Profile of Analytical Thinking Skills Through Inquiry-Based Learning in Science Subjects

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Article Info

ABSTRACT

The 2013 curriculum aims to form students who are ready to face the 21st century so that the 2013 curriculum is not only taught about aspects of knowledge but also aspects of skills. Thinking skills are the skills used in the 2013 curriculum, where one of the thinking skills students need is expertise in analytical thinking. These skills are necessary for science learning. Analytical thinking skills can be improved if the teacher trains them correctly, both from the learning model and learning strategies. This study examines learning models and learning tools that can improve analytical thinking skills. Learning based on inquiry learning is expected to improve students' analytical thinking skills. The findings of this study, it is known that inquiry-based models and tools can improve analytical thinking skills because they start from a problem. The problems given are then discussed with the group to find information that fits the situation and find ways to solve the problem nicely by conducting experiments or observations, then summing up the results obtained and communicating them well. Analytical thinking skills are closely related to problem-solving. So with analytical thinking skills, students will quickly identify and solve a problem.

INTRODUCTION

Education in the 21st century has a huge role in the face of an increasingly rapid globalization era. The purpose of implementing education in the 21st-century era is expected to be a tool or instrument that can help in increasing human knowledge. The hallmark of 21st-century education is using the value of knowledge in all its aspects (Mukhadis, 2013). Currently, Indonesia is implementing the 2013 curriculum, which aims to create Indonesian society in facing the 21st century and excelling in the science field. In 21st century education, there has been a paradigm shift in learning which is one of the characteristics of the 2013 curriculum. There is a change in the object as a learning center where previously teacher-centered learning become a student-oriented and student-centered learning system. Science learning is a process of learning activities that link experience with specific skills, concepts, and principles in a learning process (Ekapti, 2016). Science is a field of study that emphasizes students so that they can be active throughout the implementation of learning and be able to process the information obtained to facilitate students in learning understanding in mastering a concept (Qomariya et al., 2018). In addition, science learning is also taught to recognize and understand problems and find solutions to solve these problems (Fadilah. MS et al., 2020). So it takes the ability to think analytically.

Science learning is taught about knowledge in the form of facts, concepts, and laws and is also taught to recognize, understand, and solve problems carried out by students. To solve a

problem, a student needs good analytical thinking skills (Nilah & Roza, 2020). These thinking skills are obtained from thinking creatively, critically, and analytically. Analytical thinking involves breaking down material into small pieces, determining the relationship between each component and the other factors, and paying attention to the overall structure (Astriyani et al., 2017). Expertise in analytical thinking is needed to face life in the 21st century (Setiawaty et al., 2019).

Students are said to have analytical thinking skills if they can find various problems, describe these problems, different unrelated problems, and form links between issues that have the same concept to find appropriate solutions to each situation (Fitriani et al., 2021). Analytical thinking skills are also closely related to problem-solving so that with analytical thinking skills, students will readily identify and solve a problem. Analytical thinking skills are fundamental for students to understand information or concepts in-depth, detail, and connect each information or idea.

The analytical ability of students in science subjects tends to be below, based on research conducted by Trends in International Mathematics and Science Study (TIMSS) also research by the Program for International Students Assessment (PISA). To be known from research findings from PISA in 2018, the scientific ability of students in Indonesia has a score of 396 and is ranked 71 out of 79 countries (OECD, 2019). The results of a study from TIMSS in 2015 Indonesia ranked 46 out of 51 participating countries. Meanwhile, in 2019 Indonesia did not participate in the survey conducted by TIMSS. Dinni (2018) argued that PISA encourages learners to think and act logically and be guided in solving a problem. So it takes skills in reviewing and evaluating to be able to solve the conditions of the problems faced. Based on the data from the two studies, it can be concluded that students' achievement of students in science is still low, especially in the ability to think analytically.

Students must be accustomed to solving and solving analytical problems so that students have good analytical thinking skills (Ilma, 2017). The ability to think analytically can be trained as early as possible for students to be accustomed to thinking analytically. Following the theory put forward by Jean Piaget, which states that children in the age range of 11-13 years, namely at the junior high school level, are in the concrete operational stage (Santrock, 2013). At this stage, students can identify tangible things but have not been able to identify abstract things.

Students will have good analytical thinking skills if they can adequately train them through learning models and strategies. A teacher must be able to determine appropriate learning strategies and models to facilitate analytical thinking skills. However, science learning in schools only teaches theoretical concepts and is insufficient to prepare students' analytical thinking skills (Setiawaty et al., 2019). So it is necessary to have a model or learning device to facilitate analytical thinking skills that are appropriate in terms of material and abilities to be achieved by students. One of the learning models that can improve analytical thinking skills is inquiry (Qomariya et al., 2018). Inquiry-based learning involves students actively seeking, finding, and investigating knowledge with confidence (Kusdiastuti et al., 2016). Based on the explanation above, it is known that analytical thinking skills are essential for students, so a strategy is needed to be able to facilitate and support improvement in thinking analytically to students. Based on these researches was carried out to find out the approach that needs to be carried out to enhance students' analytical thinking skills, both using models and learning tools.

RESEARCH METHOD
The type of research used in this research is library research. While the strategy used in this study is a qualitative research strategy. The definition of qualitative research is research on natural objects, where the researcher is the key instrument, the data analysis is inductive or qualitative, and the research results emphasize generalization. The natural object in question is an object that is as it is and is not manipulated by the researcher either before, during, or after the research takes place. The method of data collection in this research is the method of literature study or literature review.

Sources of data in this study were obtained from various journals or articles that can be accounted for nationally and internationally regarding inquiry learning models and inquiry-based learning tools that can help improve analytical thinking skills. Data collection is done by searching, collecting, and reviewing topics following research from various journals or articles that can be accounted for nationally and internationally regarding inquiry learning models and inquiry-based learning tools that can help improve analytical thinking skills. After the data is collected, then the next is the process of analyzing the data. Data analysis was carried out to obtain valid data following the research conducted. After the data is collected, the next step is data analysis. The method used is the descriptive method. The descriptive analysis technique is a research technique where information that has been collected will be compiled and analyzed to obtain clear and valid research data.
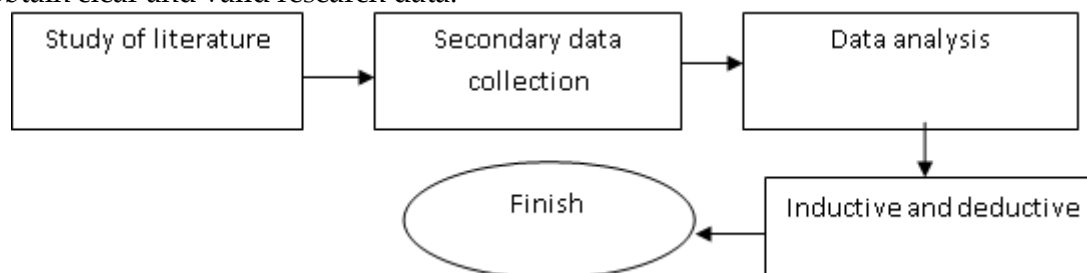

Figure 1. Research Flowchart

RESULTS AND DISCUSSION

Articles are obtained from the results of selection and selection as well as adjustments to this research, namely the ability to think analytically and inquiry-based learning. The following is a table regarding research that discusses the relationship between analytical thinking skills and inquiry-based learning.

Table 1. Profile of Analytical Thinking Skills Through Inquiry-based Learning in Science Subjects

No	Journal/Article	Journal Review
1	(Sartika, 2018)	Research result : *Several learning models that can help improve analytical thinking skills include guided inquiry models, problem-based learning, group investigation, context-based learning, and analytical thinking skills training models.* Research weakness : *This research is only a literature study, and it is not explained how effective the learning model is to improve analytical thinking skills.* Research recommendations : *Conduct research on the effectiveness of one learning model or learning strategy by applying it to the learning process to improve analytical thinking skills.*
2	(Wahyuni & Analita, 2017)	Research result : *Laboratory inquiry-based learning is carried out for 3 cycles. The average percentage of learning in cycle 1 got 79% with a very good category. In cycle 2, the average percentage of learning is 86% in the excellent category. And the average percentage of learning in cycle 3 is 89% in the excellent category.* *Guided inquiry with an experimental laboratory model able to make students' skills in analytical thinking increase, as seen from the n-gain score obtained, which is 0.03 with low improvement criteria.* *The p-values of the paired t-test for pretest and post-test were 0.113 and 0.561, respectively (Sig. (2-tailed) > 0.05). It means that the measurement results are not significant and showed no difference in terms of students' analytical thinking skills in the implementation of cycles I, II, and III.* Research weakness : *Laboratory inquiry-based learning can improve analytical thinking skills. But the increase is only in the low category.* Research recommendations : *Further research is needed on laboratory inquiry-based learning, and more*

No	Journal/Article	Journal Review
		preparation is required to conduct laboratory inquiry-based learning to improve analytical thinking skills effectively.
3	(Qomariya et al., 2018)	Research result : • *The average value of the analytical thinking pretest in the control class got a score of 28.18, and the pretest in the experimental class got a value of 29.28.* • *The results of the scores based on the analytical thinking skills of the experimental class students after going through the implementation of guided inquiry learning with the pictorial riddle model were better than the control class, 77.69 and 68.14. The average percentage of post-test scores for each indicator of analytical ability for the control class is 69.3% and for the experimental class is 76%.* Research weakness : *Research on the effectiveness of the pictorial riddle method in guided inquiry learning was only carried out on a small scale, that is, there are two classes, namely the control class and the experimental class. So it is not known the level of effectiveness of the learning method on a wide scale.* Research recommendations : *Research needs to be done on a broader scale, for example, in a school. It is recommended that the pictorial riddle learning method in guided inquiry learning is an alternative learning method used in the learning process to train analytical thinking skills and conduct further research, for example, in other subjects or different levels of education, for the quality of education in Indonesia which is getting better and developing.*
4	(Fakhrurrazi et al., 2019a)	Research result : • *The mean values of the pretest and posttest in the control class were 45.33 and 59.67. While the average value of pretest and posttest in the experimental class is 46.22 and 83.11.* • *The interactive demonstration-based inquiry module was declared quite effective In improving students' analytical thinking, which indicated an average n-gain score of 68.52% and the calculation of the independent sample t-test, the value of sig (2 tailed) was less than 0.05, which is 0.000 <0.005, which means that between the experimental class and the control class, it is proven that there is a significant difference between their cognitive learning outcomes.* Research weakness : *The effectiveness of the interactive demonstration inquiry-based module needs to be carried out on a small scale, namely in 1 control class and 1 experimental class.* Research recommendations : *Testing the effectiveness of the interactive demonstration inquiry-based module needs to be carried out on a broader scale. And it is necessary to research the development of interactive demonstration inquiry-based modules on different materials, subjects, and levels of education.*
5	(Fakhrurrazi et al., 2019b)	Research result : • *The feasibility test of the interactive demonstration-based inquiry module was carried out using validating material aspects by experts, validation of development aspects by experts, validation of aspects of learning tools by experts, and validation of aspects of problem development by experts.* • *The motion system module in humans based on interactive demonstration of inquiry obtained a validation score of 92.7 from material experts in the very feasible category, module development experts at 91.8% in the very feasible category, learning device experts at 96.7% in the very feasible category, linguistic and readability experts were 93.7% in the very decent category, and cognitive development experts at 91.5% in the very decent category.* Research weakness : *The interactive demonstration-based inquiry module was only tested for its feasibility by validation methods by several experts. The interactive demonstration-based inquiry module was not tested for its effectiveness on a small sample or a large sample, so it is not known how effective it is to improve analytical thinking.*

No	Journal/Article	Journal Review
		Research recommendations :
		It is necessary to test the effectiveness of the module on a small or large scale.
6	(Rosadi et al., 2018)	Research result :
		• *The n-gain score in the control class is 0.5 and the n-gain score in the experimental class is 0.6.*
		• *The results showed that the level of students' analytical thinking increased as indicated by the n-gain value. For the control class, there were results of N-gain scores in the low category of 6.7% of students, followed by those with N-gain scores in the medium category of 83.3% of students, and those with N-gain scores in the high category of 10% of students. In the experimental class, 70% of students got n-gain scores in the medium category and another 30% in the high category. Based on this, it was concluded that students' analytical thinking skills differed after learning with the Process-Oriented Guided Inquiry Learning (POGIL) method.*
		Research weakness :
		The test of the effectiveness of the POGIL method in learning was only carried out on a small scale sample, namely 1 experimental class and 1 control class.
		Research recommendations :
		It is necessary to test the effectiveness of the POGIL method on a large scale.
7	(Sartono et al., 2018)	Research result :
		• *In this study, there are 2 experimental classes, namely 1 experimental class using POGIL learning and 1 experimental class using discovery learning.*
		• *the results obtained in the experimental class using discovery learning the average posttest value is 74.7 and the posttest average value in the experimental class using POGIL learning is 72.13. Meanwhile, the average posttest score in the control class was 62.27.*
		• *The learning implementation score in the experimental class was higher than the control class, namely 95.84 for discovery learning, 93.89 for POGIL, and 88.09 for the control class.*
		• *The test results with one-way ANOVA, it was concluded that POGIL and discovery learning affected students' analytical thinking skills.*
		Research weakness :
		The study was only conducted on a small-scale sample.
		Research recommendations :
		It is necessary to test the effectiveness of the POGIL method and discovery learning on a large scale.
8	(Annisa et al., 2016)	Research result :
		• *The value of students' analytical thinking skills in pre-cycle, cycle 1, cycle 2, and cycle 3 are 45.34; 61.64; 70.06; and 74.02.*
		• *The application in learning with the guided inquiry model found an increase in students' analytical thinking skills, which was 28.68%.*
		Research weakness :
		The study was only conducted on a small-scale sample.
		Research recommendations :
		The guided inquiry-based learning model can be used as an alternative model that can be used to help improve analytical thinking skills. It is necessary to apply an inquiry-based learning model to other subjects and levels of education to help students at all levels enhance analytical thinking.
9	(Puspita et al., 2018)	Research result :
		In the experimental class students with a gain score of more than 26 there are 16 students, while at intervals 1-5, there are no students at all. Based on these results, it can be stated that the gain score in the experimental class obtained a higher value. In this case, it is assumed that the post-test and pretest had a significant increase in students who were in the experimental class. While the gain score in the control class was evenly distributed but did not experience a significant increase in value as in the experimental class.
		Research weakness :

No	Journal/Article	Journal Review
		Testing the effectiveness of the observation-based inquiry learning model is only done on a small scale. Research recommendations : *The observation-based inquiry learning model can be utilized and used alternative models that can be used to help improve analytical thinking skills. It is important in implementing an inquiry-based learning model to other subjects and levels of education to help students at all levels enhance analytical thinking.*
10	(Weaver et al., 2016)	Research result : • *Feedback from students after the learning took place was very positive and they indicated that learning with this method was needed to complete research projects.* • *After the learning process, it is known that the skills possessed by some students in the form of critical thinking, problem-solving, and analytical thinking achieve high results.* • *This learning method encourages students to think independently and helps in understanding the concepts and knowledge they have.* Research weakness : *The test of the effectiveness of the inquiry-based learning model was only carried out on a small scale.* Research recommendations : *It is necessary to test the effectiveness of inquiry-based learning on a large scale.*
11	(Indrayanti et al., 2021)	Research result : • *Based on the results of assessments from media experts and science teachers, criteria 4 < Va < 5 were obtained, which means that this guided inquiry-based learning module is valid and feasible to use.* • *Student assessment resulted in 12 out of 15 students stating that this module is suitable for learning.* • *The level of students' discourse understanding in this module is 80%, meaning that this module has module readability in the category of easy to learn by students independently.* • *The students' average environmental care attitude at meeting 1 was 83, meeting 2 was 88, and meeting 3 was 85.* • *The pretest and posttest scores of students' higher-order thinking skills were 66.25 and 88.33. With an n-gain score of 0.36, the criteria are quite increased.* Research weakness : *The implementation of the test of the effectiveness of the guided inquiry-based learning module is only carried out on a small scale.* Research recommendations : *It is necessary to test the effectiveness of guided inquiry-based learning modules on a larger scale*
12	(Nisak & Yulkifli, 2021)	Research result : • *The electronic module with the HOTS integrated IBL model has gone through the validity and practicality test stages and obtained results with valid and practical criteria. The average value of the tests carried out on the electronics module is in a good category. There are four aspects of assessing the validity of the electronic module, and each gets a different validity score. Namely, the material aspect gets a score of 0.78, the learning form aspect gets a score of 0.80, the visual communication aspect gets a score of 0.78, and the software use aspect gets a score. 0.81.* • *The level of practicality measured is helpful, easy to use, attractive, and efficient. With each score in percentage and category (from the teacher) is 90.00 (very practical), 93.06 (very practical), 96.43 (very practical), 92.50 (very practical), and get an average score - an average of 93.27 with an efficient category. While the practicum results of each student were 88.59 (very practical), 88.01 (very practical), 89.14 (very practical), 85.71 (very practical),*

No	Journal/Article	Journal Review
		and the average score was 87.86 with the category efficient. After assessing practicality by teachers and students, the electronic analysis module is in the efficient category.
		Research weakness :
		The effectiveness of electronic module-based inquiry learning was only carried out on a small scale.
		Research recommendations :
		Inquiry-based modules can be used as a tool or media that can be used during the learning process. And more in-depth research can be done on the development of inquiry-based modules to be used in different subjects and levels of education.
13	(Savira et al., 2019)	Research result :
		• *The average feasibility test for e-modules conducted by material experts was 82.78% in the very feasible category.*
		• *The average e-module feasibility test conducted by media experts was 88.81%, with a very decent category.*
		• *The average e-module feasibility test conducted by learning experts was 80.83%, with a very feasible category.*
		• *The average of the feasibility test conducted by the teacher is 98.25%, with a very decent category.*
		• *The average of the feasibility test conducted by students is 92.05%, with a very feasible category.*
		Research weakness :
		The development of the inquiry-based e-module is carried out according to the ADDIE development model. However, this e-module has only been tested for feasibility using the validity method carried out by several experts. E-modules are not tested for effectiveness, for example, by applying them to learning.
		Research recommendations :
		It is necessary to test the effectiveness of the developed e-module. It needs to be done to determine how much the module's effectiveness is to improve students' higher-order thinking.
14	(Fitriyati et al., 2017)	Research result :
		• *The device developed is an inquiry-based learning tool that gets the validity test results on textbooks by 87.43% and learning media by 87.31%, each of which is in the very valid category.*
		• *The average result of the trial in the small group is 80.55 with a suitable category for use.*
		• *The test result of the effectiveness of learning devices in higher-order thinking skills obtained an average score of 62.45 in the control class and 74.16 in the experimental class.*
		• *The test result of the effectiveness of learning devices in scientific reasoning obtained an average score in the control class of 4.16 and the experimental class of 5.23.*
		Research weakness :
		Science learning tools developed in the form of textbooks and learning media were only tested in small groups.
		Research recommendations :
		Science learning tools developed in the form of textbooks and learning media should be tested in large groups such as 1 school or various schools so that it is known how effective science learning tools have been developed.
15	(Purnamawati et al., 2017)	Research result :
		• *Higher-order thinking indicators used are the ability to analyze, evaluate, and create. The pretest value for each indicator is 23.13, 22.29, and 19.58. While the posttest value for each indicator is 77.92, 78.75, and 76.87.*

No	Journal/Article	Journal Review
		• *The n-gain value for each indicator is 0.70, 0.72, and 0.70 with each high category.*
		Research weakness :
		The developed student worksheets were only tested in small groups.
		Research recommendations :
		The developed student worksheets should be tested in large groups such as 1 school or in various schools to determine how effective the created worksheets are. Inquiry-based worksheets need better development to be used in the learning process and get better results.
16	(Mubarok et al., 2019)	Research result :
		• *The results of Calculations in the study showed that the experimental group obtained an n-gain value of 0.57 (experimental class 1) and 0.54 (experimental class 2). On the other hand, for the control group, the increase was 0.13 and both groups were shown to have a statistically significant difference in improvement. That means the experimental group can analyze, evaluate and create.*
		• *Using an inquiry-based laboratory can improve students' abilities which will benefit students' habituation in doing higher-order thinking due to 21st-century learning.*
		Research weakness :
		This research was only conducted on a small scale.
		Research recommendations :
		Further research was conducted on a broader scale. Laboratory-based inquiry learning can be an alternative learning method in science or other subjects to improve higher-order thinking skills.
17	(Yulianti et al., 2018)	Research result :
		• *The instrument used has been validated with reliability of 0.872.*
		• *The t-test found that t arithmetic was greater than t table, so it was concluded that the value of students' higher-order thinking skills in the experimental class (inquiry-based interactive demonstration model) was higher than in the control class (discovery learning model).*
		Research weakness :
		This research was only conducted on a small scale.
		Research recommendations :
		Further research was conducted on a broader scale. Laboratory-based inquiry learning can be an alternative learning method in science or other subjects to improve higher-order thinking skills.
18	(Mawardi et al., 2020)	Research result :
		• *After getting treatment, using a guided inquiry-based worksheet, the experimental class got an n-gain score of 0.64 in experiment 1 and 0.60 in experiment 2. At the same time, the control class got an n-gain score of 0.58 in experiment 1 and 0.56 in experiment 2.*
		• *It can be concluded that the experimental class can analyze, evaluate, and create better than the control class.*
		Research weakness :
		The improvement of higher-order thinking skills in the experimental class is included in the excellent category.
		Research recommendations :
		Further research is needed on the development of student worksheets so that they can produce better results.
19	(Wafiroh, 2017)	Research result :
		The validation test results from the module development experts obtained a percentage of 69.79% with a feasible category. The results of the student response questionnaire on the small class test were 82.44%, while the increase in students' thinking skills on the small class test obtained an N-Gain percentage of 0.67% with a medium increase category. The results of the student response questionnaire in the

No	Journal/Article	Journal Review
		limited class trial obtained a percentage of 82.07%. In comparison, the increase in students' thinking skills in the restricted class test received an N-Gain percentage of 0.64% with a moderate improvement category. Research weakness : *This research was conducted on a small scale.* Research recommendations : *Further research on a large scale is needed.*
20	(Tindangen, 2018)	Research result : • *Data analysis has been carried out using the t-test and obtained results where t results are higher than t tables. Its shows that the inquiry learning model affects on increasing students' higher-order thinking skills.* • *The research was conducted using a control class and an experimental class. The results of the post-test in the control class showed that 11 students had good higher-order thinking skills. While in the experimental class, 30 students had good higher-order thinking skills. In the experimental class, learning is done using an inquiry-based model with the help of student worksheets.* Research weakness : *This research was conducted on a small scale.* Research recommendations : *Further research on a large scale is needed.*

The Inquiry-based Learning Model
The inquiry-based learning model is one of the learning models that involve thinking processes and activities (Kidman & Casinader, 2017). Students can be trained by conducting inquiry-based learning to develop various scientific abilities in thinking, namely observing, characterizing, calculating, formulating hypotheses, linking relationships, measuring, interpreting data, and designing experiments (Brown, 2017). Learning with an inquiry approach is learning that prioritizes students to be able to use and process the information obtained to be able to solve a given problem and not only provide the right solution but also be able to analyze the situation (Ahaddin et al., 2020). Inquiry-based learning is constructivism-based learning that prioritizes student activity in exploring and finding knowledge during the learning process. The teacher involves students in scientific questions or problems raised in learning so that they can invite students to explore, make scientific explanations by connecting knowledge and ideas they have, creating opportunities for students to add, apply, evaluate things that have been learned (Simamora et al., 2020).

Inquiry-based learning implementation in the classroom, but there are two things that need to be prepared, namely determining learning objectives and identifying scientific questions or problems that will be raised in learning (Arends, 2012). Meanwhile, before inquiry-based learning begins, teachers are also required to know the knowledge possessed by students (Odegaard et al., 2015). The teacher is tasked with facilitating students in every phase of inquiry learning. The phases in inquiry-based learning are known to help students develop scientific inquiry skills. The steps in inquiry learning, according to (Arends, 2012) are 1) get attention and explain the inquiry process, 2) describe inquiry problems, 3) formulate hypotheses, 4) collect data material for hypothesis testing, 5) formulating conclusions, and 6) reflecting on the situation. Problem and the thought processes used.

Advantages and Disadvantages of Inquiry-Based Learning
As with other learning models, inquiry-based learning models have advantages and disadvantages. The advantages and disadvantages of the inquiry-based learning model will be described in Table 2.

Table 2. Strengths and Disadvantages of Inquiry-Based Learning

Strengths	Disadvantages
Can support students in increasing their higher thinking potential and be active in working of their own volition (Anam, 2015)	Some students have not been able to use previous knowledge to be able to recognize and explain scientific phenomena given in the learning process independently and ideally (Asyhari & Clara, 2017)
Cultivate an honest, objective, and transparent or open attitude (Anam, 2015)	In the learning process, no learning resources or reading are provided for students, so it is feared that their knowledge will not develop properly (Basam et al., 2018)
Can grow or train the skills of each student (Odegaard et al., 2015)	At the investigative stage, the teacher cannot teach decision-making skills because, at this stage, students only conclude the results of data analysis (Rakhmawan et al., 2015)

Devices are media used during the learning process. While learning is a teaching and learning activity carried out by students and teachers both inside and outside the school environment. Learning devices are media that teachers must own to support learning activities (Masitah, 2018). Meanwhile, according to Sari et al. (2020), learning tools are a collection of media used during the learning process by both teachers and students prepared by the teacher to support learning. Inquiry-based learning tools are learning tools in which scientific abilities are trained. Learning tools are generally in the form of syllabus, lesson plans, worksheets, handouts, and evaluation tools**.**

Student Analytical Thinking
Analytical thinking is a part of higher-order thinking skills and is a skill that is needed for students to face challenges in the 21st century (Prawita et al., 2019). Analyzing is an activity that involves breaking down material into smaller parts than before, determining the form of relationships between elements and the overall structure (Anderson & Krathwohl, 2015). Analytical thinking is a skill to break down information into smaller parts to provide a deeper explanation of the meaning of the information (Irwanto, 2017). It can be concluded that the formation of analytical thinking patterns is a higher-order thinking skill that involves solving information into smaller parts to gain an in-depth and precise knowledge of the information.

To identify and solve a problem, students need good analytical thinking skills. Analytical thinking skills are one of the essential parts of the problem-solving process. With good analytical thinking skills, students can make appropriate decisions to solve problems, such as answering questions. Methods in analytical thinking are categorized, namely the process of distinguishing, organizing, and attributing (Anderson & Krathwohl, 2015). The purpose of education which is classified in the cognitive process in analytical thinking is about learning in sorting and determining the parts of relevant information from given information or object (distinguishing), determining how to organize parts or pieces of information obtained so that it can become the suitable set of information (organizing), and determine the purpose and point of view of the information (attributing).

The level of students' analytical thinking ability can be known by measuring it using several indicators. Indicators of analytical thinking skills include distinguishing, organizing, and attribution (Anderson & Krathwohl, 2015). According to Setyani et al. (2017), the indicators of analytical thinking ability are interpreting information, using previous concepts and knowledge to solve problems, evaluating general conclusions based on the investigations carried out, and providing reasons why something can solve issues sensibly. Meanwhile, according to Wahyuni & Analita (2017), indicators of analytical thinking are formulating tentative assumptions, interpreting observations, integrating knowledge and experience that have been gained in the discussion process, formulating conclusions, and applying a concept that has been obtained into different problems. Based on the explanation above, it can be concluded that the indicators that are commonly used to measure analytical thinking skills are

being able to explain information by sorting and determining the part of the information that is relevant to the material, being able to organize the information obtained by considering the previous knowledge it has, and being able to determine the purpose, point of view, and conclusions from the information obtained.

Analytical Thinking Skills Through Inquiry-Based Learning
Based on the opinions of several experts, it can be concluded that analytical thinking is a HOTS that involves breaking down information into smaller parts to gain an in-depth and precise knowledge of the data. In learning science, it is essential to have good analytical thinking skills. With good analytical thinking skills, students can recognize and analyze a fact in detail that can be used to solve problems given in class. Students can have good analytical thinking skills if they are supported by methods, learning models, and learning tools that support them during the learning process (Qomariya et al., 2018). One of the learning models that can help achieve good analytical thinking skills is an inquiry-based learning model. There are several types of inquiry-based learning: confirmation inquiry, structured inquiry, guided inquiry, and open inquiry. In table 1, it has been explained that many studies that discuss inquiry-based learning can help improve students' analytical thinking skills, especially in science subjects. In table 1, it is known that almost all types of inquiry-based learning can improve analytical thinking skills. The inquiry-based learning model is one of the constructivism-based models, which means that this model prioritizes student activity in the learning process, such as building independent learning and analyzing complex information (Sartika, 2018). The independence and activeness of students in education are benchmarks for the success of inquiry-based learning because each student will have the same responsibility to contribute ideas in solving problems.

Based on the opinion of Arends (2012), inquiry-based learning has a syntax that includes getting attention and explaining the inquiry process, presenting inquiry problems, formulating hypotheses, collecting various materials to test opinions, formulating conclusions, and reflecting on problematic situations the thinking processes used. Each syntax in inquiry-based learning supports the training of students' analytical thinking skills. In the first syntax of inquiry-based learning, the teacher has the task of preparing students to learn. In the second syntax, the teacher brings students into a form of problems presented in the learning process where the existence of these problems can foster an attitude of curiosity, get students to the material to be studied, and can invite students to explore these problems so that students can be active. This stage is the stage of directing students to scientific investigations and stimulating the sorting aspect (Annisa et al., 2016). When students observe a given phenomenon, the sorting element in question will think which phenomenon is relevant or not to be used as the next problem at the problem formulation stage. In the third syntax, namely formulating hypotheses whereby practicing in formulating hypotheses, students can simultaneously develop their thinking skills by using the knowledge they have previously to analyze the causes of problems (Annisa et al., 2016; Phumeechanya & Wannapiroon, 2013). At this stage, the sorting and organizing aspects are being trained where students will determine hypotheses that follow the formulation of the problem that has been proposed and involve the activity of compiling statements consisting of several temporary variables (Annisa et al., 2016).

While in the fourth syntax, there are activities to collect data that can be done using investigation or observation to solve problems that have been given at the beginning of learning and test hypotheses while analyzing the data obtained. Students can understand and increase their knowledge by finding a new concept through these investigation activities. The ability to think analytically is very closely related to problem-solving activities. To facilitate analytical thinking, it can provide an activity that involves a problem-solving process, one of which is by way of investigation. In this syntax, the sorting and organizing aspects are trained, namely planning appropriate and systematic investigation or observation activities to solve problems (Annisa et al., 2016). In addition, at this stage, the organization and attribution aspects are also trained through data analysis activities. In analyzing data, it is necessary to have the ability to
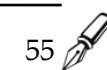
break down information or data from the results of the investigation, determine the relationship between these data, and conclude data analysis. The fifth syntax is to formulate conclusions where this activity also requires a good analytical thinking ability. And the last syntax is to reflect the problematic situation and the thought process used. In addition to using inquiry-based learning models, inquiry-based learning tools can also foster students' analytical thinking skills. Inquiry-based learning tools are learning tools that apply the syntax of the inquiry model in it.

Inquiry-based learning is carried out to create interaction between students or interactions between students and teachers. In line with this, Vygotsky argues that a child's development will not be separated from activities that smell social and cultural so that children's knowledge can be achieved well through interaction with other people, for example, in groups (Hyun et al., 2020). Interaction with other people will increase and develop the knowledge and cognitive level of students. Students need help in the learning process both from the teacher and from peers. With this assistance, students will move further into the nearest development zone where new learning occurs. This is in line with the opinion expressed by Belland (2017), which states that students will be motivated to learn various things with the help of others who are more capable, such as teachers, tutors, experts, or more capable friends. In addition, inquiry-based learning is one of constructivism-based learning, which emphasizes students finding their concepts or information, which is then transformed into more complex knowledge and revised if it is not appropriate (Slavin, 2015).

During the learning process, especially in science learning, students need a good analytical thinking ability. Analytical skills are necessary because the final product in science learning does complete knowledge and can also recognize, understand, and solve a scientific problem. With inquiry-based learning models and tools, during the learning process, students' thinking abilities can be maximally involved to be able to investigate and solve a problem critically, analytically, creatively, and systematically with the knowledge they have either independently or with the help of the teacher. So that inquiry-based learning models and tools can enable students to apply and analyze their ability to achieve a learning goal.

CONCLUSION

Inquiry-based learning can facilitate analytical thinking skills because they depart from a scientific problem presented in the learning process. Students are trained to recognize a problem, formulate ways or solutions to problem-solving, seek information or concepts related to the problem, conduct investigations with experimental or observational activities, conclude the results of experiments, and communicate them through inquiry-based learning and learning tools. In each syntax in inquiry-based learning, analytical thinking indicators are trained to train analytical thinking well. The research recommendation from the researcher is to develop a learning model and learning tool that can specifically teach analytical thinking skills where each syntax can pay attention to and train the indicators used to measure analytical thinking skills.
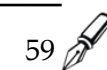
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