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STUDENTS CRITICAL THINKING SKILLS THROUGH PROJECT-BASED LEARNING MODELS IN SOLVING PYTHAGORAS THEOREM PROBLEMS

Liliyani Sameth[1], Djaffar Lessy[2]
[1,2]IAIN Ambon, Jl. Dr. H. Tarmizi Taher, Batu Merah, Kec. Sirimau, Kota Ambon, Maluku, Indonesia
Email: liliyanisameth.iainambon01@gmail.com

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Abstract. This research aims to find out the ability to think critically through project-based learning models on the material of the theorem Pythagoras of students in class VIII of State Junior High School 5 West Leihitu District. The type of research used in this study is qualitative descriptive. Taking subjects is based on the student worksheet's highest value of group work. From the group's work results, three students were taken from the total number of students, namely 30 people. The instruments used in this study were researchers, tests, and interviews. The data analysis techniques used follow concepts developed by Miles and Huberman, namely data reduction, data presentation, and inference. The results of the data analysis obtained that the critical thinking skills possessed by each student vary. From the interviews with three subjects, it is known that SL subjects meet four indicators of critical thinking skills used in this study, namely providing simple explanations, building basic abilities, making conclusions, and providing advanced explanations. The AH subject meets two indicators: providing simple explanations and building basic skills. While the subject of RK only met one indicator used in this study: building basic capabilities in the problem-solving process.

Keywords: Critical Thinking, Project-Based Learning Model, Pythagoras Theorem

Abstrak. Penelitian ini bertujuan untuk mengetahui kemampuan berpikir kritis melalui model pembelajaran *project based learning* pada materi teorema teorema phytagoras. Tipe penelitian yang digunakan dalam penelitian ini adalah deskriptif kualitatif. Proses pengambilan subjek berdasarkan nilai tertinggi dari hasil kerja kelompok pada LKS. Dari hasil kerja kelompok tersebut diambil 3 orang siswa dari jumlah keseluruhan siswa yakni 30 orang. Instrumen yang digunakan dalam penelitian ini adalah peneliti, tes dan wawancara. Teknik analisis data yang digunakan mengikuti konsep yang dikembangkan oleh Miles dan Huberman yakni reduksi data, penyajian data, dan penarikan kesimpulan. Hasil analisis data diperoleh bahwa kemampuan berpikir kritis yang dimiliki oleh setiap siswa bervariasi. Dari hasil wawancara dengan 3 subjek diketahui bahwa subjek SL memenuhi 4 indikator kemampuan berpikir kritis yang digunakan dalam penelitian ini yaitu memberikan penjelasan sederhana, membangun kemampuan dasar, membuat kesimpulan, dan memberikan penjelasan lanjutan. Subjek AH memenuhi dua indikator yakni memberikan penjelasan sederhana dan membangun keterampilan dasar. Sementara subjek RK hanya memenuhi satu indikator yang digunakan dalam penelitian ini yaitu membangun kemampuan dasar dalam proses pemecahan masalah.

Kata Kunci: *Berpikir Kritis,* Model Pembelajaran *Project Based Learning, Teorema Phytagoras*

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INTRODUCTION

Mathematics is a symbolic language of its characteristics: deductive reasoning and inductive reasoning methods (Kusumaningsih et al., 2018; Putri & Zulkardi, 2020). Mathematics is a symbolic language that expresses quantitative relationships, while its theoretical function is easy to think of If students understand and understand the concept (structure) of mathematics taught in a pure order of concepts, followed by the concept of notation. Ending with applied concepts and studying the structure of mathematics well, the representation (model) begins with concrete objects with a variety (Putri et al., 2019; Simanjuntak, 2003).

Students are unique individuals, meaning that no two students are the same, but each student has differences from the other. An educator notices individual differences in learning efforts. According to some students, mathematics is a difficult field. Although it is said to be difficult, it is required to learn it. There are five reasons for studying mathematics, namely: 1) as a means of thinking clearly and logically, 2) as a means to break down the problems of daily life, 3) as a means of developing creativity, 4) as a means of introducing patterns of generalization relations of practice, and 5) as a means to increase awareness of culture.

In mathematics, every concept relates to other concepts and between others, such as propositions and propositions (Setiana et al., 2021), Between theory and theory, between topics with topics, between branches of mathematics (algebra with geometry, for example), and between past lessons and lessons being studied must have something to do with it (Karanja, 2021; Lisnawaty Simanjuntak, 1993). In mathematics teaching, each subject is a unit, so the mastery of one subject is supported by learning the next subject. Similarly, students' ability to carry out calculating operations in mathematics lessons in developing students' critical thinking skills (Boonsathirakul & Kerdsomboon, 2021).

To perform calculating operations on the right learning requires the right learning model and teaching materials (Çelik & Özdemir, 2020). Therefore, the right learning model for cultivating students' critical thinking skills is a project-based learning model to gradually work on the Pythagoras theorem from the easy to the most difficult (Şahin & Doğantay, 2018). In doing math problems, students are required to solve in various ways, which will certainly make students more critical in thinking or solving Pythagoras theorem problems (Aksu & Koruklu, 2015; As'ari et al., 2017).

Based on the author's initial observations on July 28, 2015, at SMP Negeri 5 West Leihitu District, found that there are still many students who do not understand the material of the Pythagoras theorem well. This is because students still have difficulty solving the

Pythagoras theorem questions. This situation indirectly makes students bored in the learning process and less eager to learn. The learning process only involves students as empty bottles during this time, meaning active teachers while passive students. In addition, there are still many students who are not completed mathematics subjects, especially in class VIII, besides that teachers prioritize the learning results achieved by students without thinking to develop students' thinking skills, especially students' critical thinking skills, but the ability to think critically is a cognitive activity related to.

With the use of reason with critical thinking ability indicators as follows: (1) the ability to provide simple explanations, (2) the ability to build basic skills, (3) inferring skills, (4) the ability to provide further explanations, and (5) the ability to organize strategies and techniques (Nurdiansyah et al., 2021). For the above problems, it is expected that teachers will use a varied learning model, one of the right learning models for authors is the project-based learning model (Mulyanto et al., 2018; Sholihah & Shanti, 2017). This learning model is chosen because, in this model, students are given the freedom to plan learning activities, carry out projects collaboratively, and ultimately produce work products that can be presented to others.

METHOD

This research seeks to describe the critical thinking process of students in solving problems in Pythagoras material. Because the data collected is verbal data from the results of critical thinking processes to reveal students' thought processes, this research is classified as descriptive qualitative research. The subject in this study was a class VIII student of SMP Negeri 5 West Leihitu Subdistrict. The subjects in the study were taken based on a group of 3 to 4 people and taken using certain criteria. The group selected as the subject is the group that is the best group work result (highest score) against the shared student worksheet.

The critical thinking indicators used in this study are (1) students can provide simple explanations, (2) students can build basic skills, (3) students can make conclusions, and (4) students can provide further explanations. The instruments used in this study are (1) researchers, researchers as data collectors who can influence instrument factors and become key instruments that are believed in collecting data, and (2) interviews; High-ability student interviews are conducted to find out the student's critical thinking skills. Interviews conducted are not structural and are coupled with teachers of mathematics subjects. The interview process is focused on indicators of students' critical thinking in solving the problem of the Pythagoras theorem material contained in the student worksheet.

The data collection process carried out, namely (1) this research examines the critical thinking process of students in solving Pythagoras' problems. Data collection is carried out by providing questions in student worksheets for students to complete. In the completion process, the student systematically reveals what he is thinking. Researchers recorded students' verbal expressions and behavior, including the things students did when completing the problem. The types of students are different. Some students can express what is thought verbally. Some students can reason to solve a problem but cannot express it verbally. Therefore, in data retrieval, student conditioning needs to reveal what is thought. In retrieving research data, to reduce limitations, researchers condition students to express what is being taught in the free language (Simanjuntak, 2003), (2) (2) interview; This interview is used to capture as much data as possible from subjects related to the critical thinking process of students in solving. This study used unstructured interviews, namely free interviews where researchers do not use interview guidelines arranged systematically and completely for data collection, and (3) field records; Field notes are used to record any observation or interview process. Field notes in the form of keywords, phrases, and subjects of conversation/observation content, maybe in the form of pictures or sketches. The record is useful only as an intermediary tool, i.e., between what is seen, heard, perceived, Etc., and (4) documentation; documentation is used as supporting data to complete observation and interview methods (Sugiyono, 2013).

The data that has been collected is further analyzed using stages based on the opinions of Milles and Huberman, namely (1) data reduction; data reduction is defined as the process of selecting, concentrating, and simplifying coarse data obtained from written records in the field, (2) presenting data; the presentation of data is carried out by compiling information obtained from data reduction to provide the possibility of drawing conclusions and taking actions, and (3) concluding; Concluding is a process based on data obtained from data reduction and presentation of data (Miles & Huberman, 1994). The conclusion is carried out in steps, transcribes the collected verbal data, and examines all available data from various sources, namely from the results of think-aloud, interviews, and observations that have been written in field notes. Checking the validity of data is done using data triangulation. Data triangulation is a technique of checking the validity of data that utilizes something outside of that data to check purposes (Miles & Huberman, 1992).

RESULTS

An interview is conducted directly on each subject to determine students' critical thinking skills in the learning process. The interview was conducted by focusing on predefined indicators of critical thinking ability. The questions were asked regarding students' critical thinking skills and developed based on the answers obtained by students regarding their critical thinking skills.

Results of Interview Analysis with SL Subjects

The interview process conducted with SL subjects is carried out directly by researchers to know the student's critical thinking ability in solving the problem of the Pythagoras theorem material. Sl subjects are students from the group who get the highest score in the problem-solving process in the student worksheet with a score of 91.

P : According to SL, how to solve problem number 1?

SL : (SL looks silent and thinks for a while, then starts to answer). To solve problem number 1, we first determine what is known and what is asked in the question.

P : If, according to SL, what is known and what is asked.

SL : If you look at the problem, it is known that a child raises a kite with a thread that is 250 meters long so that it can be likened to the oblique side. Because if we raise the kite, it is not straight because surely the person who raises the kite will tilt. While the child's distance on the ground with the right point under the kite is 70 meters, it is likened to a base or the lower side. Then the base is 250 meters, and what is asked is how high it is.

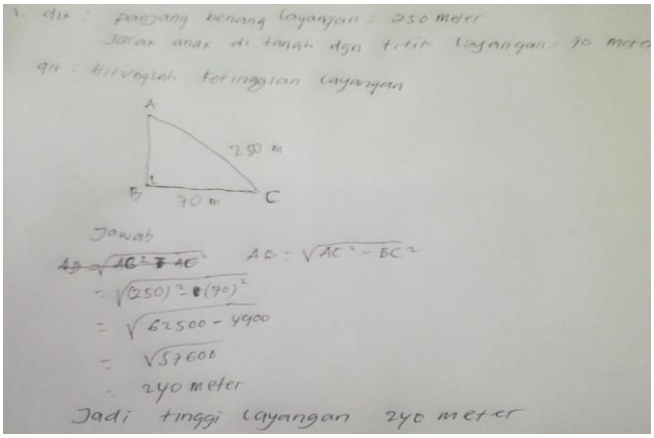

Figure 1. Results of the work of SL subjects in solving problems

P : Can SL explain how to get the answer above?

SL : To solve the problem, we first observe it well. So that we know very well what is known from the matter, from the known matter that a child raises a kite with a thread length of 250 meters, from the statement, we can illustrate that it is the oblique side of a triangle with a length of 250 m. The child's distance on the ground with the right point under the kite is 70 meters we can suppose as the base of the triangle. So by

using the formula theorem Pythagoras we can calculate the kite's height from the ground.

P : Why can SL say that 250 meters can be used as the oblique side of a triangle?

SL : Because on the matter, it is said that it is the length of the thread when raising the kite. Furthermore, when raising the kite, it must have risen not straight from the point when we stood so that it can be said as the oblique side of a triangle.

Based on the various answers above, it can be known that the subject solving the problem in the student worksheet shared at the time of the interview conducted by the researcher, the subject understands the material of the Pythagoras theorem well. The subject can analyze the problem in the problem, before solving it. In solving the problem, the subject first pays attention to the problem and then writes down various things that are known and what is asked in the question.

In mathematics learning, the ability to analyze various problems in solving problems is essential because it is beneficial for students in problem-solving. The subject looks very calm and uses the concept understood against the theorem of Pythagoras in solving the problem. In addition to solving the problem, the subject can elaborate and explain again simply and in detail. This means that the SL subject clearly understands how to solve the problem done in solving the problem. The basic skills of the subject are very clearly visible in the interview process because it uses the concepts and understandings it has so that the subject can well solve the questions given at the time of the interview. When viewed from the stages of solving the problem carried out by the subject, it can be concluded that the subject SL can think critically, especially in solving the problem of the material theorem Pythagoras. This is concluded based on the stages of solving the problem carried out by the subject.

The critical thinking ability possessed by the SL subject in the problem-solving process is described as follows.

SL subjects can provide simple explanations

The subject's ability to provide a simple explanation is visible from the interview process conducted directly by the researcher. Before solving the problem, the subject first pays close attention to the stages of solving the problem, which will be done. After careful observation, usually, the subject begins to think to solve it by previously seeing what is known and what is asked in the matter.

When the SL subject's understanding of the problem is felt enough, the subject can usually solve it. The subject can explain how to solve the problem, which ultimately gets the answer to the problem's solution to be done. In more detail, the subject's ability to provide a

simple explanation of how to solve the problem is contained in the following interview excerpt:

P : According to SL, what questions are known and what is asked?
SL : If you look at the problem, it is known that a child raises a kite with a thread that is 250 meters long so that it can be likened to its oblique side. Because if we raise the kite, it is not straight because surely the person who raises the kite will tilt. While the child's distance on the ground with the right point under the kite is 70 meters, it is likened to a base or the lower side. Then the base is 250 meters. Furthermore, what is asked is how high it is.

Students can build fundamental skills

Basic skills in learning mathematics are an essential basis owned by students. Therefore, the ability to build fundamental skills is a must to help students solve the problems they face. In this research, then in solving the problems of the theorem Pythagoras, a student must certainly be able to have basic abilities to the material. Therefore, in the learning process, the teacher must be able to build fundamental skills in the student, which will later be used by each student in solving the problems of the Pythagoras theorem. Based on the results of interviews conducted with SL subjects, the subject can have the basic material skills of the Pythagoras theorem well. This is seen in the way the SL subject solves the problem. In solving the question, the subject uses basic skills to answer the questions completed during the interview so that the SL subject can solve the problem well. This is also stated in the following interview excerpt:

P : Why would you subtract 62,500 by 4,900, not add up?
SL : Because what is sought is not the oblique side but the height. If the oblique side is sought, then it must be summed up by the square of the other two sides, but because what is asked is the height, it must be reduced to the square of the oblique side by the square of the other side.

Students can make conclusions

The ability to conclude an event or event is a mirror that can know the ability to think students critically. By blinding a conclusion, it can be known that a person's understanding of a problem is excellent. Based on the interview results with subject SL, it can be known that the subject can well conclude the results of solving the problem carried out on the material theorem Pythagoras. After solving the subject problem, he looks to be able to reach a conclusion based on the results of his work in solving the problem. The conclusions made by SL subjects can be seen in the following interview results:

P : What is SL's conclusion about solving the problem?
SL : In solving the material problems of the Pythagoras theorem, we must be able to know the problem well so that we are not wrong in applying the problem.

Students can provide further explanations

The ability to provide explanations is vital for students because then we can determine the extent of students' ability to understand the material and how much it benefits students. Based on the interview results, it can be known that the subject can explain more about the Pythagoras theorem because the subject can explain the results of his work in-depth to the given problem and also the benefits of studying the material. This can be seen from the following interview excerpts:

P : Can SL explain how to get the answer to question number 2?
SL : To solve problem number 2, as I explained earlier, solving problem number 2 is the same as solving problem number 1. Because by leaning the stairs on the wall, it will form a triangle. Therefore, it is known that AB = 12 m and BC = 5 cm. So by using the Pythagoras theorem, we can solve it, which is AC = AB2 + BC2. Then the city will get its oblique side with that oblique side.
P : Why is the use of the formula in solving problem number 2 reduced instead of summer?
SL : The reason asked is that the oblique side is AC based on the image I made. So by the theorem of Pythagoras, the other two sides must be subtracted to obtain the oblique side of a triangle.

Results of Interview Analysis with Subject AH

P : Try AH. Please pay close attention to the number 1 issue. According to AH, how to solve the problem?
AH : In the case of the problem, the length of the thread is known when raising the kite 250 meters. Meanwhile, the child's distance on the ground with the right point under the kite is 70 meters. So to solve the problem, first, we describe the triangle formed from the event of raising the kite. After describing ourselves and filling in what is known in the problem, we can quickly solve the problem. Finally, we use the Pythagoras theorem to solve the problem.

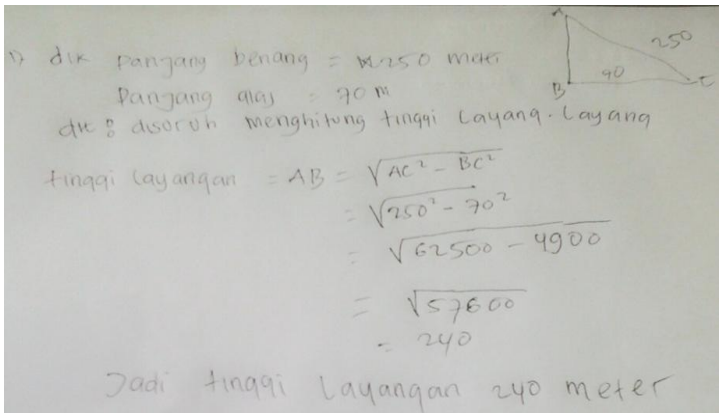

Figure 2. Results of the work of the AH subject in solving the problem

P : Can you please explain how ah got the answer?
AH : As I explained earlier, we first describe the incident of raising the kite. So we use the theorem formula, Pythagoras, to get the answer.
P : Can AH explain in more detail how to get the answer.
AH : So, based on the image data I have made above, it is known that the oblique side of the triangle is 250 meters, and the triangular base is 70 meters. So using the theorem formula Pythagoras obtained, the triangle's height is 240 meters.
P : Why, in the final calculation, you use the theorem formula, Pythagoras, by summing. Why don't you lack it?
AH : The subject is silent and does not answer?
P : Where did you get the value of 62500?
AH : It was obtained from the results of times 250 with 350?
P : Where did you get 4900?
AH : It was obtained from the results of times 70 by 70?
P : Can AH further explain the results obtained regarding the completion of problem number 1?
AH : (The subject is silent and unable to answer the questions presented by the researcher)

Based on the results of the subject's work in solving problem number 1, it can be known that the subject has a fairly good ability and understanding of concepts in solving problem 1. In solving the problem carried out by the subject, the subject can understand the essential ability of the Pythagoras theorem material well and in solving the subject's problem. Before solving the subject's problem, first, the subject tries to understand the problem well and then describes it using a triangle. After that, the subject uses the Pythagoras theorem and then obtains an answer from the triangle's height.

At the time of the interview, the subject seemed to be able to answer some of the questions submitted by the researcher. However, some questions that some subject indicators are silent and cannot express their opinions. This is visible when the subject is asked to give a conclusion based on the results of solving the problem he made. The subject's conclusions have nothing to do with the material being studied. In addition, the subject has not been able to provide further explanations related to the material of the theorem Pythagoras. Based on the interview results, it can be known that the subject in solving the problem meets several indicators of critical thinking ability in the process of completion. This is based on the results of interviews where the subject ah cannot provide answers to questions submitted by researchers.

The critical thinking ability possessed by SL subjects in the problem-solving process is described as follows.

Students can provide simple explanations

The interview results showed that in addition to completing quite well, some of the settlement results could be explained back by the subject to the researcher directly. The subject can explain how to get an answer and obtain the triangle's height based on the results of calculations made by subject AH. If understood further, the subject seems to have a good enough understanding of the problem solved so that the subject can explain it to the researcher simply.

This seems to prove that the subject meets the ability to explain simply, which is one of the indicators of critical thinking ability used in this study. The ability to explain simply can be seen in the following interview excerpts:

P : Can you please explain how ah got the answer?
AH : As I explained earlier, we first describe the incident of raising the kite. So we use the theorem formula, Pythagoras, to get the answer.
P : Can AH explain in more detail how to get the answer.
AH : So, based on the image data I have made above, it is known that the oblique side of the triangle is 250 meters, and the triangular base is 70 meters. So using the theorem formula Pythagoras obtained, the triangle's height is 240 meters.

Students can build basic skills

Based on the interview results above, it can be known that the subject has excellent basic abilities to help the AH subject solve the problem. This can be seen in how to analyze the problems or problems given by researchers during the interview process. In solving the subject problem, first, analyze the things known in the problem and use them to help him solve the problem. With this, the subject can solve the problem, and the results of the subject's work obtain the value of truth and can be accounted for. For more details of the subject's essential ability to solve problems can be seen in the following interview excerpts:

P : It does not matter. Try AH please pay close attention to the number 1 issue. According to AH, how to solve the problem?
AH : In the case of the long thread, when raising a kite 250 meters. Meanwhile, the child's distance on the ground with the right point under the kite is 70 meters. So to solve the problem, first, we describe the triangle formed from the event of raising the kite. After describing ourselves and filling in what is known in the problem, we can easily solve the problem. Finally, we use the Pythagoras theorem to solve the problem.

Students can make conclusions

The ability to make conclusions based on the results of problem-solving work is very important in mathematics learning. Therefore, in the remaining learning process is required to

be able to make conclusions so that the conclusions made later will help students solve other problems. The interview results showed that the interview process conducted by the subject could not complete the interview properly based on the results of his work. The subject makes conclusions without regard to the results of his work and makes conclusions that tend not to be by the problem solved. This can be seen from the following interview excerpts:

P : What is the conclusion of AH's work on solving problem number 1?
AH : The material of the Pythagoras theorem is very important in the learning process.

Students can provide further explanations

Based on the interview results, students cannot provide a follow-up explanation of completing the material they made. This can be seen from the results of the interview conducted. The subject can only give a simple explanation and cannot provide a follow-up explanation of the process of solving the problem.

Interview Analysis Results with RK Subjects

P : According to RK, how to solve the problem?
RK : (The subject fell silent and began to pay attention to the questions given by the researcher). I think the process of solving it on question number 1 uses the theorem formula, Pythagoras.
P : It can be explained more clearly.
RK : (The subject is silent and does not answer the questions presented by the researcher)

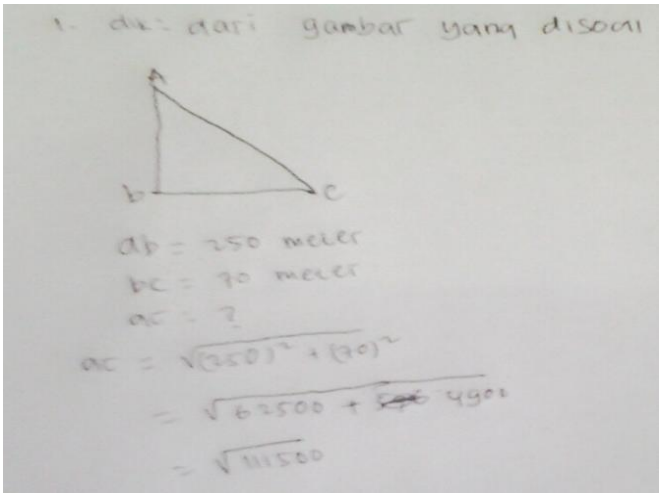

Figure 3. The results of the work of the RK subject in solving the problem

P : Can you please explain how to get the answer?
RK : Known AB = 250 and BC = 70 cm. What is asked is the oblique side. So by using the theorem Pythagoras, we can calculate its oblique side. Then the result is the root of 111500.

P : Where did RK get the value of 111500?
RK : That's the squared result of 250 and 70 summed up.
P : Why is it added up?
RK : Because it is like that, brother.
P : According to RK, what questions are known?
RK : A child raises a kite with a thread that is 250 meters long. The child's distance on the ground with the right point under the kite is 70 meters. The question is how high the kite is.
P : If what is known in the matter of a child raises a kite with a thread that is 250 meters long. Why does RK write it as an AB? According to RK AB, the image made is part of the triangle.
RK : (The subject just fell silent and did not answer)
P : According to RK, BC in the triangle, what does it mean?
RK : (The subject just fell silent and did not answer)

Based on the interview results above, it can be known that in solving the problems of the Pythagoras theorem material, the subject of RK has basic abilities and a fairly good understanding of the material. However, on the other hand, the subject of RK is only limited to having a concept of the Pythagoras theorem and lacking adequate analytical skills. This is shown from the results of interviews that, in general, when asked about his understanding of the theorem, Pythagoras's subject understands the concept. However, there are still errors in solving the problem and analyzing the problem-solving.

When the interview took place, the subject was more silent and unable to answer the questions presented by the researcher during the interview process. When viewed from the situation, the subject AH understood the concept as a result of group learning, so AH was able to solve the problem. However, this understanding is not accompanied by the ability to analyze problems and follow up on the problem-solving process. The subject cannot explain where the answer he obtained and cannot make conclusions based on the results of solving the problem he made.

Based on the interview results, it can be concluded that the subject of RK only meets 1 indicator of critical thinking ability used in this study, namely building a basic ability to solve the material problem of the Pythagoras theorem. However, other indicators are not met. Because the subject cannot explain well the solution of the problem, cannot make conclusions about the results of problem-solving, and is unable to provide further explanations. This is clearly stated in the following interview excerpt:

P : If what is known in the matter of a child raises a kite with a thread that is 250 meters long. Why does RK write it as an AB? According to RK AB, the image made is part of the triangle.
RK : (The subject just fell silent and did not answer)
P : According to RK BC on the triangle, what does it mean?

RK : (The subject just fell silent and did not answer)
P : Can RK conclude that answer?
RK : I'm confused

DISCUSSION

Creative students are in the same position as ordinary learners at home, at school, and in society (Hermond & Tanner, 2020). Nevertheless, they need special help to develop their critical thinking skills because of their creative potential. With the ideal learning approach, the potential of critical thinking can continue to be honed well. The use of appropriate methods is a learning method that places learners as learning subjects so that students can be motivated to carry out learning and develop critical thinking of students in the learning process (Azizah et al., 2018). Because by thinking critically, learners can easily bring problems into the real world, this is also in line with the demands of national education goals that require students to have the ability to think critically to make it easier for themselves to enter society (Riyadhotul et al., 2019). Critical thinking of learners should be fostered early with the habituation of learning that can encourage critical thinking skills (Farib et al., 2019; Noer & Gunowibowo, 2018).

In order for the educational process to assist students, the role of teachers and mentors in schools should recognize students who are creative and critical. By recognizing students who think critically, teachers more easily guide students to develop their creative potential (Boonsathirakul & Kerdsomboon, 2021). The potential of critical thinking will make it easier for teachers to develop students' ability to solve every problem they face because creative students tend to be able to solve every math problem well. The nature of the helping relationship to guide students who can think critically is the same as the relationship for students in general. Ideally, teachers and supervisors know the mechanisms of the creative process and the manifestations of creative behavior (Setiana et al., 2021). This understanding provides great opportunities for teachers and mentors to succeed in assisting the development of creative students (Arisoy & Aybek, 2021).

The process of critical thinking needs to be known and developed early on, as it can affect a person's level of criticality. The ability to think critically is indispensable in everyday life. It can help decipher questions related to mental and spiritual, can be used to evaluate people, policies, and institutions, and solve social problems (Bahatheg, 2019). This study shows that students' critical thinking skills in a class and one group are always diverse. The results showed that of the 3 subjects interviewed, only 1 person, namely SL subjects, met 4

indicators of critical thinking ability used in this study. The master's subject in this study includes students with a high level of critical thinking because he is the only research subject who can solve problems by going through all stages of the critical thinking process, namely explaining, building basic-level abilities, making conclusions, and explaining further. However, not all problems can be solved by going through the four stages of the critical thinking process (Novtiar & Aripin, 2017; Sarıcan et al., 2021).

While the subject ah only meets 2 indicators, it is namely building basic abilities and providing a simple explanation. This is because the subject ah is known based on information from the teacher of mathematics subjects is one of the students in the middle category. In addition, the subject of RK only meets 1 indicator, namely building basic skills in problem-solving.

CONCLUSION

Based on the above research results, it can be concluded that the critical thinking skills possessed by each student vary. From the interviews with 3 subjects, it is known that SL subjects meet 4 indicators of critical thinking skills used in this study, namely providing simple explanations, building basic abilities, making conclusions, and providing advanced explanations. The AH subject meets two indicators: providing simple explanations and building basic skills. While the subject of RK only met one indicator used in this study, namely Building basic capabilities in the problem-solving process.

RECOMMENDATIONS

Based on the above conclusions, there are several things that the author can suggest, namely (1) it is expected for all mathematics teachers always to strive to develop the critical thinking skills of each student to achieve educational goals and also develop the ability to analyze problems owned by students, and (2) students should carry out problem-solving activities in the daily environment in order to always improve their abilities.

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