homogeneous abilities. In this research, the subject will receive treatment in one of the natural sciences lessons, precisely in the material of the human digestive system. This is based on the results of early studies showing that the value of critical thinking skills in the sub-material of the human digestive system is classified as having a value that does not meet the KKM. The implementation of the research process was carried out in two meetings with an allocation of 60 minutes for each meeting. Research subjects will be given the same questions both during the pretest and posttest with a total of 10 multiple choice questions.

Giving treatment to students aims to train and improve students' critical thinking skills with 5 types of indicators, namely the skills of identifying or formulating a problem, identifying and dealing with relevance and irrelevance, answering an explanation or challenge, the ability to give reasons and generalize. After the indicators of critical thinking skills to be trained have been identified, the data will be analyzed to see the improvement in critical thinking skills for each indicator. The following table 1. displays the stages of the learning process that are applied, the implications for student behavior during the learning process, as well as indicators of critical thinking skills that are trained.

**Tabel 1. Learning Implementation Instruments**

Reflective Learning Stages	Implications of learner behavior in learning	Critical thinking skills indicator
Context recognition	<ol style="list-style-type: none"> <li>1. The teacher recognizes the context of learning material with the student's situation</li> <li>2. Asking questions related to the context of the material</li> </ol>	Identify or formulate a problem
Experience Presentation	<ol style="list-style-type: none"> <li>1. Observing shows in the form of animated media as an apperception</li> <li>2. Identify the relevance of impressions</li> </ol>	Identify and address relevance and irrelevance

Reflective Learning Stages	Implications of learner behavior in learning	Critical thinking skills indicator
Reflection	1. Listen to learning material 2. Linking learning material with experiences that have been passed	Responding to an explanation or a challenge
Action	1. Discuss the formulation of the problem 2. Discuss the experimental design	Ability to give reasons
Evaluation	1. Present results 2. Provide opinions and corrections 3. Do practice questions	Summarize or generalize

The results of the implementation of the pretest and posttest of the research, the next step, the data will be tested using an independent sample T-test . This test aims to find out whether or not there is a difference from the implementation of the pretest to the implementation of the posttest on students. Calculation of statistical descriptions and Independent sample t-test using IBM SPSS Statistics 21. Then the resulting values will be analyzed to find the average value of critical thinking skills, gain, N-gain.

## Results and Discussion

Indicators of critical thinking skills measured in this study are skills in identifying or formulating problems, dealing with relevance and irrelevance, answering an explanation or challenge, ability to give reasons and generalize. After that, each of these indicators will be analyzed for their achievement based on the acquisition of scores during the pretest and posttest. The achievement of improving students' critical thinking skills is explored based on the implementation of the pretest and posttest after participating in the learning process. The results of the assessment will then be analyzed for the percentage calculation. Comparison of the percentage of achieving an increase in the average pretest, posttest, and N-gain critical thinking skills in the experimental class and the control class totaling 59 students is shown in table 2. as follows:

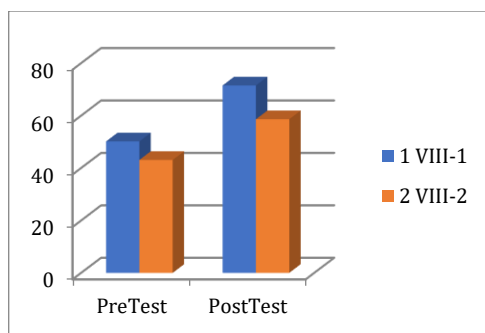
**Table 2. Average Critical Thinking Skills of Students in Experiment Class and Control Class**

Class	PreTest	PostTest	Gain	N-Gain	N-Gain Interpretation
Experiment	44,66	70,00	25,33	1,12	Superior
Control	35,86	58,37	22,41	0,60	Moderat

The results of the analysis of hypothesis testing using the Independent Sample T-Test assisted by IBM SPSS Statistics 21 show that there is an influence of reflective learning models assisted by animation media on students' critical thinking skills in class VIII human digestive system material. The results of this study indicate that students' final critical thinking skills are different from their initial critical thinking skills. Students' critical thinking skills in the experimental class or control class experience positive changes.

Based on the analysis of the results of the pre-test, the average value of the critical thinking skills of the experimental class was 44.66 and the average value of the critical thinking skills of the control class was 35.86. Meanwhile, the results of the analysis of the critical thinking skills final test showed that the average score of students in the experimental class was 70.00 and the control class had an average score of 58.37. This difference in value provides an explanation that at each meeting both the first meeting and the second meeting both experienced an increase.

Based on the bar graphs of the experimental class, the differences in scores were higher than those in the control class. This difference could be due to differences in the use of the applied media. The media applied to the experimental class is animation media while the control class uses study journals so that there are differences in the final scores on students' critical thinking skills. Comparison of the average scores of the pre-test and final test of students' critical thinking skills in the experimental class and the control class is shown in Figure 1. below:

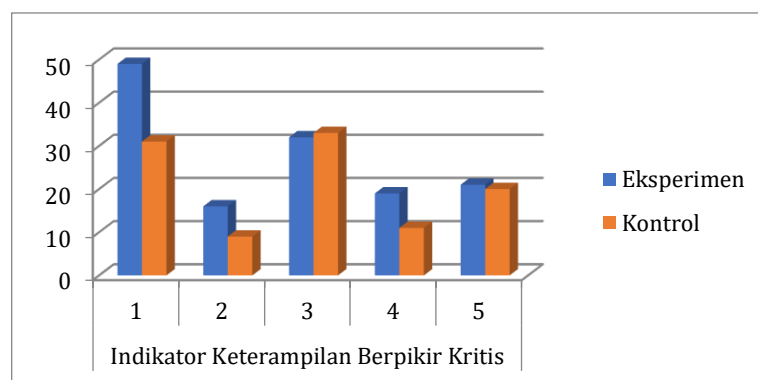


**Figure 1. Graph of the increase in pretest and posttest critical thinking skills of the experimental class and the control class.**

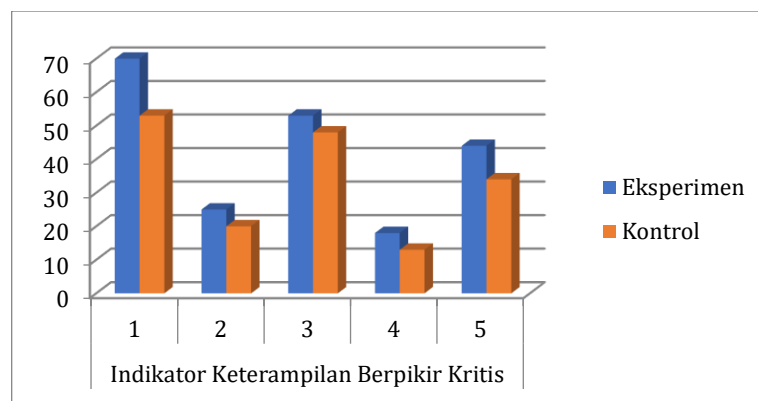
The results of the initial test or pretest show that students' critical thinking skills in the experimental class or control class are still classified as less critical. This can be seen from the average score of the initial test of students' critical thinking skills in each class, which is 44.66 and for the control class, it is 35.86. This is due to the lack of trained students to think critically through appropriate learning models to improve their critical thinking skills. Based on the results of observations during the learning process, it can be seen that the treatment given to the experimental class using reflective learning models assisted by animated media contributed positively to improving students' critical thinking skills.

The use of animated media during the reflective learning process helps students to directly capture an explanation of the material to be studied, this is because animation media is a type of visual media, where this media is related to the sense of sight. Visual media can facilitate understanding (eg through elaboration of structure and organization) and strengthen memory. Visuals can also foster student interest and can provide a relationship between the content of learning materials and the real world. This fact is reinforced by one of the studies conducted by Andini (2019) which states that animation media can improve students' critical thinking skills. Therefore the application of reflective learning models assisted by animated media contributes positively to improving critical thinking skills on several indicators such as identifying or formulating problems, identifying and dealing with relevance and irrelevance, answering an explanation or challenge, the ability to give reasons, and generalize.

Overall, students' critical thinking skills in reflective learning in the experimental class obtained the highest score of 90. The value of the pretest and posttest in the experimental class had a difference of 25.33%, an increase in students' critical thinking skills in this experimental class can be seen in the results of the N value -gain is equal to 1.12 with the interpretation of N-gain which is included in the high category.



**Figure 2. Pretest Critical Thinking Skills for each indicator in the experimental class and control class**



**Figure 3. Posttest of Critical Thinking Skills in each indicator of the experimental class and control class**

- Indicator 1 : Identify or formulate a problem  
 Indicator 2 : Identify and address relevance and irrelevance.  
 Indicator 3 : Responding to an explanation or challenge.  
 Indicator 4 : Ability to give reasons  
 Indicator 5 : Generalizing.

The results of the data analysis on the increase in the ability of critical thinking skills obtained by students in the experimental class and the control class illustrate that reflective learning has the potential to increase students' critical thinking skills. This is because in reflective learning students will be directed and guided to be able to learn independently by forming appropriate thoughts based on understanding from the experiences they have passed. Table 2. above shows that the average value obtained from the experimental class is higher than that of the control class.

Results The indicator for critical thinking skills that improved the most was the Indicator of Identifying or formulating problems. This is consistent with the characteristics of the reflective learning model itself where this reflective model requires students to be able to identify, describe situations and the ability to develop an emotional response to a problem (Rais and Aryani, 2019). The indicator of the ability to give reasons is the indicator that achieves the lowest results, this is due to the subject's lack of thoroughness in working on the questions so that the results obtained are not optimal. The relatively long time when giving reasons is also a factor in making mistakes because it takes time to think deeply in answering questions and takes a long time to consider the answers to be given (Fridaniati, 2018). The data on the results of the study both during the pretest and posttest of the two classes showed an increase in critical thinking skills with different percentages.

The results of the analysis of critical thinking skills using the reflective learning model in terms of the experimental class had the highest increase of 25.33% and 22.44% improvement in critical thinking skills in the control class. This is in line with Majid's research (2015) where reflective learning can improve students' critical thinking skills because this reflective model trains students to be able to think continuously and this is in line with the characteristics of critical thinking which are conceptualization, rational and reasoned, reflective, independent thinking. , creative, fair and open (Majid, 2015).

## Conclusions and Recommendations

The conclusion that can be drawn based on the analysis of research data states that the increase in students' critical thinking skills in science learning, especially in the material of the human digestive system by using reflective learning models, has experienced a significant increase where students obtain an average score of 25.33%. The reflective learning model has the potential to improve students' critical thinking skills.

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