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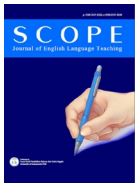

Research Article

Investing in Inquiry-Based Teaching to Improve EFL Students' Critical Thinking Skill

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A B S T R A C T

The study on inquiry-based classroom teaching provided us an opportunity for recognizing how critical thinking skills for EFL students are enhanced through inquiry-based instruction. In order to obtain the results, the researcher used a mixed method of qualitative and quantitative data with triangulation design. qualitative and quantitative data were obtained at the same time. A cluster random sampling technique was used in order to determine the sample; 36 junior high school students in grade 7 were employed as the research sample. The instrumentation was comprised of a reading test for obtaining quantitative data and an observation sheet for obtaining qualitative data. Data analysis was assisted by SPSS 18 and observation checklist. Findings showed that inquiry-based teaching significantly improves students' critical thinking skills. The improvements are made possible through five phases of the inquiry cycle which is implemented by the teacher in EFL learning. The ability to interpret, analyze, infer, evaluate, explain, and the improvement of their self-regulation all falls under this improvement.

INTRODUCTION

In this 21st century education, the sector of educations around the world are challenging to improve their students' educational performance or skill to be fully participated in this modern society. EnGauge (2003), the north central regional educational laboratory, classified the skills that is required by the students in 21st century to compete in global job market; including digital-age literacy, inventive thinking, effective communication, and high productivity. One of the skill that is requisite for emerging the educational domain is higher-order thinking and sound reasoning. This aspect relates with the ability to solve the problems innovatively and logically till it creates the appropriate consideration and decision. Thus, to meet this demand, it is important to provide the students the ability to think critically. In accordance with this, the 6th president of Indonesia, Susilo Bambang Yudhoyono in (Baedhowi, 2010) also stated that through the reform of education it is expected to produce smart, creative, innovative, active and critical graduates. Thus, critical thinking skill is closely required by the students in overcoming the encountered challenges as well as society demands.

In an attempt to meet the society's demand, Indonesia government through the education ministry brought out PERMENDIKBUD No. 20/2016 which concerns the

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standard of graduate performance. The regulation states that at least there are three dimensions that should be accomplished by the graduate students; attitude, knowledge, and skill. One of the important skills should be possessed by the students is to think and act critically. On the other hand, Critical thinking skill is also important to be accustomed since the early age. As it is appeared on the standard competence of elementary school graduate which requires them to be competent in developing knowledge factually, conceptually, critically, and conceptually (PERMENDIKBUD, n.d.). In the EFL context, critical thinking involves the activity which stimulates the students to do the interpretation, collaborate in practicing the English language, use the convention in writing ability, implement the knowledge, solve the discussed problem, reflect the language use and create a topic.

Fattahi & Haghverdi (2015) acknowledge critical thinking as a process of actively involving, analysing, studying, and surveying the problem to come up to a final conclusion (p. 134). Merely, it can be defined as the ability to think rationally and logically. Critical thinking is one of the most thought provoking methods of teaching, which can be implemented in any discipline since the its implementation in the learning process can help students bring about positive changes in the way they think and expand the horizons of their knowledge. Thus, if it is well-developed in EFL class, it will not only build up students' English communicative competence but also their intellectual trait as well.

But unfortunately, the result of the survey conducted by Programme for International Student Assessment (PISA, 2015) – the ongoing programme that offers insights for education policy and practice which monitors the trends in students' acquisition of knowledge and skill across countries – revealed the surprising fact on Indonesian students' achievement. From the survey, it is found that the Indonesia's result in the Organization for Economic Co-operation Development (OECD) program for International student assessment or PISA report shows some improvements in the skill of the students. Nevertheless, it has to be continually improved seeing that the Indonesia ranks the 62nd from the 72 countries participated. Contrasted to the other Asian countries, Indonesia occupied the lowest rank perceived from the percentage of the share of top performers in at least one subject that reached level 5 or 6; Singapore 39.1%, Hongkong 29.3%, Vietnam 12.0 %, Thailand 1.7 %, and Indonesia 0.8 %. In line with this result, Indonesia merely obtained below 400 of the reading score as they were getting frustrated in answering the open-ended questions which need some reasoning and analysing which necessitate them to think critically.

The PISA report was also approved by the observations conducted in several junior high school English classes. The observation revealed that the Indonesian students' ability in seizing upon their critical thinking skills which were not well-developed yet. Moreover, the students are not accustomed to think critically since the teacher applied the conventional teaching method (teacher-centered). As acknowledged by Nugroho (2008) cited in Ilyas (2016) that for decades, education in Indonesia has been dominated by teacher-centered instruction and rote learning (memorization technique based on repetition); where the students have to sit, listen, take note, or memorize minister names for example. In addition, most of the students focus on linguistic factors rather than higher level of thinking. Thus, the critical thinking skill development in EFL class seems to be a by-product of teaching and learning process. Regarding to the importance of students' critical thinking development in 21st century education, the teacher are urged to promote students to use the higher order level of thinking by planning and implementing the teaching and learning models that may assist the students in enhancing their critical thinking skill. One of them is inquiry-based teaching method.

Inquiry-based teaching is truly recommended for the teacher since it is categorized into student-cantered learning. Besides that, in inquiry-based teaching, students are willy-nilly encouraged themselves to do the experiment or observation, collect and analyse the data, draw the conclusion, as well as to be objective, truthful, and critical in solving the problem given by the teacher. In line with this, L, D, & J (2000) express that the inquiry-based teaching method was just like problem-solving method, but more comprehensive and flexible that leads to critical thinking. In addition, Garrison, D & Anderson (2003) state that the inquiry-based teaching model can improve students' critical thinking in students mind. Since inquiry-based teaching is a method of teaching that mandates the teacher to create learning atmosphere which may promote the students as scientist. The students are also stimulate to ask or question on a phenomena initiatively as well as proposing the hypothesis, doing observation, analyzing data, drawing the conclusion, and clarifying their discovery.

METHOD

Aiming at answering the research question generated in this study, the researcher utilizes mixed method with the triangulation design (see Figure 1) which collect the data both quantitatively and qualitatively as it is trying to investigate how effective the inquiry-based teaching method is implemented in EFL learning to enhance students' critical thinking skills. Meanwhile, in collecting the data, the quantitative and qualitative methods are given the same priority and simultaneously in this study.

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In this mixed method research, the cluster random sampling technique was utilized by the researcher in selecting the research sample. The sample selecting began by applying the cluster random sampling to the 7th grade students of one of junior high school in Bandung and then selected one class from 12 classes randomly through the lottery.

The instruments used in this study are critical thinking scoring rubric, observation, and documentation. Those instruments are considered to be chosen since this study focusing on how the inquiry-based teaching improve the students' critical thinking skill in learning English. The grid of instrumentations can be seen as follow:

Table 1. Holistic Critical Thinking Scoring Rubric, adopted from (Facione, 1994)

4	Consistently does all or almost all of the following: • Accurately interprets evidence, statements, graphics, questions, etc. • Identifies the salient arguments (reasons and claim) pro and con. • Thoughtfully analyzes and evaluates major alternative points of view. • Draws warranted, judicious, non-fallacious conclusions. • Justifies key results and procedures, explains assumptions and reasons. • Fair-mindedly follows where evidence and reason lead.
3	Does most or many of the following: • Accurately interprets evidence, statements, graphics, questions, etc. • Identifies relevant arguments (reason and claims) pro and con. • Offers analyses and evaluations of obvious alternative points of view. • Draws warranted, non-fallacious conclusions. • Justifies some results or procedures, explains reasons. • Fair-mindedly follows where evidence and reason lead.
2	Does most or many of the following: • Misinterprets evidence, statements, graphics, questions, etc. • Fails to identify strong, relevant counter-arguments. • Ignores or superficially evaluates obvious alternative points of views. • Draws unwarranted or fallacious conclusions. • Justifies few results or procedures, seldom explain reasons. • Regardless of the evidence or reason, maintains or defends views based on self-interest or preconceptions.
1	Consistently does all or almost all of the following: • Offers biased interpretations of evidence, statements, graphics, questions, information, or the points of view of others. • Fails to identify or hastily dismisses strong, relevant counter-arguments. • Ignores or superficially evaluates obvious alternative points of views. • Argues using fallacious or irrelevant reasons, and unwarranted claims. • Does not justify results or procedures, nor explain reasons. • Regardless of evidence or reasons, maintains or defends views based on self-interest or preconceptions. • Exhibits close-mindedness or hostility to reason.

The method used in this study was a combination of quantitative and qualitative method, called a mixed method. Quantitatively, the sample of this study will be treated by inquiry-based learning activities. The writer depicts the research procedures as follow:

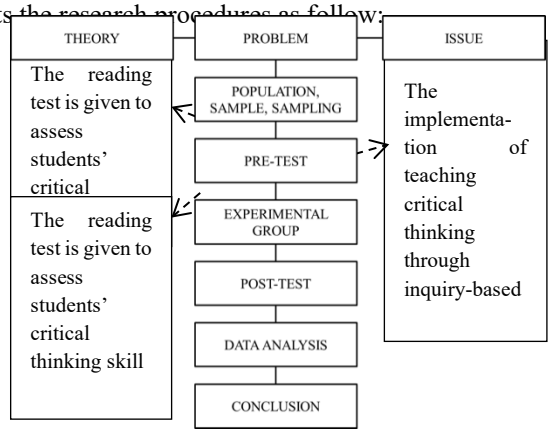

Figure 1. Research Procedure

To analyze the data obtained, the researcher used two phases of data analysis; quantitative and qualitative. The quantitative data obtained were analyzed by using SPSS 18. While the observation and documentation data obtained were analyzed qualitatively to collaborate and confirm the findings gathered from the quantitative result.

RESULTS AND DISCUSSION

The findings of this research are obtained through quantitative and qualitative data collection. The analysis reveals that the inquiry-based teaching significantly influences the improvement of students' critical thinking skills. The data show that the improvement of students' critical thinking abilities occurred in all phases of the inquiry cycle. By implementing all the inquiry phases, the students had more opportunities in stimulating their higher order thinking. The following sections explain the detail of findings of the students' improvement in critical thinking skills equipped with its discussions. The findings are obtained from the analysis of students' scores in pretest and posttest, and the observation which is administered about nine times in class session.

The Students' Critical Thinking Skills Improvement

Based on the analysis and data processing from the students score on pretest and posttest. Quantitatively the analysis shows that there is a significant improvement of the students' critical thinking skill scores.

Tabel 2. Test of Hypothesis

Paired Samples Test

		Paired Differences						
					95% Confidence Interval of the Difference			
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	f Sig. (2-tailed)
Pair 1	Pretest – Posttest	-2,76667	1,00630	,18372	-3,14243	-2,39091	-15,059	,000 9

According to the table 2, the result of Paired Sample test of the pretest and posttest score using inquiry-based teaching towards the students' critical thinking skill ability indicate the significant result at 0.000. Due to the data significance of pretest and posttest is <0.05 then it can be assumed that there is a significant effect of the implementation of inquiry-based teaching towards students' critical thinking skill ability. From the quantitative data analysis, it can be inferred that inquiry-based teaching model could improve significantly the EFL students' critical thinking skills. This quantitative finding was also supported by a qualitative data analysis which specifically inform the way of how students' critical thinking skills could improve through the phases of inquiry-based approach that was implemented in teaching.

The Implementation of Inquiry-Based Approach to Improve Students' Critical Thinking

This section presents the findings and discussion of how the inquiry-based approach could affect the improvement of students' critical thinking skills. The improvements that are elaborated in this section are the improvement of the students as a whole. The research data used in this section are based on the observation that is administered about nine times in class session.

In an attempt of improving critical thinking skill, students needed to be stimulated to solve a problem in the process of learning. The lack of ability to think critically might lead to the students' negative learning behavior. The students with this lack tended to have a difficulty in accomplishing a complex task. Moreover, the students were also difficult to examine their answer or work. They could not respond properly to the questions that were addressed to them. They could not even communicate the answer properly. In this study, the students' problems in expanding their critical thinking skill emerged in every cycle of inquiry learning. Surprisingly, the researcher highlighted some efforts which were employed by the teacher to help students against the problems that might hindered the students in expanding their ability in thinking critically. The teachers' efforts found in this study helped the students as it was a conditional strategy that teacher implemented in the class during the teaching and learning process. This is the way of how the teacher could expand student critical thinking skill through the implementation of inquiry-based teaching phases. Certainly, those implemented strategies made the students' critical thinking skill improved in terms of its disposition. The improvement of critical thinking took place within several phases which will be elaborated as follows.

The phase of asking

The phase of asking is a phase which initiated the critical thinking activity. In this phase, there should be many questions which might lead to the topic of the learning. The question would be better come from students. however, to stimulate it, the teacher could ask some guiding question that might lead the students' interest. In this phase, the teacher only tried to explore students' prior knowledge and then integrate it into the learning process. In line with this, Bruce (2008) also acknowledged that in the phase of asking, the activity included is asking a question whether it can be derived from both teacher and students.

In the very beginning of teaching and learning process, the students tended to be more passive in the phase of asking. They tended to be stiff in the learning. They seemed not know what to say and what to ask. As they paid attention still to the teacher without any interruption to the teacher explanation. Thus, to make the learning more communicative, the teacher asked some guiding question which provoked students' voice and reaction. The guiding questions then lead the students' interest and stimulate their curiosity.

Day by day, when they begin to be more curious about the learning material or topic, they could not do anything to answer their curiosity except waiting for teachers' respond. In this situation, when the students wanted to know the answer on what they were curious of, the teacher did not give the answer directly to the student. To make the students kept their thinking, the teacher let the students discover and find out the answer. There could be in a form of a statement or guiding question that led to the answer, ask other students to give their voice, or even in a form of students' task which let them discuss the answer of their curiosity with their friend.

To keep the students thinking, the teacher discussed something that could attract students' interest – something that students experienced. As the result, the students nodded which indicates their understanding or agreement with the teacher question. As they were excited with the topic being discussed, some students began to show their interests and curiosities by asking question and communicate it with the class. As for teachers' guidance in implementing inquiry-based approach in promoting students' critical thinking, (Ministry of Learning, 2004) proposed some lists that inquiry-based approach should provide for the students. He proposed that the inquiry-based learning provides the opportunities for students to develop skills they will need all their lives, learn to cope

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with problems that may not have clear solutions, deal with changes and challenges to understandings, and shape their search for solutions, now and in the future.

The phase of investigating

The phase of investigating is a phase which let the students seek a lot of information on what they want to know. They were also given the opportunity to use many sources. (Bruce, 2008) argued that the teacher in the phase of investigating should exploit the initial curiosity of the students then let them seek, collect, and create information through collaborative learning.

In the very first meeting, nothing that students did in this phase of the investigation. When the teacher asked them to accomplish the task in a small group discussion, they demonstrated confusion as they did not know where to begin, what to do, how to accomplish the task, the rules, so on and so forth. Based on the observation, nothing the students discussed but talking out of the topic, opening the textbook sheets, and laughing on their confusion.

Thus, when this situation happened, the teacher came to a group and repeat the instruction more clearly or even give such an example for them to follow. After that, when the students began to understand it all, then the teacher let them to accomplish the work within their group by themselves. Indeed, this situation might be happened in every possible situation in the process of students' learning. Therefore, it would be better for the teacher firstly to know their students' characteristic and could not put the high expectation on it like pushing them too much. Another example of how the teacher helps the students in leading them found the answer.

In addition, the teacher invariably gave appraisal for the students on their effort like by giving point reward or just saying *very good, good job, great,* etc. In the phase of investigating, we have to make sure that the students could be in a stress-free atmosphere such as by letting them think with their ability without being interrupted. Moreover, when the teacher asked students to do the investigation, the teacher had to ensure that the students had enough source to use. The teacher then had to facilitate them sufficiently. So that the students could become more active in learning, in seeking the related information and they could have some insights as well.

The phase of creating

The phase of creating is a phase which required the students to discover, generate and create a new idea based on relevant sources. In this phase, the collected information began to be merged by the students. They started to make links between their discoveries and prior pieces of knowledge. So that, the ability to synthesize meaning was stimulated in creating a new knowledge. Besides, the students could also be demanded to generate new thoughts, ideas, and theories perhaps that was not directly inspired by their own experiences for instance. Thus, the students needed to note them down in some kind of report.

In this phase, students kept share idea and thought. While the students were explaining his/her point of view, the rest of the students were listening carefully and writing the point. Although, in the beginning of this phase, the students seemed to show difficulties in generating the idea within the group as they did not have enough material to be shared. Thus, the teacher sometimes needed to give some times to rethink, reread, research for them. As the students were given the time again, they began to show their curiosity which was evidence by the emergence of asking activity among students within their group. more than that, the students were also demonstrated open-mindedness during group discussion which was indicated by their attitude in respecting others' ideas. They had enough space to share ideas without being interrupted. Sometimes, they also demonstrated rationality which was evidenced by their ability to relate a newly known knowledge to their prior pieces of knowledge and experiences.

The phase of discussing

The phase of discussing is the phase in which the students reveal demanded an idea and discoveries to a larger group of discussion (class). In this phase, the students were required to be confident in sharing their idea. Their discoveries might come from the accountable and relevant sources. Moreover, the students in this phase were demanded to be able to express their thinking in responding toward others' idea or discoveries. By accustoming students to this activity, the students were demanded to think critically. Susanto (2014) as cited in Fatahullah (2016) acknowledged that critical thinking is an activity that entails the students to think then generate a new idea conceptually and relevantly. The idea generated was based on the inquiries in the previous phase. However, in the teaching and learning process, there were some obstacles that happened with the students. The students were lack of the ability to combine and relate their prior knowledge or experience to a relevant source. They tended to speak or respond spontaneously without referring it to some sources.

Meanwhile, the teachers' strategy to overcome the students' critical thinking hindrance happened in this phase were giving an initiate information (could be in a form of guiding question) so that the students could discover an idea conceptually based on their experience (prior knowledge) and relevant sources. In addition, to invite students' participation in an active learning, the teacher provided some rewards for the students who could give their comments.

According to the findings, the students' critical thinking existed when a student commented on the presenter by asking his/her curiosity to the presenter. It is indicated by the emerge of *'why'* question. Thus, this can be meant that students critical thinking skill in term of evaluating exist through the inquiry-based approach activity implemented by the teacher. It was evidenced by the emergence of students' critical thinking disposition characteristic.

The phase of reflecting

The phase of reflecting is a phase which was required the students to summarize the whole material been learned, the ideas emerged during the learning process. The ability to summarize ideas or synthesizing would be influence the summary. The ideas collected were reviewed subsequently until they reached the conclusion in accordance with the topic of learning. It is in line with the statement of Chang (2017) which expressed that through English language learning, the students could recognize themselves, their culture and others' culture. Besides, through the English language learning, the students could express their ideas and feelings, participate and socialize with the society and even find and use their analytical and imaginative ability. The English language learning could be combined with problem-based learning method which was required the students to think critically on every problem they encountered. However, as the researcher acknowledged previously that in this phase, the students could not be able to make inferences from the ideas. Thus, to overcome that hindrance, the teacher asked the students to make their own note, to write everything they found during the process of learning. This strategy was effective as in the end of the learning, the students could infer the learning easily.

Based on the finding, the students seemed to show the critical thinking disposition characteristics in each inquiry-based learning cycle after they well-treated by the teacher. This result was in accordance with the characteristic of inquiry-based learning, which encouraged students to be more active and productive in the learning process so that they possessed the critical thinking ability. Arauz (2013) acknowledged that the inquiry-based learning method becomes essential for students to achieve a more productive academic and non-academic life as they participate in real life situations (p. 480). Thus, they can develop effective research skills, adapt and respond better to change, and they are also prepared to develop critical thinking skill.

The Students' Critical Thinking Improvements

From the observation on the implementation of inquiry-based teaching, the following data showed the students' critical thinking skills improvement viewed from the students' critical thinking disposition characteristics improvement in the process of learning. From the data, the researcher found that there was an improvement in the students' critical thinking disposition characteristics. In this case, the researcher categorized those critical thinking dispositions based on the critical thinking disposition characteristics which were acknowledged by Reichenbach (2001) whereupon the researcher classified those 16 critical thinking disposition into five aspects, those are curiosity, relevancy, open-mindedness, rationality, and implementation. Meanwhile, the finding of this study related to this was elaborated below.

Curiosity

The curiosity refers to the ability of students to know about everything they want to. In this case, the students make themselves well-informed on everything they are interested in. Thus, the students with this critical thinking disposition characteristics will become more inquisitive on everything as they show their inquisitiveness through asking questions, keeping their mind on "why" question, and seeking the answers of their curiosities from many sources.

From the data collected, it was found that students' curiosities improved better than the first meeting. It was evidenced by the emergence of questions that came from the students' interest during the process of learning in which the students seemed not demonstrate in the first meeting of the learning as they did not accustom with the learning situation.

The students' critical thinking appeared when the students could relate their prior knowledge and environment, with what they want to know. This can be seen when the teacher built the lesson by using the current event the students could easily relate it with what they already know before. Moreover, in this case, the teacher also gave an appraisal word to the students who were courage to share curiosity and idea, like *Good ..., Very good ..., Great ...,* etc. This is in line with the opinion acknowledged by Ostroff (2016) cited in Masauko (2018) that curiosity is about being aware and open, checking things out, experimenting, and interacting within one's surroundings.

This situation can be compared with the data of observation that found in the first week of the meeting. In the first week of the meeting, the students seemed not participate the learning. They also tended to be more passive in responding the teachers or doubt to respond when the teacher gave them space to express their ideas. When the teacher asked a question, the students just smile; sign of the fear of making mistake, and feeling not confident to speak out the idea, without giving any response on teacher's question.

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The situation of the class in the very beginning (meeting 1). The class tended to be more passive and students also withdrew themselves from an active participation as they seemed not to demonstrate any critical thinking disposition characteristics, especially in field of curiosity. Based on the observation, there are some causes that might hinder students from participating the class, just like bring up the anxiety to the students such as calling on the student the students' fear of volunteering to ask or to answer a question in class, shyness, fear of making mistakes and being laughed at, and even fear of negative teacher evaluation.

The student seemed not play an active participation in the learning process. None of the students demonstrated their curiosity but waiting for the teacher to approach them. Moreover, in seeking the information, they tended to use only textbook. Although the teacher had facilitated them to seek information from other learning media (mobile telephone), they did not maximize the use of it. They did not use the mobile telephone for the internet access, and even used any credible sources in looking for the information. This situation indicated that the students were less curios in term of using any credible sources.

Nevertheless, by the number of stimuli given by the teacher in the learning, the students' curiosity emerged without being compelled. The stimulus given by the teacher was in a form of pictures, stories, songs, or even task that could attract their attention in participating the class activity. As an example, in the phase of asking, the teacher stimulated the students to expand their inquisitiveness. It is in line with opinion argued by Bruce (2008) that in the phase of asking, the teacher might begin to stimulate students' curiosity through introduction talk related to the topic that would be discussed in the class. Thus, in encouraging students' curiosity, the teacher has to trigger students' curiosities by asking valuable questions that might stimulate students to think critically, be able to look for teachable moments, and invite students to learn through building lesson around current events which might make them think critically. Interestingly, after stimulated, this disposition characteristic emerged almost in all cycles of inquiry. This can be seen from how the students could exploring their environment, devouring books and information, asking questions, connecting with people and nature and seeking new learning experiences.

Relevancy

The relevancy refers to the ability of the students to take into account the total situation when they interpret something. In other words, the people with this critical thinking disposition characteristic will become more contextual in clarifying something. They keep their thinking relevant to the main point and avoid going off on tangents.

From the data collected, the researcher found that the students experienced improvement in their critical thinking disposition in term of relevancy. In this case, the students seemed to demonstrate their ability in responding something relevantly with the topic being discussed. It was evidenced by the students' ability in expressing the inquiries based on the information that they found and collected from many sources, whether from the book or discussion even from their prior knowledge.

The students could describe the things around them correctly based on their observation relevantly to the topic being discussed (What we use them for). They could also interpret the use of things based on what they see and what they experience. In other words, they could do the assignment relevantly to the main point of the study. This can be done through giving the understandable assignment and clearly instruction. Perhaps the teacher can give the assignment provided with its example as the teacher did in this research. The student can engage with the learning process as they follow the learning actively and relevantly. As proposed by (Park, 2003) that students who actively engage in what they are studying tend to understand more, learn more, remember more, enjoy it more and be more able to appreciate the relevance of what they have learned. It is not quite similar to what they did in the previous meeting when the teacher asked them to describe things/animal/people that they found before they go to school. As the assignment, the teacher asked them to describe things/animal/people that they found. For example, in the beginning of the assignment, the student A could describe the animal he found. However, up to the last sentence, the students A, he described his feeling.

Nevertheless, week by week, they could show their progress in demonstrating relevant thinking, which means focus on the topic discussed, as the teacher stimulated them with the activity that could train them with thinking relevantly. In this case, the teacher maximized it in the phase of investigation. (Bruce, 2008) expressed that through the process of investigating, the students were directed to work collaboratively in collecting information, doing interview etc. Thus, through this activity, the students were accustomed to seek many information that suit to the topic. Moreover, the students' ability in adjusting their perception, thinking, ability in using the source into the context of learning was also improved.

Open-mindedness

The open-mindedness refers to the ability of the students to take or change a position and withhold judgment when their opinions, pieces of evidence or reasons are sufficient or not. People with this critical thinking characteristics

seriously consider points of view from others too, as they are open-minded to every piece of information they got.
From the data collected, the researcher found that in the initial week of the meetings, the students seemed not demonstrate the open-mindedness. The students' lack of open-mindedness could be seen from the students' activity. Briefly, the teacher asked the students to do the assignment in a group discussion. When the researcher observed the students' discussion, the researcher found that there was a student (Student B) who always interrupted while his friend being sharing the opinion.

Of course, unlike the characteristic of open-mindedness proposed by (Reichenbach, 2001). He acknowledged that the person with open-minded will seriously consider of others' point of views or others' perceptions. Thus, to be an open-minded person, student B should firstly listen all the explanation of student A. When student B had his time to share or comment then he could express his own point of view.

Nevertheless, after the teacher gave them such a stimulus to stimulate them to become more open-minded, the students showed the improvement of their ability in seeing things from different perspectives. In the following week, the students demonstrated open-mindedness in group discussion. It was evidenced by the emergence of students' activity in putting and sharing ideas within their group in an appropriate time, and even, they showed their agreement and disagreement toward something disclosed with its reason. This situation was captured when the students show their respect on others' opinion evidenced by their enthusiasm in listening others' idea.

When the students allowed the information which came from different perspective, it may indicate that they start to have an open-mindedness as they consider point of view of others. In this case, the teacher was much more on giving stimulation of the open-mindedness to the students in the phase of creating. In which the students were given space to discuss every inquiry they got to others. This is in line with (Bruce, 2008)'s statement that in the phase of creating, the pieces of information collected by the students began to be merged. They would start to interlink others' point of view with the information they had. Thus, as the students were accustomed to seeing everything from every perspective as they were open to others' opinion, their ability in open-mindedness was also improved.

Rationality

The rationality refers to the ability of the students to compare and correlate their prior knowledge with the new knowledge that they gained from the sources around them. Sometimes, the people with this critical thinking characteristic tend to realize the limits of knowledge, and hence look for probabilities rather than proofs.
From the data collected, the researcher found that the students seemed not demonstrate rationality in critical thinking in the beginning process of the learning. It could be seen from the less of the rationality of the respond expressed by the students toward the teachers' question exceedingly when they had to look for the information. In other words, they seemed not understand with what they work on, they seemed not know what they need to be looked for.

As found from the observation, the student could give response based on her presupposition. It was indicated by existence of hesitation in responding teachers' question, like doing some pauses. Moreover, at that time, the student did not realize the limit of her knowledge, as she just responded it without following with its reason. Whereas, (Reichenbach, 2001) proposed that a critical thinker should be characterized with several critical thinking disposition and one of them is that they realize the limits of knowing and the level of their knowledge. So that, to avoid bias, they could be rational in making judgement by look for some probabilities or seek for some alternative argument when they do not have sufficient reason.

However, as the teacher stimulated the students to be more rational with the treatment that could stimulate their rationality, like giving students space to rethink the answer and then relate their prior knowledge with their new knowledge, the students could demonstrate rationality in the following phase as they realized the limit of their knowledge, and then they looked for the information to avoid bias. This situation was captured in the students' group discussion activity. In a group discussion, the students try to look for the information from the internet.
the students put their efforts to be more rational in giving opinion. By looking for many information until they have enough evidence to support their opinions or ideas. Surprisingly, this disposition happened repeatedly and continually in the process of the learning. It happened when the teacher gave space for the students to reflect the learning, the students expressed their sound of conclusion based on the experience, others' opinion, facts, also data during the process of learning.

The student's rationality appeared when they asked to drawing a conclusion from their learning. The student could conclude based on what she had experienced, through interlinking or correlating her prior knowledge with the new knowledge as seen on the excerpt above with the underlined words. The student could express her conclusion about the police job based on the knowledge she knew before and then interlinked it with the new information she acquired in the class discussion.

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Implementation

The implementation refers to the ability of the students to apply their critical thinking abilities in the process of learning. They integrated the whole information collected with the knowledge they had before. Based on the data observation collected, the researcher found that the students seemed to demonstrate this critical thinking disposition characteristics when they shared their opinion with the class, commented and argued each other. Based on the observation, this situation mostly happened in phase of classroom discussion when a representative of group presented their groups' work in front of the class. In this situation, the teachers did not involve his role too much, in other words, the teacher only controlled the situation of the class, and when the situation seemed not being conducive for the discussion to be continued, the teacher then come to mediate a discussion.

In this case, the students experienced a significant improvement in term of implementing their critical thinking ability in the class. In which, in the first meeting, the students seemed not demonstrate this critical thinking disposition. This might be happened because they did not confidence in giving comments as they lack of knowledge and information. Nevertheless, in the following week, this ability was demonstrated by the students after the teacher gave them such a treatment which involved the students to discuss their inquiries actively in a class discussion. (Bruce, 2008) acknowledged that in the phase of discussing, the students might share their ideas with each other as they might be in an activity of knowledge-sharing such as comparing notes or inquiries, discussing conclusion, as well as sharing experience.

From the finding elaborated previously, we could see that by the existence of the implementation of inquiry-based teaching in the process of students' learning, the students surprisingly showed a significant improvement in critical thinking skill seen from their critical thinking disposition characteristics in the process of learning. In other words, we could assume that the more teacher stimulates students with the inquiry activity the more students could sharpen and accustomed to use and expand their critical thinking skill in everything they were encountered.

However, sometimes, in some cases, the teacher could be encountered some obstacles in implementing this inquiry activity in the class. Those obstacles might challenge the teacher in applying inquiry-based teaching into the students' learning process. The following explanation described how the teacher conducts the inquiry-based approach in the teaching critical thinking process.

In sum, the improvement of critical thinking took place within several phases. This improvement could be described on the table as follow.

Tabel 3. The Improvement of Critical Thinking

No	Phases of Inquiry	Students' Critical Thinking Improvement		
		Then	Now	Aspects
1	Asking	They were passive in learning, must be spoon fed, and gave irrelevant and irrational response	They became more active and began to ask question, showed curiosity and could give relevant and rational response	- Curiosity - Relevancy - Open-mindedness
2	Investigating	They were confused as they did not know what to do, what to look for	They became more curious as they know what they had to look for relevant information to the topic being discussed	- Curiosity - Relevancy - Open-mindedness
3	Creating	They were confused of what to do on the collected information	They could merge the information, interlink the new knowledge with their prior knowledge, until generate a new thought	- Relevancy - Rationality - Implemen-tation
4	Disucussing	They used to speak and response spontaneously without	They could give response rationally and rationally, and gave	- Curiosity - Relevancy - Open-mindedness

No	Phases of Inquiry	Students' Critical Thinking Improvement		
		Then	Now	Aspects
		referring to some source	more *why* question	- Rationality - Implemen-tation
5	Reflecting	They could not evaluate the learning material	They could resume the learning material based on what they had learned	- Relevancy - Rationality - Implemen-tation

In conclusion, by taking both qualitative and quantitative data holistically, the researcher inferred that absolutely the inquiry-based teaching method could improve significantly students' critical thinking in the learning process by following every phase existed in the inquiry-based cycle. The improvement of critical thinking ability in these students learning happened in each inquiry cycle that implemented in the learning process i.e., asking, investigating, creating, discussing, and reflecting. This inquiry cycle was recommended by (Bruce, 2008) as an attempt to promote students' critical thinking skill as follows:

1. Asking

In the phase of asking, the questions might come from both teacher and students. the questions that come from students might be derived from their curiosity about the world. The students might formulate meaningful questions about a problem or question they have in their minds or the topic to be discussed as a part of a unit of study. While the questions that come from the teacher was a question that may stimulate the students' curiosity like by giving them an introduction talk related to the topic of the study. This can be called as teachers' guiding question. Meanwhile, it had to be paid attention by the teacher in giving the guiding question, which can provoke a reaction and an opinion from the students.

2. Investigating

In the phase of investigating, the teacher played his/her role as a facilitator by letting the students to solving the initial question or problem. For instance, the teacher may lead the students to investigate more on what they want to know about the world. In other words, in this phase of the inquiry-based learning cycle, the teacher should exploit the initial curiosity of the students then lead them to seek and create information. Through this process, the students with their group will work in collaborative learning to collect the information, study, collect and exploit resources, experiment, look, interview, draw, so on and so forth and then narrow down the topic. In this inquiry phase, the student might begin to gather information, inquire from many sources, observe, study and ask people, and even reformulate the question when necessary.

3. Creating

In the phase of creating, the collected information begins to merge. The students started to make links or connections. The ability to synthesize meaning will be stimulated in an attempt to create a new knowledge. Students may generate new thoughts, ideas, and theories perhaps that are not directly inspired by their own experiences equally making new idea outside their prior knowledge and experience. The students then made a report and plan their presentations within their subgroups.

4. Discussing

At this point, the students shared their ideas and new discoveries with other members of their sub-group. They also found out about other classmates' findings and involve themselves in a community-building process. They were allowed to ask and argue each other about their own thoughts, experiences, and inquiries. The activity was in a form of knowledge sharing includes comparing notes, discussing conclusion, and sharing experiences.

5. Reflecting

In the phase of reflecting, the students got together once again to look back at the initial question or problem. As this phase consisted of reviewing and resuming on what the students have learned from the lesson given, they were required to analyze once more the whole process of learning and made a conclusion.

In addition, according to Mahapoonyanont (2012) there are some factors that affect critical thinking skills of students consisted of education factors, student factors, personal factors, and child-rearing factors (p. 149). In this study, the teacher used inquiry-based learning as a teaching method. The inquiry-based teaching, however, was very helpful and beneficial in promoting deep thinking and the ability to apply knowledge and reasoning skill rather than traditional educational approach. Furthermore, in the inquiry-based teaching, the students were motivated and required to achieve the learning goals. The students were directed further to have a positive attitude so that their critical thinking improved. Moreover, this approach could also give the students opportunity to construct their own idea and concept in every cognitive process. The students could understand a new knowledge that they acquired through cooperative learning in a peer group discussion. Besides, they would discover something to solve their problems

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autonomously. Thus, by administering inquiry-based approach, the students could be accustomed being more independent in learning as they could expand their ability to think more critically, and it would be beneficial for their future life.

CONCLUSION

Based on the data processing and analysis, it is concluded that inquiry-based teaching can improve significantly students' critical thinking skills. This improvement covers all the skills in critical thinking those are interpretation, analysis, inference, evaluation, explanation, and self-regulation. Moreover, seen from the classroom observation, the students' critical thinking disposition characteristics is also developed from week to week, in term of students' curiosity on everything they want to know, relevancy in seeking information, open-mindedness, rationality in giving argument, and implementing their ability in thinking more critically.

According to this study, this promoting process can be done through appropriate inquiry cycle which is implemented in the classroom. Meanwhile, the inquiry cycle that implemented in the learning process may include of 5 phases, those are the phase of asking, the phase of investigating, the phase of creating, the phase of discussing and reflecting. This conclusion is proven by the looking at the finding in this research which indicate that by passing every phase of this inquiry-based teaching cycle consistently in the process of learning, it can promote students' critical thinking skill.

By systematically engaging students in these phases, the study confirms that inquiry-based teaching is an effective method for fostering curiosity, open-mindedness, rational argumentation, and critical thought. This directly fulfills the purpose of the study, showing how this instructional approach leads to meaningful development in students' cognitive skills.

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