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Analysis of Critical Thinking Ability of Sixth-Grade Students Primary School

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Abstract: This research is motivated by the importance of critical thinking skills in 21st-century education. The purpose of this study is to determine the critical thinking skills of elementary school students and the factors that can influence it in Sukoharjo 02 Elementary School, Sukoharjo Regency. This study included descriptive qualitative research. The subjects of this study were class VI students who were selected by purposive sampling technique. Data collection is done through observation, interviews, and tests. Data analysis is done by flow analysis. Based on the results of research and discussion, information obtained from 6 of 28 students or about 21% of students whose grades can reach 70, the minimum completeness value 70. The average score of all students is 52. It shows that the students' ability to think critically is still low. Based on several indicators of critical thinking shows the average value of students answering interpretation questions, namely 46.43, analysis of 50.89, inference 65.18, and explanation 45.54. The low average value is caused by several factors, namely: students answer with short answers so the answers become incorrect, there are students' misconceptions because students' understanding from the beginning is wrong, and the most often done by the students is to answer systematically.

Keywords: *critical thinking, elementary school, misconceptions*

INTRODUCTION

The learning process in the 21st century must grow the 4 (four) skills of the students. One of the four skills is critical thinking skills. Zivkovic (2016) reveals that 21st-century students need high-level thinking skills to deal with every real-world problem that involves them in high-level thinking. An ability that requires students to solve a problem based on information or knowledge they have obtained before.

According to Kirmizi et al. (2015), Critical thinking is a short mental process that aims to understand the world by using existing student knowledge. Students will use their knowledge in solving the problems they face in their daily lives. Ay et al. (2015) revealed that students who think critically will be able to think realistically. They will also be able to provide solutive and realistic answers to questions given by the teacher.

Annuuru et al. (2017) argue that students who think critically will think at the reasoning stage which is to be able to understand information or lessons in school, but also be able to use the knowledge they get into everyday life. Besides, there are 6 (six) indicators of students' critical thinking skills according to Martincova & Lukesova (2015), namely: interpretation, analysis, evaluation, inference, concluding, and self-regulation.

The high level of thinking ability of students in Indonesia is still relatively low. This was based on the results of the study of international institutions from the Program for International Student Assessment (PISA), in 2012 with the theme "Evaluating School Systems to Improve Education" which was ranked 64th out of 65 countries (Mustajab et al., 2018). In 2015, Indonesia ranked at 62nd for Science, 63rd for Mathematics, and 64th for Reading from 70 countries (OECD, 2016). The initial observation conducted by Sanderayanti (2015) showed that based on the results of the analysis of critical thinking skills in fifth-grade students in Beji 6

Public Elementary School was still low. Pure grade increased test with an average of 63.60. A total of 43.3% of students completed and the remaining 56.7% had not yet completed the specified KKM, which was 70.

The low level of critical thinking skills of students will hurt education at the next level if it's not handled at the right way. Students will be passive in r forward-thinking and not being able to analyze the answers logically. This is in line with the opinion of Cojocariu & Butnaru (2014) which states that students with critical thinking are active thinkers, answer questions to understand, look for answers and solutions, support their answers with arguments, interpret, logically analyze and evaluate other people's arguments. Henita et al. (2019) added that the low critical thinking skills of students will have an impact on students to study and solve problems systematically, face various challenges in an organized way, formulate innovative questions, and design original solutions, as well as elaboration. So to overcome the above problems, according to Hidayati (2017), a scientific approach and also a solution to a problem based learning in learning are needed to encourage students to think critically.

METHOD

This research is qualitative research with a descriptive study method because it is by the nature of the problem and the purpose of the research to be obtained. Sugiyono (2016) explains that the descriptive method aims to describe or give a description of an object of research through collected samples or data and make generally accepted conclusions. The object of this study is 28 sixth grade students at SDN Sukoharjo 02, Sukoharjo District, Sukoharjo, Central Java. The selection of the object of this study uses a purposive sampling technique. Purposive sampling is a sampling technique of research sources with certain considerations (Sugiyono, 2016). The reason the researchers researched Sukoharjo 02 Elementary School because this school is the main school and academic achievement-oriented students. This school is located in the middle of the city and is often referred to as "*SD Center (SDC*)". The school is headed by the principal, who is currently chairman of the Working Group Principal (KKKS) Sukoharjo. Furthermore, principals, teachers, and students easily give permission and actively participate in research activities.

Data is collected through observation, interviews, and tests. Observation is carried out when the learning process takes place in the classroom. Interviews are conducted with teachers and students as sources of information. Tests that are tested are by the applicable curriculum and accompanied by scales and scoring guidelines. The test consists of six questions with an open form that aims to explore students' answers to the widest extent possible and assess their critical thinking skills. For this study, four of the six questions were taken, each of which represented an indicator of critical thinking skills. As for the guideline for scoring tests, the range of scores for each question is 1 to 4. Students will get a score of 4 if they can answer correctly, completely, and systematically. They will get score 3, if they can answer correctly and completely. They will get score 2, if they can only answer correctly. They will gwt score 1, if they answer but are not right. Data validation techniques use triangulation on methods, sources, and theories. According to Sugiyono (2016) in the technique of data collection, triangulation is defined as a technique of collecting data that is combining the various techniques of collecting data and existing data sources. Furthermore for data analysis using flow models with the following processes: data reduction, data presentation, and concluding. This process is interrelated and ongoing until the process and data collection is complete.

RESULTS AND DISCUSSION

The indicator of critical thinking skills measured in this study is the ability to interpret, analyze, conclude, and explain. The test given refers to the grid and scoring guidelines, and the minimum completeness criteria (KKM) set by the school are 70. The test results of the students' critical thinking skills, can be seen in Table 1.

Table 1. Student Critical Thinking Ability Test Results

No.	Value Interval	Frequency	Information
1	25 – 33	8	not pass
2	34 – 42	1	not pass
3	43 – 51	2	not pass
4	52 – 60	8	not pass
5	61 – 69	3	not pass
6	70 – 78	5	pass
7	79 – 87	1	pass
The number of students		28	
Amount of Value		1456.25	
Class Average		52.009	
Number of Students Passing		6	
Number of Students Not Passed		22	

Based on the analysis of table 1, the average value of students is still less than the KKM of class VI which is 70. The average score of students is only 52.00 and there are 6 out of 28 students or around 21.43% who complete KKM. This number is very small compared to 22 students who did not complete KKM or around 78.57%. It shows that the critical thinking skills of class VI students of Sukoharjo 02 Elementary School 02 are still relatively low.

Table 2. Student Scores for Each Indicator of Critical Thinking Ability

Indicator	Number of Students in the Score				Total score	Average Value
	1	2	3	4		
Interpretation	9	14	5	-	52	46.43
Analysis	8	11	9	-	57	50.89
Inference	3	8	14	3	73	65.18
Explanation	9	15	4	-	51	45.54

Based on Table 2, more detailed data regarding the value of students in each indicator of critical thinking ability was obtained. Inference indicators are indicators with the highest average value of 65.18. This indicator scores above the average student score of 52, but is still below the KKM value. The analysis indicators are at the second place with an average of 50.89. The interpretation indicator is at the third place with an average value of 46.43. While the explanatory indicators are at the lowest place with the average value of 45.54. The average score on the indicators of analysis, interpretation, and explanation is still low compared to the average value of students in general and below the KKM value.

In the interpretation indicator, students are expected to be able to sort information, decode, and evaluate the importance of information. Besides, students are expected to be able to

determine the meaning of the information they obtain based on data, experiences, judgments, beliefs, rules, procedures, and criteria. To measure the indicator of interpretation, a problem is presented with reading about the special characteristics of living things and the way living beings adapt to their environment. Then students must explain some of the terms in the reading (eg nocturnal, echolocation, autotomy, mimicry, etc.) correctly.

Interpretation Questions:

Bats are one animal that has several features. The only mammal that can fly. The way they sleep is unique, the head is under and the feet are hanging up and are nocturnal. Echolocation becomes special when doing activities at night.

Based on the above reading, explain the meaning of the word nocturnal and echolocation!

On a question that measures the interpretation ability above, some students have been able to explain the meaning of a word correctly. But most students' answers are less precise in explaining their meaning. Many of them answered by explaining the meaning briefly but according to what was intended, answering by rewriting the question, and answering correctly but the wording in the sentence of the answer was not systematic.

Student answers that get the maximum score:

Nocturnal animals are active at night and sleep during the day. Echolocation is the ability of bats to see their location and prey in the dark.

Student answers that get a minimum score:

Nocturnal is an animal that can fly. Echolocation is to find a location.

In the indicator analysis students are expected to be able to solve problems and decide on the main arguments from the text. Students can identify intentions and conclusions that are correct in the relationship between statements, questions, concepts, descriptions, or forms of statements intended to use a belief, judgment, experience, reason, information or opinion. To measure indicators of analysis, a problem is presented with reading about a case about the adaptation of living things to their environment. Students are required to analyze the reasons why the events presented in the reading can occur correctly.

Analysis Questions:

At the end of the holiday, Davin visited the zoo. There, he saw several crocodiles, not in the water. They bask in the hot sun while opening their mouths. The crocodiles are silent for a long time. When Davin moved away, the crocodiles are remain silent.

Based on these readings, explain why crocodiles are doing this activity!

On the analysis indicator, there are several readings on the problem. Some students can understand the problem well. But they have not been able to systematically write down the answers to the results of the analysis. Most actually write answers that are not right because they are wrong in analyzing the problem. Most students' errors are caused by misconceptions if the mouth is always related to the digestive system, misidentifying the cause of the event, answering not systematically. Misconceptions occur because crocodiles open their mouths associated with the digestive system of crocodiles or crocodiles while hungry. As for the other answers, crocodiles bask because crocodiles feel cold when they are in the water. The following is a comparison between students who get the maximum score and minimum score.

Student answers that get the maximum score:

Crocodiles bask under the hot sun to adjust their body temperature. Crocodiles are animals that have cold blood.

Student's answer gets the minimum score:

Crocodiles bask because they are cold in the water. The crocodile opens its mouth because it is hungry.

In the matter of inference, students are expected to identify the facts or information needed in making a conclusion on a problem rational and consider it in making a hypothesis. To measure the inference ability, a question is presented in the form of an interview text about the ability to live things to adapt to their environment, then students answer the questions by concluding the interview text in the question correctly.

Inference Questions:

Pay attention to the following dialog!

Khalfa, Zaki, and Asyan were given the task of interviewing zoo officials about the form of animal adaptation to their environment.

Khalfa: "Good afternoon, ma'am! We are from SD Jati Indah, we want to ask for permission to interview you about the form of animal adaptation to the environment. "

Zoo keeper: "Of course, I will be happy to explain."

Khalfa: "Currently we are in the reptile zone, ma'am? What animals are in this zone, ma'am? "

Zoo keeper: "Yes, you are in the reptile zone. In this reptile zone, you will find various types of snakes, turtles, chameleons, lizards, and crocodiles. "

Zaki: "Wow, there are so many reptile animals. Why are they called reptile animals, ma'am?

Zoo keeper: "A good question, reptiles in Latin means creeping or crawling. This animal is covered with scales and cold-blooded. Cold blood means that the reptile's animal body temperature will adjust to the temperature in its environment. "

(They listened to the explanation from the zoo officer while walking around.)

Asyan: "Ma'am, are we in a snake special room?"

Zoo keeper: "Right, dear"

Asyan: "Please give us an example of snake adjustment form to the environment, ma'am?

Zoo keeper: "Snakes will bite and some of them will emit or poison when they feel threatened. Including human threats from humans. If someone is bitten by a poisonous snake, then the thing to do is to stay calm and minimize movement. Put bite wounds lower than other body positions. Besides, clean the bite wound and do not rinse with water. The most important thing that must be done is to seek medical help. Do you understand? "

Khalfa et al: "Yes ma'am, thank you."

Based on the interview te r call, explain how the treatment of persons bitten by a rattlesnake?

In the inference indicator, some students have answered correctly and systematically. Most students answer correctly but not systematically, they summarize the actual answers in the reading. Even though the answers asked in the questions are students to conclude not to summarize. The difference in the students' answers that gets the maximum score and students who get the minimum score is as follows:

Students' answers that get the maximum score:

If someone is bitten by a poisonous snake, then the thing to do is to stay calm and minimize movement. Put bite wounds lower than other body positions. Besides, clean the bite wound and do not rinse it with water. The most important thing that must be done is to seek medical help.

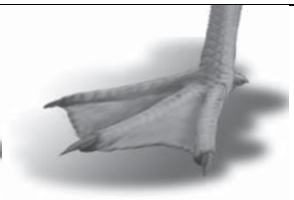
Student answers that get a minimum score:

Keep calm and take it to the doctor or hospital.

The explanation indicator is that students can present the results of their reasoning that are reasonable and convincing. This ability will be seen when students can justify a statement based on evidence, concepts, and a logical criterion in data or information. Explanatory indicators are measured using questions that display an observation of the shape of the feet, beak, and animal

food. Then students are asked to explain the results of these observations and the relationship between the shape of the feet, beak, and animal food.

Explanation questions:

Animal	Half Form	Leg Shape	Food
Duck			Worm
Chicken			Grains, caterpillars, worms, etc.
Sparrows			Grains
Eagle			Meat

Based on these observations, explain the relationship between the shape of the beak and the legs of the animals above with the food!

On questions that measure explanatory indicators, mistakes made by students include: students only mention the shape of the beak and legs; name the animals and the food only; mention the beak shape, foot shape, and animal food; students did not explain the relationship between the shape of the beak and the legs of the animal against the food. The comparison of the answers of students who get the maximum score and students who get the minimum score is as follows:

Student answers that receive a maximum score:

Duck: flat and wide beak, webbed feet, food of worms and fish.

Chicken: the beak is sharp, the foot has 4 fingers, the food is grains, caterpillars, and worms. Sparrows: the beak is short, the toes are small and long, the food is grain.

Eagle: the beak is pointed, the toes have sharp nails, the food is meat.

Student answers that get a minimum score:

Ducks eat worms, chickens eat seeds, sparrows eat grains, eagles eat meat.

Based on the analysis of students' answers about the critical thinking skills above, it can be concluded that there are some students' errors in answering questions that ask students to think critically. The first error analysis is students do not understand the open fields that ask students to think critically. It is because teachers seldom provide about stuffing open and more likely to provide many choice questions and short answers stuffing request. This is supported by the results of a study from Husnah (2017) which states that teaching and learning activities of

students are only given theories and how to solve questions without directing students to solve problems in daily life.

The results of interviews conducted with VI-grade teachers of SD N Sukoharjo 02 also stated, "I often give tests of multiple-choice questions and fill with short answers, sir. This kind of question makes it easier for me to make corrections and analysis of test results ". The teacher also stated that the repetition with multiple choice questions and entries had also become valid because it was right to measure the material to be measured. The teacher states, "Multiple choice questions or important descriptions of the question are valid". The teacher's opinion is also right because one of the requirements of the test is valid. A test which is said to be good must have validity, reliability, objectivity, practice, and economics (Arikunto, 2016). However, it would be better if the teacher gives a question that asks students to think higher or think critically. We recommend that the questions to be given to measure students' abilities need to be tested for quality first (Amelia, 2016).

The second analysis of student errors is that students are less creative in answering and tend to answer briefly. This is done by students because they have difficulty to describe their answers. At the time of the interview, the students said, "I find it difficult to answer what, the teacher never gave a difficult question like this". Was followed with the results of interviews and observations from Inggriyani & Fazriyah (2017) which states that students are still having difficulty in determining the right opinion in answering questions that require students to think critically, the obstacles most students face on analyzing indicators. In addition to being less creative, students' answers are also not systematic in the answers to questions about open descriptions. It was followed with the results of the study by Azizah et al. (2018) on Indicators of Critical Thinking Ability (IKBK) problem solving, students with high categories mean students have written how to work, but the steps have not been systematic or not in order. While the low category students only write a small part of the problem-solving strategy, or not complete writing how to work.

The third analysis of student errors in the students' misconception. Misconceptions occur because students have brought their knowledge before they get it at school. So, between common knowledge and theoretical concepts that students receive at school are often not synchronous (ariyastuti & Yuliawati, 2017). This will impact upon the students in answering questions analysis. Students will analyze the problem according to the initial knowledge students have which is not necessarily right. As with the analysis questions given, students who answered incorrectly when interviewed said, "I think the crocodile opened his mouth because he was hungry".

Misconceptions in students are caused by several factors. Broadly speaking, the causes of misconception can be summarized in five groups, namely: students, teachers, textbooks, contexts, and teaching methods (Munawaroh & Falahi, 2016). Factors from students are caused by the low interest of students in following the learning process. This is in agreement with the results of Wahyuningsih (2016) study which states that the factors causing misconceptions experienced by students are the lack of interest in student learning. The teacher factor is because the learning process carried out by the teacher is still conventional. According to Rahmah et al. (2017), students have difficulty to understand the concept of science because learning carried out by teachers is still informative and does not provide natural science experiences directly to students. Based on observations, teachers in the classroom more often use the lecture method and less encourage students to be active in the learning process.

The cause of misconception in students is also caused by the teacher. Based on the classroom observation, teachers and students were seen to use one book, a p tan no other companion

books. This was confirmed by the results of interviews with teachers who stated that "Class VI is currently only using the 2013 curriculum so that the books are still limited". The lack of this companion book causes student knowledge to be narrow because it is only driven by one book. Besides, based on observations during learning, the teacher also does not use learning media related to teaching material. When it was confirmed, the teacher said, "I did not use learning media because I was confused about what media to use for teaching this material".

To reduce misconception, the students need some things that must be done by the teacher. One of them is by conducting a creative and innovative learning process with methods that make students active in the learning process. According to Suniati et al. (2013) stated that the decrease in students 'misconceptions participating in interactive multimedia assisted contextual learning was greater than the proportion of students' decrease in misconception who followed conventional learning. Whereas according to Alfisyahrina (2015) which states that the PBL Model is effective for overcoming students' misconceptions.

The use of appropriate learning media can also reduce the misconceptions that occur in students. This is in line with the conclusions of the results of a study conducted by Silaban et al. (2017) which states that the application of virtual simulation media on the Elicit, Confront, Identify, Resolve, Reinforce (ECIRR) learning models can remedy the misconceptions experienced by students and can also filter out new misconceptions. Simple media even if combined with the right learning model will also succeed in reducing student misconceptions. According to Allo et al. (2015) concluded that the guided discovery learning model using simple tools developed had met the criteria of validity, practicality, and effectiveness so that it was appropriate to be used to reduce student misconceptions.

CONCLUSION

Based on the analysis of the results of the research and discussion, it can be concluded that there were 6 out of 28 students or around 21.43% who completed the KKM. There were 22 students or around 78.57% who did not complete KKM. The average score of students is only 52. There is also no average value in each indicator of critical thinking that exceeds the KKM, including the average value on the inference indicator, which is only 65.18 which is an indicator with the highest average value. It shows that the critical thinking skills of class VI students of Sukoharjo 02 Elementary School are still very low.

The low value of students' ability to think critically is caused by several factors, including students' answer with short answers so that answers become incorrect, students' misconceptions, especially students' understanding from the beginning is wrong, and the most often done by students is to answer systematically. It is caused by Students who rarely work on open form questions because teachers often give multiple-choice questions and short entries, learning models applied by teachers tend to be less innovative and do not involve active students in the learning process, and the absence of learning media used during the learning process.

REFERENCES

Alfisyahrina, F., Djudin, T., & Mursyid, S. (2015). Remediasi Miskonsepsi Siswa Pada Materi Suhu dan Kalor Menggunakan Model PBL di MAN. *Jurnal Pendidikan dan Pembelajaran, 5*(1), 1-12.

Allo, A. Y., Jatmiko , B., & Agustini, R. (2015). Pengembangan Perangkat Pembelajaran Fisika Model Guided Discovery Learning Menggunakan Alat Sederhana Untuk Mereduksi

Miskonsepsi Siswa SMA Pada Materi Fluida Statis. *Pendidikan Sains Pascasarjana Universitas Negeri Surabaya, 5*(1), 769-778.

Amelia, M. A. (2016). Analisis Soal Tes Hasil Belajar High Order Thinking Skills (Hots) Matematika Materi Pecahan Untuk Kelas 5 Sekolah Dasar. *Jurnal Penelitian (Edisi Khusus PGSD), 20*(2), 130.

Annuuru, T. A., Johan, R. C., & Ali, M. (2017). Peningkatan Kemampuan Berpikir Tingkat Tinggi Dalam Pelajaran Ilmu Pengetahuan Alam Siswa Sekolah Dasar Melalui Model Pembelajaran Treffinger. Edutcehnologia. *EDUTCEHNOLOGIA, 3*(2), 136-144.

Arikunto, S. (2016). *Dasar-Dasar Evaluasi Pendidikan.* Jakarta: PT Bumi Aksara.

ariyastuti, Y., & Yuliawati, F. (2017). Identifikasi Miskonsepsi IPA Menggunakan Soal Esai Bagi Siswa Cerdas Istimewa Di Sd Muhammadiyah Condongcatur Sleman. *Jurnal JPSD (Jurnal Pendidikan Sekolah Dasar), 4*(1), 27-37. doi: http://dx.doi.org/10.26555/jpsd

Ay, F. A., Karakaya, A., & Yilmaz, K. (2015). Relations Between Self-Leadership And Critical Thinking Skills. *Social and Behavioral Sciences, 207*, 29-41. doi: 10.1016/j.sbspro.2015.10.147

Azizah, M., Sulianto, J., & Cintang, N. (2018). Analisis Keterampilan Berpikir Kritis Siswa Sekolah Dasar pada Pembelajaran Matematika Kurikulum 2013. *Jurnal Penelitian Pendidikan, 35*(1), 61-70.

Cojocariu, V. M., & Butnaru, C. E. (2014). Asking questions - critical thinking tools. *Social and Behavioral Science, 128*, 22–28. doi: HYPERLINK "https://doi.org/10.1016/j.sbspro.2014.03.112" \o "Persistent link using digital object identifier" \t "_blank" 10.1016/j.sbspro.2014.03.112 .

Henita, Mashuri, & Margana. (2019). Penerapan Model Problem Based Learning untuk Meningkatkan Kemampuan Berpikir Kritis Matematis dan Rasa Ingin Tahu Siswa Kelas XII IPA 2 SMAN 5 Semarang. *PRISMA, Prosiding Seminar Nasional Matematika* (hal. 80). Semarang: Jurusan Matematika, Universitas Negeri Semarang.

Hidayati, A. U. (2017). Melatih Keterampilan Berpikir Tingkat Tinggi Dalam Pembelajaran Matematika Pada Siswa Sekolah Dasar. *Jurnal Pendidikan dan Pembelajaran Dasar, 4*(2), 155.

Husnah, M. (2017). Hubungan Tingkat Berpikir Kritis Terhadap Hasil Belajar Fisika Siswa dengan Menerapkan Model Pembelajaran Problem Based Learning. *Journal of Physics and Science Learning (PASCAL), 1*(2), 10.

Inggriyani, F., & Fazriyah, N. (2017). Analisis Kemampuan Berpikir Kritis Siswa dalam Pembelajaran Menulis Narasi di Sekolah Dasar. *Jurnal Pendidikan Dasar*, 105-116. doi: doi.org/10.21009/JPD.092.04.

Kirmizi, F. S., Saygi, C., & Yurdakal, I. H. (2015). Determine The Relationship Betwen The Disposition of Critical Thinking and The Perception About Problem Solving Skills. *Social and Behavioral Sciences, 191*, 657-661. doi: 10.1016/j.sbspro.2015.04.719.

Martincova, J., & Lukesova, M. (2015). Critical Thinking as a Tool for Managing Intercultural Conflicts. *Social and Behavioral Sciences, 171*, 1255 –1264. doi: 10.1016/j.sbspro.2015.01.239.

Munawaroh, F., & Falahi, M. D. (2016). Identifikasi Miskonsepsi Siswa SDN Kemayoran I Bangkalan pada Konsep Cahaya Menggunakan CRI (Certainty Of Response Index). *Jurnal Pena Sains, 3*(1), 69-76.

Mustajab, W., Senen, S. H., & Waspada, I. (2018). Analisis Kemampuan Berpikir Kritis Siswa SMA pada Materi Koperasi. *Jurnal Kajian Pendidikan Ekonomi dan Ilmu Ekonomi, 2*(1), 53.

OECD. (2016). *Programme For International Student (PISA) Result From PISA 2015*. BPS.

Rahmah, S., Yuliati, L., & Irawan, B. (2017). Penguasaan Konsep IPA Pada Siswa Sekolah Dasar. *PS2DMP ULM. 2*, hal. 35-40. Malang: PS2DMP ULM.

Sanderayanti, D. (2015). Pengaruh Motivasi Berprestasi dan Kemampuan Berpikir Kritis Terhadap Hasil Belajar Matematika Siswa di SDN Kota Depok. *Jurnal Pendidikan Dasar, 6*(2), 222-231. https://doi.org/10.21009/JPD.062.04.

Silaban, S. S., Suhandi, A., & Gunanto, Y. E. (2017). Aplikasi Media Simulasi Virtual pada Model Pembelajaran ECIRR untuk Meremediasi Miskonsepsi Siswa pada Materi Perubahan Wujud Zat. *Prosiding SNFA (Seminar Nasional Fisika dan Aplikasinya)* (hal. 201-213). Bandung: Prosiding SNFA (Seminar Nasional Fisika dan Aplikasinya).

Sugiyono. (2016). *Memahami Penelitian Kualitatif.* Bandung: PT Alfabeta.

Suniati, N. M., Sadia, W., & Suhandar, A. (2013). Pengaruh Implementasi Pembelajaran Kontekstual Berbantuan Multimedia Interaktif Tehadap Penurunan Miskonsepsi. *e-Journal Program Pascasarjana Universitas Pendidikan Ganesha, 4*, 1-13. doi: HYPERLINK "https://doi.org/10.23887/japi.v4i1.1019" 10.23887/japi.v4i1.1019 .

Wahyuningsih, E. (2016). Identifikasi Miskonsepsi IPA Siswa Kelas V Di SD Kanisius Beji Tahun Pelajaran 2015/2016. *Jurnal Pendidikan Guru Sekolah Dasar*, 115-122.

Zivkovic, S. (2016). A Model of Critical Thinking as an Important Attribute for Success in the 21st Century. *Procedia - Social and Behavioral Sciences, 232*, 102-108. doi: 10.1016/j.sbspro.2016.10.034.