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## Research Article

### Efforts to Improve Students' Critical Thinking Skills in Primary Education Fundamental Class through Group Investigation Model

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#### ABSTRACT

This study aimed to describe the application of Group Investigation Model (GIM) to improve students' comprehension of subject concepts and their critical thinking skills and to understand the challenges faced by lecturers while practicing GIM in the classroom. The research approach used was a qualitative method of description involving 21 students who took the course of the Foundation of Education in the Education Administration study program at Muhammadiyah University of Prof. Dr. Hamka (Uhamka), Jakarta, Indonesia, in the odd semester 2019/2020. Data were collected through tests, observations, interviews, questionnaires, and documents. The application of GIM in the Education Foundation class can improve students' critical thinking skills. The study findings suggested that the average student's grades improved on formative tests.

In using GIM there are several challenges that include aspects of learning and outside learning. This study suggests: (1) prior to implementing this model, careful preparation is needed, especially in the learning process so as to encourage students to actively think and ask questions. 2) In implementing this GIM, it is necessary to have guidance and motivation from the lecturer. (3) The implementation of this GIM can be successful if the stages one and two have been agreed and determined.

**Keywords:** Challenge, Critical thinking, Education foundation, Group investigation model, Higher education

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#### Introduction

Several universities in Indonesia have implemented a diverse learning system that gives students the flexibility to carry out various independent activities that enable them to attain maturity and independence. In this model, the

main scale is to make students able to improve critical thinking patterns in learning. Students' critical thinking skills in Thailand 4.0 are a translation of the vision that is one of the core pillars of knowledge-based economic innovation (Changwong et al., 2018). The learning

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conditions and processes provided by the schools/universities often fail to achieve the maximum result. This is because the forces required to develop students' critical thinking skills are lacking. The implementation of the group investigation model (GIM) in the teaching-learning process had the following advantages for students: (1) students have a lot of freedom in exploring their knowledge and experience in groups, (2) students are trained to be selective in finding resources to be able to hone their ability to think highly (Zingaro, 2008), (3) students are trained to be courageous in arguing and giving feedback, (4) students' scrutiny and tranquility are enhanced so that they can evaluate their findings, and (5) students can be trained in reasoning through meaningful study and exploration (Halek, 2011). Similar research results that GIM learning affects the effectiveness of student thinking were found (Changwong et al., 2018; Mushod-dik & Budijanto, 2016; Suhartawan et al., 2018). Critical and creative thinking are both important elements of higher-order thinking (HOTS) (Chinedu et al., 2015).

Found on several continents, including Europe and Asia, critical thinking skills had become one of the goals of higher education (Ilyas, 2015; Ilyas, 2016). The development of critical thinking skills at universities had become an essential competence that promotes the development of student knowledge. Thus, students must be involved in activities that facilitate critical thinking.

In Indonesia, critical thinking is one of the higher order thinking skills, and it is included in the curriculum for primary and secondary education as well as in higher education. (National Education Department of Indonesia, 2002). Critical thinking for students is the goal of education in Indonesia (Ilyas, 2016). Improving students' critical thinking skills is the goal of the teaching and learning process that has been carried out in Indonesia, in addition to obtaining a certain level of knowledge construction. Unfortunately, according to Ilyas (2016), critical thinking and classroom implementation are not yet known to many of the Indonesian teachers. In the education process in Indonesia, teachers do not include elements of critical thinking, so students are reluctant to

ask questions, is the lack of knowledge of teachers to create learning models that can stimulate students to think critically. This statement is supported by Novauli (2015). The challenges facing the teachers include the difficulty of overcoming the skills of various students, the lack of ability to determine the right learning methods and models, and the lack of understanding of high-level thinking (Nurhayani, 2018; Wibowo, 2015).

This is reinforced by the results of Syahbana (2012) who revealed that the average post-test result of the experimental class is still low, let alone the control class. The average score of mathematical critical thinking skills in the post-test of the experimental class is only 68; on a scale of 0-100, this value is just in the sufficient category. With the lack of a critical thinking culture in schools, students are not accustomed to solving problems that require critical thinking, and consequently, their critical thinking skills are low.

Brooks and Brooks (1993) identified a crucial problem faced by education across nations: how to build an understanding and empowerment of student critical thinking skills through a learning process in classrooms. Syahbana's research (2012) showed that a significant difference exists in the mathematical critical thinking ability of students who received mathematics learning using the contextual teaching-learning approach compared with students who receive mathematics learning using a conventional approach. Anita, Kar-yasa and Tika (2013) proved that the problem-based learning model can improve students' problem-solving skills and critical thinking. Current learning praxis is still focused on the information transfer paradigm, which involves a lower learning level----memorizing (Joni, 2006). In the current reality that can be used as a reason, why in schools and even universities are still using the conventional model which considers students and teachers (lecturers) as learning objects in the teaching and learning process in the classroom. That is why in the observations in the Education Foundation class at Uhamka, students rarely ask critical questions and rarely want to discuss anything as written in the semester lesson plan. The cooperative learning model, especially the GIM, appeared to

have never been practiced in the Postgraduate Education Foundation class. A very significant difference from this study with other research is that in the first, second and third rounds of face-to-face meetings in class for fourteen meetings, it gives students opportunities to ask questions and want to discuss which is a series of critical thinking. In evaluating students' critical thinking in education science foundation classes, the researcher made observations that focused on analysis, synthesis, and evaluation.

The benefits of cooperative learning had been shown in a body of literature, including Hsiung (2012), Laal and Ghodsi (2012), Lin (2015), Rennie and Morrison (2013), and Tsay and Brady (2012). Tsay and Brady (2012), for example, demonstrated that cooperative learning provides students with the opportunity to work with others, share ideas, and facilitate mutual interactions among themselves. These benefits accordingly promote positive construction of knowledge; moreover. In Indonesian universities, there are not many active and cooperative learning methods, where many previous researchers put in to create a positive relationship between study habits and academic achievement. Syahbana (2012) in his research said that this critical thinking habit has not been traditionalized in schools. Too often teachers or lecturers ask students to conclude and describe rather than create new ideas and critical questions. This also supports the opinion of strengthening the statement of Jacqueline and Brooks (Santrock, 2007) that very few schools encourage students to get used to asking questions and thinking critically.

The group investigation model is a model of active and cooperative student teaching and learning activities. Slavin (1995) suggested that GIM is an appropriate model for the type of reintegration project because it includes information gathering, synthesis, and problem-solving. The attractiveness of the investigative Group of this model, among others, is that it can provide advice to students so that they have an incentive to learn and can create group discussions in class. This research intends to analyze the implementation of the investigation group model in the Department of Educational Research and Evaluation at postgraduate Uhamka, South Jakarta. Specifically, this study

aimed to describe the application of GIM to improve students' comprehension of subject concepts and their critical thinking skills and to identify the challenges faced by lecturers while practicing GIM in the classroom of the Foundation of Education in the Education Administration study program.

## Literature Review

### *Critical Thinking*

According to Thanthowi (1993; 2010), critical thinking refers to the process of finding meaningful relations among components of knowledge. Afiki and Bar (2020) defined associative thinking as the process of associating one thing to another and making the relationship between stimuli and responses is evaluative thinking that can sense the gap between reality and expectation (*das sein* and *das sollen*), inferred from what is ideal. It is the ability to analyze, evaluate, and find out problem-solving strategies. The Manifestation of learning activities is critical thinking, especially those related to problem solving analysis (Manistry of National Education, 2002). In essence, students who have a rational mindset will use caution in answering why and how. Broadly speaking, it can be divided into 2 types of mindset, namely caustic mindset and realistic mindset, which can be interpreted as caustic is the same as day-dreaming, and realistic mindset is a reality that occurs. Realistic thinking can be divided into 3 types, namely thinking inductively (from specific to general), deductive thinking (from general to specific) and evaluative thinking (critical thinking, comparing, analyzing). Evaluative thinking patterns compare good and bad, can sense the gap between expectations and reality, and can create strategic solutions (problem solving).

### *Learning Readiness*

There are two elements in learning readiness, namely first, curriculum management that integrates with the realities of human life compared to school needs; the second development plan must be in accordance with the interests of students. In theory, there are various opinions that say homogeneous groups are more effective and other opinions say heterogeneous groups are much preferred. All of that

becomes input in the learning process that is expected to be accepted by all in the world of education.

### **Group Investigation Model Definition**

There are 3 elements of object evaluation to fully describe the implementation of the group investigation model, in order to increase students' intelligence in critical thinking, namely learning plans, learning processes and learning outcomes within a certain period of time. Program learning outcomes are as important as the benefits of learning in the community, because learning outcomes are a picture of students in absorbing knowledge in the classroom into the real world in order to help the community in solving various problems.

This group investigation model is often used by researchers with various age levels, and is designed to be useful for students, to overcome various problems in research (data description, data collection, developing and testing hypotheses). There are three main components in this model, namely: inquiry, knowledge and group dynamics. This research is a dynamic process of students' responses to a problem and how to solve it (solution).

Student learning experience is the knowledge that students acquire at school. Group dynamics is the state of students in interacting, discussing and exchanging experiences through the discussion process. According to an expert named Slavin (1995) who considers that this model can improve the way of communicating and train students' social spirit, and is appropriate to be used for studies using groups.

## **Methods**

### **Research Design and Participants**

As stated earlier, the purpose of this study is to evaluate and analyze the implementation of the group investigation model at the Educational Research and Evaluation Study Program (PEP) Uhamka, Indonesia. This research process uses Lewin's classroom action research, preferably a model that uses students' critical thinking skills (Adelman, 1993). The Lewins model uses four sequential steps, namely planning, action, observation and reflection. This model is often used in cooperative

learning strategies which are based on the educational learning philosophy of John Dewey (Slavin, 1995), which states that the classroom is a mirror of society that functions to study individual and human problems.

In this study using student respondents as many as 35 students, consisting of there are 17 male students and 18 female students. Although the proportion of male and female students is not balanced, they are homogeneous in group task competence. The courses taken by students are the Foundation of Educational Sciences.

### **Data Collection and Research Instruments**

As discussed earlier, this research uses Lewin's classroom action research model.

This research stage uses a preconditioning procedure with cycle 1 to cycle 3. For more details, it can be seen as follows:

1. Precondition: this stage intends to prepare a conducive learning area for students to understand the basic education module. At the beginning of the meeting, it was explained to the students about the strategies that must be taken during the session, because in general students in this class were not familiar with the model, so they were informed about the Learning Program Plan (RPP), class responses, the design of the group investigation model and the scope of learning. At certain times, participants are trained on how to carry out a group investigation model, participants are divided into several groups, each group makes a paper topic to be presented.
2. In the first cycle there were findings: The orientation of the first cycle lasted for one session, the discussion was focused on group one papers with topics relevant to the goal-oriented model. The findings obtained in the first cycle are Students' understanding of the basic education subjects, and questions and discussions to determine the extent of students' understanding of the issues discussed.

The instruments used were the student's critical thinking observation sheet, the GIM activity observation sheet, and the student's self-assessment test. The student's critical thinking

observation sheet consists of self-evaluation instruments for understanding group papers. Questions were used to supplement the data sourced from the lecturer's observations. The student GIM activity observation sheet consisted of five questions that were used to evaluate the ability to perform analysis, syntheses, and evaluation. The student self-assessment test consists of three questions used for the ability to ask questions during a discussion, the ability to provide answers/responses to questions asked, the ability to summarize/conclude the results of the discussion. This research instrument was validated and tested for reliability using the Pearson product-moment correlation so that the result is that the instrument in this study is classified as valid and reliable so that it can be used at a later stage.

**Data Analysis**

The data analysis technique in this study was conducted quantitatively and qualitatively. The quantitative data analysis technique was

shown using descriptive statistics by calculating the mean, standard deviation, lower score, and higher score, whereas the qualitative data analysis technique was shown by the conversion of statistical data into qualitative data. Critical thinking data were taken at the end of the cycle then the total score was calculated for each student according to the scale used, for example, from strongly disagree, disagree, doubt, agree, to strongly agree. Then, the score was converted into a percentage (%). To find out whether critical thinking has increased or not, the % critical thinking of each teacher was compared from cycles 1 to 3. A comparison of critical thinking can be made because the critical thinking instruments used were the same. Meanwhile, to determine the increase in overall evaluation skills, the mean % critical thinking is calculated for each cycle. To verify whether the criterion for critical thinking is very good or not, the guidelines for converting quantitative to qualitative data should be used (Ebel, 1972), which is shown in Table 1.

Table 1. Conversion of qualitative

Critical thinking	Criteria
81-99	Best
61-80	Better
41-60	Good
21-40	Not Good
1-20	Bad

**Results and Discussion**

**Application of GIM to Critical Thinking in Cycle 1**

From the analysis of research results in the three cycles in order to improve students' critical thinking, in detail can be seen in the first cycle in Table 2. The results of the formative test scores describe the level of students' ability to think critically, as follows: (a) The highest count result is 7.9 and the lowest count result is 5.2 and the average calculation result is 6.5 (b) The results of observations of students show that in group one the average calculation result is 46.9, be in position medium rating-1. The results of the researcher's investigation of

the students' critical thinking skills from the competence to analyze, synthesize and evaluate showed that the level of students' evaluation abilities was very low. This is all because students lack understanding of the title being presented, so students are more silent than critical thinking, for example asking questions, giving arguments. Students' self-evaluation in the analysis showed that 58.5% of students' skills in asking questions were considered to have good understanding, and seen in general at 59.5%, this shows the position of the ability level in understanding is still in a very not good position.

Table 2. Self-evaluation of Critical Thinking in Cycle 1

Group	Units	Statements			Average
		Ability to ask questions during discussions	Ability to provide response answers to questions asked	Ability to encapsulate/ simulate the results of a discussion	
1	f	5	3	3	3.7
	%	45.5	27.3	27.3	33.4
2	f	6	7	6	6.3
	%	54.5	63.6	54.5	57.5
3	f	3	4	3	3.3
	%	27.3	36.4	27.3	30.3
4	f	3	7	4	4.7
	%	27.3	63.6	36.4	42.4
5	f	0	0	1	0.3
	%	0	0	9.1	3
6	f	1	0	6	2.3
	%	9.1	0	54.5	21.2

### Application of GIM to Critical Thinking in Cycle 2

In the second cycle there are 3 activities, (1) Materials related to free evaluation are intended to be studied by students; (2) Students are put into their respective groups; (3) Groups conduct small discussions and present the material that has been studied according to the understanding of each group. After all groups have finished presenting their understanding of the material, and discussing it, the researcher provides direction and clarification of the core problems discussed in the presentation, and asks students to conclude. To find out the extent to which the students' understanding, researchers conducted a formative test in the second round, this test was also to evaluate students' competence in the subject matter being taught. The distribution of tests to students is carried out after students finish the discussion and listen to the explanation. The result of

this formative test is the highest of 8.1 and the lowest score is 5.5. The average score of 6.8 is still in the good category. When viewed from the first cycle, students' understanding of the subject increases. In this second cycle, the average score shows a significant increase in students' understanding of the lecture material. Likewise, the ability of students in asking questions increases. A total of 17 students in this rotation filled out the research instrument form, In answering the form, students reflect on various experiences during the class cycle. After completing answering the form, an analysis of the student self-evaluation form was carried out which showed that as many as 65.7% of students could ask questions during the discussion, and 56% of students could answer and respond well. It can be concluded that in general 37.9% of the position is still at the level of understanding (Table 3).

Table 3. Self-evaluation of Critical Thinking in Cycle 2

Group	Units	Statements			Average
		Ability to ask questions during discussions	Ability to provide response answers to questions asked	Ability to encapsulate/ simulate the results of a discussion	
1	f	2	0	2	1.3
	%	16.7	0	16.7	11.1

Group	Units	Statements			Average
		Ability to ask questions during discussions	Ability to provide response answers to questions asked	Ability to encapsulate/ simulate the results of a discussion	
2	f	8	6	4	6
	%	65.8	50	33.3	50
3	f	4	4	6	4
	%	33.3	33.3	50	38.9
4	f	3	7	4	4.7
	%	25	56.3	33.3	37.9
5	f	0	0	1	0.6
	%	0	0	8.1	5.5
6	f	1	0	6	2.3
	%	8.3	0	50	19.4

### Application of GIM to Critical Thinking in Cycle 3

The results of the research from the three rounds were analyzed so that it can be seen that the improvement in critical thinking can be achieved, it can be seen in table-2 for the first round, and table-3 for the second round, and table-4 for evaluating the third round, this is applied to can see the appearance of students in understanding the material conceptually. After the group discussion is over, a formative test is given. Students are also given material deepening, in order to respond to the results of the formative test. Researchers made in-depth observations in order to be able to measure the

progress of students in critical thinking on the material of the Educational Science Foundation. The in-depth observations carried out by the researchers included the stages of analysis, synthesis and evaluative. In general, it can be concluded that the third round is a continuation of the first and second rounds, but the group discussion was extended so that the researchers got a lot of questions from the students, and it can be concluded specifically, that students were given the opportunity to more intensively understand the lecture material. so that they can be more critical in analyzing a problem.

Table 4. Self-evaluation of Critical Thinking in Cycle 3

Group	Units	Statements			Average
		Ability to ask questions during discussions	Ability to provide response answers to questions asked	Ability to encapsulate/ simulate the results of a discussion	
1	f	1	0	2	1.3
	%	8.3	0	16.7	8.3
2	f	10	8	6	6
	%	81,2	65.7	51	50
3	f	1	6	6	4.3
	%	8.3	50	50	38.9
4	f	3	7	2	4.7
	%	25	56.3	16.7	33.3
5	f	0	1	0	0.3
	%	0	8.3	0	2.8
6	f	1	0	7	2.7
	%	8.3	0	56.3	22.2

In the third round according to the procedure, it was divided into two stages, namely the first conditioning, the second presentation and the third clarification. To brighten the atmosphere at the conditioning stage, students are asked to study material that contains evaluative, both formative and summative. Clarification was carried out at the group exposure stage, which was followed by questions and answers from other participants outside the group being exposed. After the group presentation was finished, they were asked to conclude. The researcher gave an explanation related to the subject of the presentation. In this third round, there are findings that indicate an increase in students' interest in lecture material. This improvement indicator was obtained from the test results on students' conceptual understanding of 8.1, the lowest score was 5.5 and the average score was 6.8, which means it is quite good. Similar to the first and second rounds, researchers distributed self-evaluation forms to students, after group presentations, this was done in order to obtain additional research information. The evaluation value obtained is an average value of 56.3 (Good), this shows an indicator of an increase in students in expressing ideas and asking questions.

From the observations in the third cycle, students seemed more responsive. Motivated by reading more material and reference books. This behavior also affects learning achievement in individual assessment. For example, students can make clarifications on the problems they face into important issues of National Education, can be combined into a synthesis, and can analyze problems, by comparing expectations with reality through certain standards. Students who have a good understanding of the concept are 81.2%, while the number of students who can answer and summarize is 65.7%, and 56.3% can make a conclusion synthesis. From this study, it can be concluded that overall students' critical thinking is at a fairly good understanding of 37.9%.

### ***Barriers to Educators in Implementing The Investigation Group Model***

There are two barriers in the implementation of this investigative group model, namely still centralized to lecturers and students are

rarely given the opportunity to express their ideas, so that it can eliminate the motivation to actively ask questions. From a non-academic perspective, there is a distance between lecturers and students, so that students become less disciplined and less responsible. The division of roles inside and outside the classroom is not clear, making it difficult for students to understand and think critically. The solution to this problem before the implementation of the learning process begins, the lecturer needs to explain the lecture contract for one semester. The implementation of this investigative group model can improve students' critical thinking skills. As an indicator of increasing students' thinking skills, it can be seen from the second and third cycles. In the first to third cycles, it provides facilities for students to improve critical thinking. However, this study found several problems, including the first findings at the reflection stage in the first round and second, students' understanding of the basic science courses. Student education still needs to be improved. Authentic evidence obtained from formative test results, there are still students who get scores below 5.5 and the evaluation results from group assignments are lower than 5.5, so it is deemed necessary to improve again, especially in analyzing, synthesizing and evaluating. Students also still seem low in arguing in group discussions. This is reinforced from previous research that to improve students' critical thinking skills, requires a scientific stage in solving problems in the investigative group model (Chairunnisa, 2016; Soufi & See, 2019). Things like this are the cause of students not being good at critical analysis. Apart from that the lack of preparation of students in group presentations, especially in literature citations, so that students are less able to answer questions, and this is a finding in the research.

### **Conclusion**

The conclusion that can be drawn from this research is that this investigative group model can be useful for improving students' critical thinking, especially in making synthesis, analysis and evaluation and understanding of lecture material concepts. From the results of observations and student self-evaluations, it can be found that there is an increase in scores



throughout the cycle. There are two challenges in the implementation of this investigative group model, from an academic point of view, such as learning methods are still focused on lecturers not students so that it can eliminate the motivation to actively ask questions. From a non-academic perspective, there is a distance between lecturers and students, so that students become less disciplined and less responsible. The division of roles inside and outside the classroom is not clear, making it difficult for students to understand and think critically. The solution to this problem before the implementation of the learning process begins, the lecturer needs to explain the lecture contract for one semester.

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### Conflict of Interest

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