

# The Effect of Integrated Civil Approaches with Inquiry Model on Critical Thinking Ability and Cognitive Learning Outcomes of Samarinda State 11 High School Students

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**Abstract—** The purpose of the study is to determine the combined approach of learning learning models on cognitive thinking skills and cognitive learning outcomes of student of Samarinda Grade II High School. This research includes Quasi Experimental population of all students of class X scientific grade Samarinda with six classes. The samples selected in the two classes are class X IPA 2 (treatment class which is using a scientific approach combined with inquiry learning model and ten science five (conventional class) with purposive sampling technique. Research design using nonrandomized control group question (pretest-posttest), observation sheets / questionnaires and documentation Hypothesis testing used is the significance level of 5% assisted by SPSS 22. Research procedures include planning, implementing and analyzing data. Results showed that the scientific learning approach combined with the inquiry learning model had an effect on critical thinking outcomes of the X grade students' skills and biological cognitive learning of Samarinda State High School 11.

**Keywords—** scientific inquiry, critical thinking, cognitive learning outcomes

## I. INTRODUCTION

Education in the school environment is intended to realize national education goals as stated in the Law of the Republic of Indonesia Number 20 of 2003 concerning the national education system, namely: developing the potential of students to become human beings who believe and fear the Almighty, noble, healthy knowledge, skillful, creative, independent, and become a citizen of a democratic and responsible country.

To achieve national education goals, the role of professional educators is needed. Professionals in the sense that they can improve the quality of education [1]. Teacher teaching and learning process does not have to be fixated by using only one method or learning strategy, a teacher is able to use a variety of learning methods or strategies so that teaching and learning activities are not boring for students and in accordance with the goals to be achieved namely achieving increased motivation and learning achievement [2].

The learning process is one of the important elements to achieve success in learning. Nana [3] suggests that the teaching and learning process or teaching process is an activity to implement the curriculum of an educational institution so that it can influence students achieving the educational goals set. In the teaching and learning process in the classroom there is a close relationship between teachers, students, curriculum, facilities and infrastructure.

Biology learning emphasizes giving direct experiences that can be obtained from everyday life, the surrounding environment, and communities that are loaded with technology. In biology learning a scientific process needs to be developed that can encourage students to solve a problem in the learning process, in this case practicum activities carried out both inside and outside the classroom [4].

Daily learning cannot be separated from complementary appropriate learning such as syllabus, lesson plans, teaching materials, teaching media, student worksheets and evaluation instruments [5]. The results of the observations that we conducted at SMA N 11 Samarinda through interviews and questionnaires illustrate that generally the implementation of the learning process in the classroom still tends to be monotonous because the method used is still lecture. Learning activities are less effective and saturating because they do not actively involve students. This has an impact on the cognitive outcomes of low students and the ability to think critically in solving problems is still not optimal. This becomes a problem and a big task to be given a solution.

Responding to learning problems in school, the writer made a breakthrough and developed a solution to make teachers and students active, creative and innovative, one of which was the scientific approach to learning combined with the Inquiry model. It is expected that learning through the Scientific approach combined with the Inquiry model can change the learning system in the classroom that seems monotonous, become more active and critical of problems.

Hanafiah [6], states that Inquiry is a series of learning activities that involve maximally all the ability of students to search and investigate systematically, critically, and logically so that they can find their own knowledge, attitudes and skills as a manifestation of behavior change. According to Wina [7], states that the steps in the Inquiry learning model are as follows: 1. Orientation, orientation steps are steps to foster a responsive learning atmosphere or climate. In this step the teacher conditions so that students are ready to carry out the learning process. 2. Formulating problems is a step to bring students to a problem that contains puzzles. 3. Analyze the problem, namely the step students review the problem critically from various points of view. 4. Formulate a hypothesis, a hypothesis is a temporary answer to a problem that is being studied. 5. Gathering data is the activity of capturing information needed to test the proposed hypothesis. The process of collecting data not only requires strong motivation in learning, but also requires perseverance and the ability to use his thinking potential. 6. Testing hypotheses is the process of determining answers that are considered acceptable in accordance with data or information obtained based on data collection. 7. Formulating conclusions is the process of describing findings obtained based on the results of hypothesis testing. Formulating conclusions is the point in the learning process.

Critical thinking refers to the use of theoretical or strategic skills to increase the likelihood of a desired outcome. Critical thinkers use skills without any influence that is generally conscious. Critical thinking is a process in which someone tries to answer questions that cannot be answered easily rationally, to add information. According to Inch et al. [8], critical thinking is an investigation that aims to find out the situation, events, questions, or problems in order to make a hypothesis or conclusions while regarding the things studied by combining all information that has been obtained so that it can be accepted the truth. Students who think critically do not just believe the teacher's explanation, but try to consider their reasoning and look for other information to obtain the truth.

## II. METHODS

The research method used is the Quasi Experiment Research (quasi-experimental research) through a quantitative approach. The aim of the study was to determine the effect of the scientific approach combined with the inquiry learning model on critical thinking skills and cognitive biology learning outcomes of Samarinda High School II High School students. This research includes Quasi Experiment Research (quasi-experimental research) through a quantitative approach. The population in this study was all students of class X IPA Samarinda II High School consisting of 6 classes. The sample chosen by two classes is class X IPA 2 (treatment class namely with scientific approach combined with inquiry learning model) and X IPA 5 (conventional class) with the taking technique using purposive sampling. The research design

uses a non randomized Control Group. Data collection techniques use soaltes (pretest-posttest), observation sheets / questionnaires and documentation. The hypothesis test used is the t test with a significance level of 5% using SPSS 22. The procedure of this study includes planning, implementation, and data analysis.

The independent variable in this study is the scientific approach combined with the Inquiry model. The dependent variable is students' critical thinking abilities and cognitive outcomes of students. Data collection uses tests (pretest and posttest), interviews, questionnaires, documentation. Data analysis using t-test or t test.

Table 1. RESEARCH DESIGN

Group	Pretest	Treatment (independent variable)	Posttest (dependent variable)
A	O1	X1	O2
B	O2	X0	O4

Information:

A and B: Treatment class

O1 and O3: Pretest

X1: The treatment class uses learning with a scientific approach combined with Inquiry learning models

X0: The control class uses conventional learning

O2 and O4: Student learning outcomes and students' critical thinking skills (posttest)

## III. RESULT AND DISCUSSION

The researcher conducted research on the control class and the experimental class, but before the researchers conducted sample selection using random sampling techniques. The sample to be observed is based on the average value in the even semester.

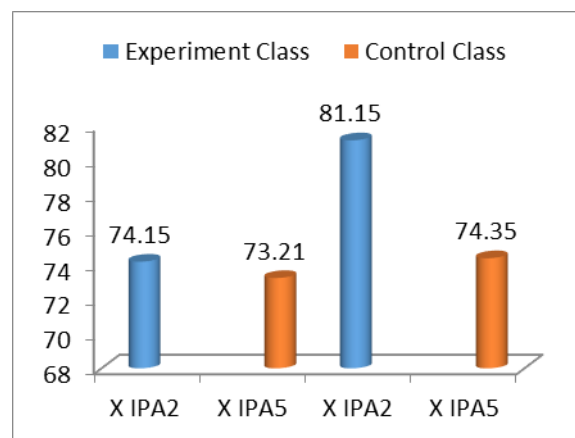


Figure 1: Learning outcomes diagram

Based on the histogram the average value of the treatment class learning outcomes has increased with the treatment of scientific approaches combined with the inquiry model. The initial average value in the treatment class was 74.15 while the initial conventional class average value was 73.21. The average value of the treatment class after being given a scientific approach combined with inquiry was obtained at 81.15. In the conventional class the final average value is 71.35.

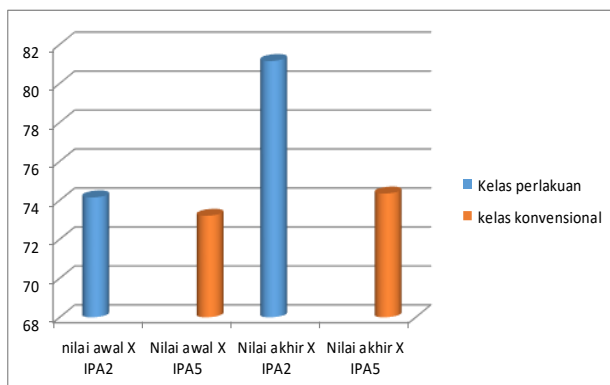


Figure 2: The average diagram of the results of the pretest and postes

Based on the histogram above in figure 2 shows that class X IPA2 the average pretest value was obtained 70.25 while class X IPA5 obtained an average pretest value of 70.17. After being given treatment with a scientific approach combined with the inquiry model class X IPA2 (experimental class), the average posttest value was 80.10, while class X IPA5 (conventional class) obtained a posttest average value of 73.15.

Based on the results of the analysis and the data obtained there is an increase in the value of learning outcomes through a scientific approach combined with the inquiry model. The average value of learning outcomes of class X IPA2 (experiments) has increased by being given the treatment of a scientific approach combined with the model of inquiry. The initial average value in class X IPA2 (experiment) amounted to 74.15 while the initial average value of class X IPA5 (conventional) was 73.21. The average value of class X IPA2 (experiment) after being given a scientific approach combined with inquiry was obtained at 81.15. In class X IPA5 (conventional) the final average value was 71.35. From these data indicate that the learning outcomes of biology that uses a scientific approach combined with the Inquiry model is better than having studied biology using conventional models. Based on the data obtained about the value of the pretest shows that the class X IPA2 the average pretest value was obtained 70.25 while the class X IPA5 obtained an average pretest value of 70.17. After being given treatment with a scientific approach combined with the inquiry model class X IPA2 (experimental class), the average posttest value was 80.10, while class X IPA5 (conventional class) obtained a posttest average value of 73.15.

In class X IPA2 (treatment class) obtained a critical thinking average value of 79.10. Whereas in class X IPA5 the critical thinking average value was 73.10. This shows that the X class of Science given the scientific method combined with the inquiry model succeeded in making students think more critically in solving problems and answering questions.

This is in accordance with the advantages of the scientific approach combined with the Inquiry model that makes students more active, creative, and can solve their

own problems so that students are more critical in the learning process. Increasing student learning outcomes are also influenced by the school environment, infrastructure, and the selection of learning models that are appropriate for the students' conditions. In this study raised issues about ecosystems.

Inquiry Learning encourages students to have experience and conduct experiments or lab work that allow students to find principles for their own students. This is in line with the opinion of Hofstein (2004) in Firdausi [7] who stated that effective practicum activities to develop logic of thinking, ability to solve problems, improve psychomotor and student learning interest and avoid monotonous learning atmosphere.

Inquiry learning model is a cooperative learning model that is able to train students to solve problems using the steps in the science process and help facilitate the teacher in the learning process. Inquiry is a series of learning activities that involve maximally all students' abilities to search, and investigate systematically, critically, and logically so that they can find their own knowledge, attitudes, and skills as a manifestation of behavior change [6]. In Inquiry learning students are encouraged to be able to solve a problem by directly practicing so that they get their own experience.

The experimental class is more effective because the learning model is used according to the needs of students, the teacher engages in active interaction with students, discussion and presentation activities with the group, material is easy to understand, students are more active in conveying their ideas, immediately practice continuing to write scientific reports to make students more creative and skilled in conducting experiments and can pour the results of his thoughts in the form of scientific reports. Relevant to the opinion of Anam [8] states that inquiry-based learning is a learning model that provides free space for students to find their passion and learning methods. Students are not forced to learn in a certain style, they are developed to become creative and productive learning. The positive value in this inquiry learning is that students will not only know, but also understand the essence and potential of the development of certain learning materials.

The scientific approach combined with the Inquiry model has a syntax with group learning. Learning can be effective if group discussions are conducted so that ideas and input from group friends can be integrated so that all students can be active. The stages of the scientific approach are combined with inquiry models namely orientation, formulating problems, analyzing problems, formulating hypotheses, collecting data, testing hypotheses, formulating conclusions.

#### IV. CONCLUSION

Based on the results of research and discussion, it can be concluded as follows: (1) Scientific approach combined with inquiry model has a significant effect on the ability of student learning outcomes; (2) The scientific approach combined with the Inquiry model influences critical

thinking skills; (3) The scientific approach combined with the influential Inquiry model is an approach and model that supports each other's syntax so that students can be more active, happy and innovating. We suggested that teachers can use a scientific approach combined with inquiry learning models to improve the results of learning and critical thinking through learning in schools so that students are expected to be more actively involved and can express their ideas well.

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