

# *Development And Implementation Of Collaborative Guided Inquiry (Cgi) Models In Improving Students' Critical Thinking In Biology Subjects At Man 3 Padang Panjang City*

Refma Dewita<sup>1</sup>, Hadiyanto<sup>2</sup>, Solfema<sup>3</sup>, Nurhizrah Gistituati<sup>4</sup>, Mega Iswari<sup>5</sup>, Sufyarma Marsidin<sup>6</sup>, Z Mawardi Effendi<sup>7</sup>

<sup>1</sup>Postgraduate Educational Science Doctoral Program Universitas Negeri Padang

<sup>2, 3, 4, 5, 6, 7</sup> Lecture at Padang state University. Doktoral Student Of Educational Sciences Padang State University.  
Padang, Indonesia  
Padang, Indonesia

e-mail: refmadewita0@gmail.com, hadiyanto@fip.unp.ac.id, solfema@fip.unp.ac.id, gistituatinurhizrah@gmail.com, mega\_biran@fip.unp.ac.id, sufyarma1954@gmail.com, zmeffendi@fe.unp.ac.id.



**Abstract** – Education is an effort to self-develop students in terms of knowledge, attitudes and skills in a social environment in which there is interaction between students and educators. It is in this interaction that learning of behavior and norms takes place that is able to develop students' thinking potential. Collaborative Guided Inquiry learning is a structured and systematic model, in which small groups work together to achieve common goals and is a core part of contextual-based learning activities. It is hoped that the knowledge and skills acquired by students are not the result of remembering a set of facts but the result of discovering them yourself. The purpose of this study was to analyze the development and implementation of the Collaborative Guided Inquiry Model at MAN 3 Padang Panjang City. The method used is a qualitative method. Data collection techniques using triangulation techniques. Based on these conclusions, the researcher provides the following suggestions. For teachers, it can be used as a guide for learning guided inquiry models and used as an alternative learning to improve student learning outcomes. Introducing the stages of learning to students in advance, so that students can work independently and be more focused in doing practicum.

**Keywords** – Development and Implementation, Collaborative Guided Inquiry models, Critical Thinking.

## I. INTRODUCTION

Based on 21st century skills, communication and collaboration skills are skills that must be developed in students (Partnership 21st Century Skill, 2010; NRC, 2011; Care et al., 2015). Communication and collaboration skills also include generic skills and science process skills which are very important in education. Based on the Hong Kong Curriculum Development Council, these two skills are skills that are useful for supporting success in continuing education, in the world of work and in life in society, apart from being used to learn various concepts and solve various problems in natural science/science towards education.

Education is an effort to develop students' self-development in terms of knowledge, attitudes and skills in a social environment in which there is interaction between students and educators. It is in these interactions that learning behavior and norms occur that are able to develop the thinking potential of students. To improve human intelligence, the government has implemented various programs to improve the quality of education in Indonesia. Programs carried out by the government to improve the quality of education are increasing the professionalism of educators in making changes to the education curriculum.

The 2013 curriculum is the curriculum before the introduction of the Merdeka Learning curriculum which previously emphasized student-centered learning with active learning patterns and also critical learning (Permendikbud number 69 of 2013).

Based on the Permendikbud it can be understood that the learning pattern that is emphasized now is learning that prioritizes critical thinking skills. Students' critical thinking skills can be developed through collaborative guided inquiry learning. The development of Collaborative Guided Inquiry (CGI) learning models can improve students' critical thinking in Biology learning. Besides that, the teacher's role is very important to guide students in learning as well as the teacher as a facilitator, directing, facilitating, or assisting students in learning. To overcome this, in the world of education the term Collaborative Guided Inquiry learning model was introduced. In this learning process, students are invited to investigate, discover, collaborate, play an active and creative role in learning. Meanwhile, the facilitator must be able to make the learning process effective and enjoyable for the students so that it does not lead to boredom in learning.

An explanation of the concept of Collaborative Guided Inquiry learning is a structured and systematic model, in which small groups work together to achieve common goals and is a core part of contextual-based learning activities. It is hoped that the knowledge and skills acquired by students are not the result of remembering a set of facts but the result of discovering them yourself. The teacher must always design activities that refer to finding activities, regardless of the material being taught. Learning will be meaningful if students are actively involved in discovering facts seen from the environment with the guidance of the teacher.

Cooper and Heinich (in Nur Asma, 2006: 12) explain that collaborative learning is a learning approach that involves small groups of students working together to achieve common goals and tasks, while working together to learn collaborative and social skills. Group members have responsibilities and are interdependent on one another. Meanwhile, the Collaborative Guided Inquiry Model is an activity that involves students to find and investigate a problem in learning so that they can solve learning problems, emphasizing the involvement of students in a solution to the problem which means that they can compile their own knowledge from the results of the solutions given. they found, emphasizing that students bear primary responsibility for building their own knowledge and understanding

The collaborative guided inquiry learning process can help students develop critical thinking and problem-solving skills that will be used as basic concepts in learning so that students are more independent. Collaborative Guided Inquiry Learning involves students directly in learning so that the knowledge gained is easy to remember and understand because besides working together in groups they also discover for themselves what learning concepts they have not learned through the guidance and direction of the subject teacher, so as to improve Critical thinking of students so that it influences learning outcomes.

Collaborative Guided Inquiry Learning is based on the idea that everyone works together in group study and is simultaneously responsible for the learning activities of their group members, so that all group members can master the learning material from what they find themselves and the teacher as a facilitator as well as being a guide in the learning process teach. Collaborative learning emphasizes cooperation between groups. This is based on the idea that everyone is easier to find/understand a concept if they discuss the problem together. Most of them in learning Collaborative Guided Inquiry form heterogeneous groups and take into account differences in academic abilities and the characteristics of students. Student activities in collaborative Guided Inquiry learning include actively following the teacher's explanation, completing assignments in groups, giving explanations to their group mates, encouraging their group mates to participate actively, and discussing.

In order for the activities to run well and smoothly, special skills are needed, which are called students' critical thinking skills in collaborative guided inquiry learning. These skills can be built by developing communication and division of tasks between group members. Study groups that achieve maximum learning outcomes are given awards or rewards. Giving this award is to motivate the emergence of interest and increase in Student Thinking.

The problems faced in order to improve the quality of formal education in Madrasah Aliyah Negeri 3 Padang Panjang City are influenced by several factors; including the quality factor of educators in the teaching and learning process, teachers have not created an effective learning atmosphere. The use of methods and models is not yet varied and innovative so that students are not yet able to think critically in finding knowledge about learning related to the material to be studied. This problem is evidenced by the Student Learning Outcomes obtained from the Recapitulation of Mid semester Biology Exam Scores. Students who get scores above the Minimum Completeness Criteria are 15%. Students who get the KKM limit score is 20%. Students who get scores

below the KKM are 65%. If this condition is allowed from year to year, it will have an impact on the quality of education in Madrasah Aliyah Negeri 3 Padang Panjang City, especially in Biology subjects. Anticipating the decline in learning outcomes, solutions are sought, including through various activities such as: teacher training, application of various learning approaches/models including the development of Critical Thinking through the Collaborative Guided Inquiry learning model in Biology subject at Madrasah Aliyah Negeri 3 Padang Panjang City.

The above phenomena need research and interesting learning material concepts, so that learning objectives are achieved and students' critical thinking needs to be developed in continuous classroom learning. Conditions like this are very decisive for students to learn so that they can achieve optimal learning results in accordance with what is expected. The teacher is not only a facilitator but also masters learning material, innovation, creative and communicative so that it can create an atmosphere that evokes the enthusiasm of students to learn can improve students' critical thinking, creative and communicative, the teacher must develop learning methods and models that suit the circumstances of students .

How big is the influence of the development of the Collaborative Guided Inquiry learning model in Biology subject carried out by the Teacher on learning outcomes so far, whether the influence is positive or even vice versa, of course depending on the creativity of the Teacher, how to organize learning can be conditioned in such a way that allows for interaction and good cooperation in the process and achieve good learning outcomes together. Therefore, in achieving satisfying learning objectives, it is necessary to create a learning model that can establish cooperation in learning, namely the relationship between students learning with the teacher as a guide in learning as well as a facilitator, so as to obtain maximum learning results. Based on the description above, the authors are interested in conducting research entitled "Development and Implementation of Collaborative Guided Inquiry Models (ITC) in Improving Students' Critical Thinking in Biology Subjects at MAN 3 Padang Panjang City"

## **II. RESEARCH METHOD**

This study was designed with a "Research and Development" approach, as Borg & Gall (1979:624) argues that what is meant by a development research model is: "a process used to develop and validate educational products". This understanding implies that research and development methods in the field of education are, in principle, a process for developing an educational product and then validating the product. This means that research and development methods are applied to produce products and test product effectiveness.

In the context of this research, the educational product that will be developed and validated is the Development of Students' Critical Thinking through the Collaborative Guided Inquiry learning model in Biology Subjects which was developed and validated in learning at Madrasah Aliyah Negeri 3 Padang Panjang City. What is meant by educational products are not only material objects, such as textbooks, films for teaching, but also include procedures and processes, such as learning models, teaching methods, or teaching organization. The form is in the form of learning objectives (learning outcomes), models, methods, curriculum, evaluation, both hardware, software and methods or procedures. This approach is a way to research to produce new products, and test the effectiveness of certain products.

The target of developing Critical Thinking through the Collaborative Guided Inquiry learning model in Biology Subjects who were the subjects of this study were the Students of Madrasah Aliyah Negeri 3 Padang Panjang City who were determined by purposive sampling of 100 people with a total of 25 students as respondents for the preliminary study, while 25 people as response in the implementation of learning models, which are divided into two groups. The experimental group (treatment) or treatment consisted of 25 students and 25 students as the control group.

This research was conducted through two stages of activity. The first stage, preliminary study and formulation of a conceptual (theoretical) learning model. Preliminary studies are needed to explore and explore the necessary data, explore the focus, themes and initial research data by examining both empirically and theoretically. In addition, it will be socialized with students, and then jointly compile and formulate a model conceptually (theoretically). The conceptual model that has been compiled is then validated by experts (expert judgment) in accordance with their field of expertise. The validation stage is carried out so that the conceptual model has a strong theoretical basis in accordance with scientific principles. This conceptual model must refer to the learning needs and development of the learning process of students.

The second stage, testing the conceptual model that has been compiled and validated in the field. The test aims to see how far the conceptual model that has been developed has actual effectiveness and efficiency in the field. In addition, during the model trials evaluation, revision and refinement will be carried out so that in the end the expected effective model can be found. Thus the model will be documented and will then be used as the final model as a product of this research.

### **III. RESULT AND DISCUSSION**

#### **3.1. Results of the Needs Analysis Phase**

Analysis of the need for renewal of learning models will have an impact on student success. The data obtained at the learning model needs analysis stage are as follows: Analysis of the research data in phase I, related to the preliminary study which was carried out qualitatively. Qualitative data analysis was carried out to objectively describe the implementation of Critical Thinking Development through collaborative learning models in Biology Subjects at Madrasah Aliyah Negeri 3 Padang Panjang City. Qualitative data analysis as a whole to describe the results of the preliminary study as an important component in formulating the developed learning model. Quantitative data analysis in the preliminary study is intended to explore the knowledge and understanding of the learning community, which is an urgent component that is very basic to obtain an overview of the condition of the learning community in improving learning outcomes through the developed model.

The results of the analysis of the results on the level of fulfillment of the 8 SNPs at MAN 3 Padang Panjang City show a deficiency in the standard process below 50%. An analysis of the PBM tools made by the teacher obtained a value of 61.25. This means that there is a fairly high gap in the teacher's PBM tools. For example in the preparation of syllabus indicators that have not integrated and integrated student involvement. the syllabus made by the teacher still allows it to be developed, especially the indicators, learning strategies, and assessment sections. While the results of the analysis of the RPP obtained a value of 60.00 so that it can be concluded that the RPP made by the teacher is categorized as inadequate so that it is necessary to develop the RPP, especially on learning objectives, learning strategies, media and assessment, even though identifying the goals to be achieved is an activity that must be carried out (Sanjaya, W, 2008), strategies are less varied according to Kemp in Sanjaya, W (2008) states learning strategies are activities that must be carried out by teachers and students so that learning objectives can be achieved effectively and efficiently so that if the strategy used is not appropriate then the learning objectives will not be achieved. achieved.

The involvement of students needs to be done so that learning is more interesting for them. Students are invited to think critically, thinking cannot be separated from human activities. Thinking is generally defined as a mental process that can produce knowledge. Thinking turns out to be able to prepare students in various disciplines and can be used to fulfill intellectual needs and develop students' potential. More than 2500 years ago Plato in his discussion of logic showed that critical thinking is a tool that helps individuals find answers or solutions to one's confusion and problems. Socrates, Plato's teacher believes that discussion and critical thinking with knowledge are in the minds of individuals, rather than teachers who transmit knowledge to students (Chagwong et al., et al. 2018: 37). Critical thinking must go through several stages or processes to arrive at a conclusion or assessment, namely the stages of analyzing, synthesizing, recognizing and solving problems, concluding and evaluating. The goal of critical thinking is to achieve deep understanding. The discovery of indicators of critical thinking skills can be expressed through the behavioral aspects expressed in the definition of critical thinking. The Mann-Whitney U analysis explains that the level of critical thinking skills across gender does not show a significant difference (Noni et al, 218: 509).

Critical thinking skills are included in higher order thinking skills or Higher Order Thinking Skills (HOTS). HOTS is associated with three levels of Bloom's taxonomy. Critical thinking in particular is defined as thinking skills using basic thought processes to analyze arguments and generate insights for each meaning and interpretation, develop cohesive and logical reasoning patterns, understand the assumptions underlying each position, and provide a reliable, brief and convincing presentation model. Critical thinking is a process that aims to make rational decisions that are directed to decide whether to believe or do something. This intellectual process is active and skillful conceptualization, applying, analyzing, synthesizing and evaluating information gathered or generated from observation, experience, reflection, reasoning or communication to guide our beliefs and actions. It can also be defined as a mental process involving operations such as deduction, induction, evaluation, classification and reasoning (Samsudin et al, 2019: 118).

Critical thinking indicators are grouped into five aspects as shown in the following table.

No	Aspect	Indicator
1.	Give a simple explanation	a. Focus on questions b. Question analysis c. Ask questions about explanations
2.	Build Basic Skills	a. Consider whether a source is trustworthy or not b. Observe and consider induction
3.	Dedicate	a. Summarize and consider the results of the education b. Induction and consider induction c. Make and determine the results of the considerations
4.	Provide further explanation	a. Defining Requirements and definitional considerations in three dimensions. b. Identify assumptions.
5.	Establish strategies and tactics	a. Decisive action b. Interact with others

Source : Samsudin dkk,2019)

The opinion of experts about the definition of critical thinking above can be concluded that critical thinking is a mental process for analyzing or evaluating information. To understand information in depth can form a belief in the truth of the information obtained or the opinions conveyed. The active process indicates the desire or motivation to find answers and achieve understanding. Critical thinkers examine the thinking processes of others to find out which thinking processes are used correctly.

Development of students' critical thinking through the development of Collaborative Guided Inquiry learning models in biology subjects for students begins with a preliminary survey as a basis for designing new products and procedures then is field tested systematically, evaluated, improved until effective findings, both in terms of material and in terms of processes, such as approaches, strategies, methods, techniques and organizing learning materials. At this stage the researcher integrates the existing model with other supporting models, so that the new product model can answer the weaknesses in the old model.

### **3.2. Product Development Stage Results**

The product development stage includes learning models and tools consisting of syllabus, lesson plans, teaching materials, worksheets, and assessments. The model developed is a collaborative guided inquiry learning model by utilizing critical thinking. This model is composed of several components, namely 1) Theoretical basis. Collaborative guided inquiry learning utilizes the basic concepts in learning as follows: students are guided to find their own concepts by collaborating in small groups in an interdependence manner between group members meaning that the existence of group members is the same, no one member dominates other group members. Collaborative guided inquiry learning by utilizing the potential of students is built on the premise (1) that students before carrying out the learning process already have initial conceptions (schemata), namely the concepts students have about matters related to the learning being carried out. Learning will be meaningful if students' initial conceptions are activated to be associated with the new information they will learn. (2) that in learning there is syncretization of the initial concept with the new concept being studied. This will lead to two things, namely if the initial concept is not in line with the new concept then cognitive conflict will occur. Old conceptions will be changed by students until a new cognitive balance occurs through the accommodation process, whereas if the new conception is in line with the initial conception, then the initial conception will be expanded or developed through the assimilation process. (3) that students have a gap between the actual and potential zones which is commonly called the zone of proximal development (ZPD). According to Vygotsky in Baharuddin and Nurwahyuni (2007) ZPD can be achieved if students are given scaffolding by people who are more capable, namely teachers and peers through dialogue, discussion and collaboration. (4) that learning will be more meaningful and embedded in students' brain memory when they see, observe and hold learning objects directly by utilizing the potential that exists around their place of residence (Dahar, RW, 2006).

The reliability of the collaborative guided inquiry learning model by utilizing the potential of students' critical thinking has been assessed as reliable and acceptable by experts and senior teachers as educational practitioners with a score of 90.25 and declared feasible to be implemented in learning but needs improvement, including in writing so that it is adapted to EYD .



According to Khabibah in Trianto (2009) to see the level of feasibility of learning models, experts and practitioners are needed, while to find out the practicality and effectiveness of learning models, learning tools are needed. The syllabus is developed based on the BNSP format. The syllabus components include identity, competency standards (SK), basic competencies (KD), subject matter, learning activities, indicators, time allocation, resources, learning tools/materials and assessment. The syllabus product in the form of a collaborative guided inquiry syllabus by utilizing students' critical thinking has been assessed for its reliability by experts and users with a result of 80. Based on the results of this assessment, it can be concluded that the syllabus can be implemented in school learning. The assessment product consists of assessments for cognitive, affective and psychomotor. Product trials were carried out with an evaluation tool to test the validity of the data. The assessment product developed has been assessed by experts and senior teachers, educational practitioners with an assessment result of 85.50. This means that the assessment product can be implemented in biology learning to measure the critical thinking of biology students.

### 3.3. Product Trial Stage

In the trial phase of the new model, the data on student learning outcomes is obtained as follows

No.	Study competence	Grade point average
1.	Knowledge	68,13 %
2.	Attitude	66,65 %
3.	Skills	67,32 %

Source: Archives of student grades MAN 3 Padang Panjang

From the data above, trials on the three learning competencies are still not satisfactory. When compared with the Minimum Completeness Criteria (KKM) standard of 75, learning competence has not been achieved. There is no student critical thinking yet, students only hear and answer what the teacher asks. Need to improve the teaching and learning process. All parties need to contribute to advancing education. The educational paradigm that is still classical needs to be adjusted to the progress of the times. This improvement will produce students who are ready to face the changing times. In the next stage, the researchers conducted trials with a new product, namely the ITC Learning Model (Collaborative Guided Inquiry). The trial results with this new model are as follows:

The average achievement of competence in the realm of knowledge of 25 students is 84.06%. There are 4 students who do not reach the minimum completeness threshold, with scores below 75, with a percentage of 16%. Students who reach the minimum completeness limit are 21 people with a percentage of 84%. Classical completeness in this trial has been well achieved. It can be seen from the results of the competency evaluation of the knowledge, attitudes and skills of students that have increased and achieved minimal mastery. This data acquisition is as expected, this is because students are already familiar with collaborative guided inquiry learning.

Observation of the competency attitudes of students is carried out during the learning process. The attitude competencies observed consisted of 4 indicators, namely spiritual, disciplined, responsible and self-confident.

Table of Results of Attitude Domain Competency Data Analysis

No	Aspect Observation	meeting to-			Average	Criteria
		1	2	3		
1.	spiritual	77,94	79,28	80,84	79,35	Good
2.	Discipline	78,13	79,50	81,63	79,75	Good
3.	Responsible	77,50	79,00	81,09	79,20	Good
4.	Self-confident	81,34	Good	83,31	82,19	Very Good
	Average				80,12	Very Good

The table above shows the percentage of competency in the attitude of students who have an average in the very good category. The indicator with the highest score is the self-confidence indicator, an average of 82.19%. The description of the

attitude for each indicator will be described as follows: 1) Spiritual students with an average of 79.35% are taken from the following indicators: Pray before and after learning, Giving thanks for God's grace, Greeting before and after expressing opinions, Expressing admiration orally or in writing for the greatness of Allah SWT, Feeling the greatness and presence of Allah when studying science. 2) Discipline. The aspect of discipline with an average of 79.75% consists of the following indicators: Entering class on time, Collecting assignments on time, Wearing uniform according to the rules, Doing the assignments given, Be orderly in following the lesson, Following the practicum in accordance with the steps given, Bring a notebook according to the subject, Bring a test book. 3) Be responsible. The aspect of responsibility with an average of 79.20% consists of the following indicators: Carrying out individual tasks properly, Not accusing others of cheating without strong evidence, Accepting risks from actions taken, Returning borrowed items, Apologizing for mistakes what to do 4) Confidence. The aspect of self-confidence with an average of 82.19% consists of the following indicators: Dare to present in front of the class, Dare to give opinions, ask and answer questions, Opinion or carry out activities without hesitation, Able to make decisions quickly, Not easily discouraged or abstinence surrender.

Observation of the competency skills of students is carried out during the learning process. The observed competency skills consist of 4 indicators, namely completeness, suitability, neatness and timeliness. The results of analysis of competence data in the skill domain are as follows:

Table of Results of Skills Domain Competency Data Analysis.

No	Aspect Observation	3rd meeting			Average	Kriteria
		1	2	3		
1.	Completeness	83,33	83,33	83,33	83,33	Very good
2.	suitability	78,28	78,65	84,38	80,43	Very good
3.	Neatness	83,91	84,69	89,61	86,07	Very good
4.	Punctuality	81,95	83,40	88,63	83,28	Very good
	Average				83,28	Very good

The table above shows the percentage of competence in the skill domain of students who have an average in the very good category. The indicator with the highest value is the confidence indicator, an average of 83.28%. The description of competence in the skills domain for each indicator will be described as follows: a) Completeness. Based on the table taken by the researcher, the completeness aspect of the students with an average of 83.33% was taken from the indicators of the same tools in the laboratory and added with materials brought by the students, so that the average for all students is the same, that is, they come from school labor. b) Compatibility. The suitability in question is conformity with the concept of the material in question with an average of 80.43%. c) Neatness. The percentage of student neatness can be seen from the way students work and the order of work. This illustrates the character of students in their daily lives with an average of 86.07%. c) Punctuality. This timeliness indicator shows how skilled students manage the time provided by researchers, an average of 83.28%.

The increase in the competence of students occurs because the implementation of collaborative guided inquiry learning models provides opportunities for students to develop their abilities in learning. Students find knowledge to test their hypotheses, besides that during the learning process using the collaborative guided inquiry model, the teacher gives instructions about learning resources to students to help solve problems given by the teacher and connects with experimental results to be able to think critically.

#### IV. CONCLUSIONS AND SUGGESTIONS

Based on the results of the research conducted, it can be concluded that the collaborative guided inquiry learning model can improve students' critical thinking skills with knowledge competence mastery of 37.50% to 87.50% at the end of the trial, attitude competence completeness of 56.25% to 100% at the end of the trial. trials, and pre-cycle skills competence completeness of 59.38% to 100% at the end of the trials. Based on these conclusions, the researcher provides the following suggestions:

1. For teachers, it can be used as a learning guide for the guided inquiry model and used as an alternative learning to improve student learning outcomes.
2. Introducing the stages of learning to students in advance, so that students can work independently and be more focused in doing practicum.

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