THE EFFECT OF AUDIO VISUAL BASED PROBLEM BASED LEARNING ON CRITICAL THINKING ABILITY OF ELEMENTARY STUDENTS

Anita Rachman Ainur Rofiqoh[1*], Meirza Nanda Faradita[2], Kunti Dian Ayu Afiani[3]

[1,2,3] Universitas Muhammadiyah Surabaya
[1] anita.rachman.ainur-2019@fkip.um-surabaya

Abstract

The purpose of this research is to: 1) determine the average pretest score students before using the audio-visual-based problem-based learning model, 2) knowing the average posttest of students after using the audio-visual-based problem-based learning model, 3) knowing the effect of audio-visual-based problem-based learning on the critical thinking skills of fifth grade elementary school students in subjects Science at MI Muhammadiyah 5 Surabaya. This study used a quantitative research approach and the type of research used was Pre-Experimental research . The design used by the researcher is the One Group Pretest-Posttest Design with one class as the research subject. The data analysis technique in this study was the normality test and the one sample test using the one sample test method with the help of SPSS. The results of the study: 1) the average critical thinking ability of students before using the audio-visual-based problem-based learning model is 57.50. 2) the average critical thinking ability of students after using the audio-visual-based problem-based learning model is 88.43. 3) the results of the one sample T-test data analysis using the one sample T technique show a significance value of <0.05, which is 0.000. The conclusion of this research is that learning using problem-based learning based on audio-visual models can improve elementary students' critical thinking skills.

Keywords: audio visual; problem based learning; critical thinking ability

Abstrak

Tujuan dari penelitian ini adalah untuk: 1) mengetahui rata-rata nilai pretest siswa sebelum menggunakan model pembelajaran berbasis masalah berbasis audio visual, 2) mengetahui rata-rata nilai posttest siswa setelah menggunakan model pembelajaran berbasis masalah berbasis audio visual, 3) mengetahui pengaruh pembelajaran berbasis masalah berbasis audio visual terhadap kemampuan berpikir kritis siswa kelas V SD pada mata pelajaran IPA di MI Muhammadiyah 5 Surabaya. Penelitian ini menggunakan pendekatan penelitian kuantitatif dan jenis penelitian yang digunakan adalah penelitian Pre-Experimental. Desain yang digunakan oleh peneliti adalah One Group Pretest-Posttest Design dengan satu kelas sebagai subjek penelitian. Teknik analisis data pada penelitian ini adalah uji normalitas dan uji beda menggunakan metode one sample t-test dengan bantuan SPSS. Hasil penelitian: 1) rata-rata kemampuan berpikir kritis siswa sebelum menggunakan model pembelajaran berbasis masalah berbasis audio visual adalah 57,50. 2) rata-rata kemampuan berpikir kritis siswa setelah menggunakan model pembelajaran berbasis masalah berbasis audio visual adalah 88,43. 3) hasil analisis data uji-t satu sampel dengan menggunakan teknik one sample T-test menunjukkan nilai signifikansi < 0,05 yaitu 0,000. Kesimpulan dari penelitian ini adalah pembelajaran dengan menggunakan model pembelajaran berbasis masalah berbasis audio visual dapat meningkatkan kemampuan berpikir kritis siswa SD.

Kata Kunci: audio visual; kemampuan berpikir kritis; pembelajaran berbasis masalah

Introduction

Education is a conscious and planned effort to create a learning process and learning atmosphere (Purbarani et al., 2018) . Education is also an integral process that links aspects such as learning objectives, educators, students, learning equipment, and the environment (Mirnawati, 2017) . Education can also be interpreted as a very important process of activity in human life, because in essence it is an effort to educate and glorify humans (Afiani & Faradita, 2022) . Ki Hajar Dewantara argues that the purpose of education is self-mastery because humans have spiritual powers, namely creativity, initiative, and the ability to work (Indrayani et al., 2023) . To meet these needs, the education process requires attention, processing and priority by the government, society and education providers. One of the organizers of formal education is school education. School education, especially elementary school education, plays an important role as a foundation or knowledge base and as a basis for character formation as capital for continuing education to the next stage.

Education for these 3 years since the outbreak of Covid-19 has become unstable. The government issued a lockdown order requiring students to study at home (Suyadi & Selvi, 2022) . This resulted in a decline in education because students did not receive material directly from the teacher (Alsubaie, 2022) . So that students cannot learn directly, even though there are several subjects that require students to know directly. Especially in science subjects, where the learning process relates to the environment and everyday life.

Natural Science (IPA) is one of the subjects related to students' daily lives (Ariani, 2020) . In everyday life science is really needed to meet human needs by solving identifiable problems. Science is also one of the disciplines that make a major contribution to life. Science education is closely related to learning through concrete objects and through real experiences, so it is important for educators to pay attention to how to really instill the science concept so that there are no student mistakes when understanding the science concept (Faradita, 2019) . In the competency-based curriculum era, Natural Sciences (IPA) subjects in Elementary Schools (SD) are expected to focus more on science, environment, technology and society according to Permendiknas No. 22 : 484 in (Ariani, 2020) . In this modern era, both educators and students will be faced with the challenges of globalization. This era is marked by the development of abilities possessed by humans (Lemay et al., 2021) . Therefore, in order to be ready to face this challenge, humans are not only equipped with basic knowledge but also equipped with how to manage the environment, natural resources, human resources, think critically and creatively. Based on the explanation above, it can be concluded that Natural Sciences (IPA) is a very important subject because each material is always related to problems in everyday life. Therefore learning science at the elementary level needs to be expanded and packaged in an attractive way so that students are enthusiastic about participating in science learning (Rahmayanti et al., 2020) .

Learning is formulated by Slameto as a process in which individuals make changes to new behavior as a whole which is the result of individual experiences in interacting with the environment (Istiqlal, 2017) . Meanwhile, according to Surya learning is a person's process of obtaining a new change in overall behavior which is the result of his own experience in interacting with the environment (Istiqlal, 2017) . From the understanding of the two experts, it can be concluded that learning is a process in which teachers and students acquire knowledge through various learning methods or models that can be used as a medium to achieve learning goals (Kartono et al., 2019) .

During the learning process, success is always assessed. The success of learning, especially in science learning, cannot be separated from the supporting components of the

learning process in the classroom, namely teachers, students, and learning media. The roles of these three components enable effective learning in the classroom. In addition, the use of appropriate learning media will also attract students' learning interest and make the learning process effective. Learning Media is anything that can distribute information effectively and efficiently in a learning activity (Istiqlal, 2017) . In addition, learning media has the ability to provide the same stimulation, equal experiences, and produce the same perceptions. The purpose of learning media is to increase interaction between students and the learning environment in learning science. In addition, learning media also has a function, namely as a teaching aid, assisting teachers in using appropriate teaching methods. Selection of appropriate learning media can achieve learning objectives. One of the technology-based learning media that can be used for science learning is audio-visual media. Audio Visual Media is a combination of audio and visual media combined with audio tapes or sound elements and the same images as video recordings, sound slides, and others (Utami et al., 2019) . Audio Visual media is media that shows elements of hearing and vision that can be seen and heard by voice (Vera & Wardani, 2018) . There is Audio-visual based learning media is expected to make students focus on learning, and by displaying animated videos it is hoped that students will not get bored because students can immediately see and hear the material being played by the teacher (Prayekti & Utomo, 2018) . In learning, educators play an important role in helping students solve problems, so educators must encourage students to play an active role in the learning process and think critically. But in reality, many teachers do not create fun and innovative learning.

Based on observations at MI Muhammadiyah 5 Surabaya in Science Subjects, several problems were found in learning, including the science learning process which still uses the lecture method. Where the use of the lecture method is less attractive to current students. In schools there are also LCDs but teachers do not use them properly, so technological developments are not used and utilized properly. The teacher also never gives students questions and answers regarding questions that contain cognitive levels 4-6 (HOTS). So that it cannot make students think critically and relate material to everyday life.   Therefore,   to support the success of learning, an appropriate learning model is needed to develop critical thinking attitudes in students. The learning model is a framework for describing systematic procedures and organizing teaching and learning activities to achieve certain goals and serves as a guide in planning and implementing teaching and learning activities (Mirnawati et al., 2020) . One of them is by using the problem-based learning model or problem-based learning (Ssemugenyi, 2023) .

Problem Based Learning is learning that occurs by asking questions, starting dialogues, and facilitating investigations (Cahyo & Prasetyo, 2020) . According to the Shoimin Problem Based Learning model, it also conveys a learning model that allows students to learn critical thinking and problem solving skills and acquire knowledge in the context of real problems (Kadek et al., 2022) . Winangun, et al also argue that Problem Based Learning provides the best achievement between problem solving skills and students' critical thinking (Kadek et al., 2022) . Based on the above perspective, the problem based learning model is a kind of motivation based on problem solving practices that encourage students to apply what they have learned and solve problems by thinking critically. Using problem based learning to develop critical thinking skills must be based on the PBL syntax, namely: 1) Orientation to student problems, 2) Organizing students for learning, 3) Directing individual/group investigations, 4) Developing and presenting works, 5) Analyzing and evaluate problem-

solving processes (Herzon et al., 2018) . Students who are oriented towards a problem will find relevant solutions because they practice critical thinking independently.

The process of critical thinking is needed during the learning process in addition to stimulating students' thinking, critical thinking can also hone student activity (Mari či ć & Špijunovi ć , 2015) . Critical thinking is a skill that is very meaningful and plays an efficient role in all aspects of life. Therefore, the ability to think critically is very important and must be instilled from an early age, either at school, at home, or in society. To achieve the best results in the educational process, active thinking is needed, meaning that the maximum learning process requires critical thinking from students (Gheorghe, 2021) . Therefore, critical thinking is very meaningful in the process of learning activities. Critical thinking indicators in this study, namely: 1) finding information, 2) concluding the information that has been obtained, 3) analyzing, 4) describing the stages of information that is already known, 5) linking the topic with everyday life.

From the research conducted (Utami et al., 2019) it can be concluded that the Problem Based Learning (PBL) Learning Model can improve students' critical thinking skills and learning outcomes of 5th grade students at SD Negeri Pagersari 01. This research is different from this research where the research was conducted Utami, et al used a CAR research with repeated phases, while this study used a quantitative research approach to collect data in the form of a pretest and posttest . Similar research was conducted by (Nurkhasanah et al., 2019) , but the difference between this research and this research is that research conducted by Nurkhasanah, et al used 2 cycles to determine the effect of problem based learning on critical thinking skills, whereas in this study pretest and posttest used to determine the impact of problem based learning on critical thinking skills of elementary school students.

Based on existing problems that can encourage critical thinking in students, researchers usually only rely on pretest questions . However, what makes this article different is that researchers want to make updates through audio-visual learning to develop students' critical thinking attitudes. Therefore, the researcher identified the goals to be achieved according to the title, namely: 1) determine the average pretest scores of students before using the problem- based model audio-visual based learning , 2) determine the average posttest scores of students after using the problem based model audio-visual based learning , 3) to determine the effect of problem based learning audio-visual based learning on the critical thinking skills of MI Muhammadiyah 5 Surabaya students in class V science subjects.

Research Methods

This study uses quantitative research methods with a type of research called Pre-Experimental research. The Experimental Method is a research method used to study the effect of certain treatments on other treatments under controlled conditions Sugiyono, (2018) . From this perspective , it can be seen that experimental research is always carried out by giving research subjects and observing their effects. The design used by the researcher is the One Group Pretest-Posttest Design with one class as the research subject. The design plan in this study is as follows:

$$\boxed{O_1 \; X \; O_2}$$

Information:
O1   : Pretest value (before being given treatment)
O2   : Posttest value (after being given treatment)
O2–O1: Influence on the given treatment

This research was conducted at MI Muhammadiyah 5 Surabaya which is located at Jalan Jojoran I No.77 Surabaya. Population is a domain consisting of objects/subjects where research evidence is basically self-evident, then conclusions are drawn and used as data sources in Darmadi Hamid's research, (2013) . The population of this study consisted of all grade 5 students A, B, C, and D with a total of 100 students. The sample is part of the quantity and characteristics possessed by the population from the extracted images Gay, LR Mills, GE Airasian, (2012) . Sampling was carried out using random sampling technique given the consideration of the random placement of students at the class level without differentiating class, student gender and student class. In addition, the number of students in the same class, also students receive material based on the same curriculum, and students get the same amount of study time. Therefore, the researcher randomized the sample and chose 30 students as a sample including students of MI Muhammadiyah 5 Surabaya class 5 B. The indicators for critical thinking to be achieved by students are:

Table 1. Student Achievement Indicators

No.	Critical Thinking Indicator	Achievement Indicator
1.	Finding Information	Discover the benefits of water for humans, animals and plants. **C4**
2.	Summarize the information that has been obtained	Summarize the benefits of water for humans, animals and plants. **C4**
3.	Analyze	Analyze the causes of water scarcity. **C4**
4.	Describe the stages of information that is known	Describes the stages in the water cycle such as evaporation, condensation, and precipitation. **C3**
5.	Associate topics with everyday life	Linking the water cycle and its impact on events on earth and the survival of living things. **C4**

Source: modification from 2023 researchers

The data collection technique used in this study used a test technique, namely a critical thinking test in the form of pretest and posttest . The pretest test technique was carried out before giving the treatment in the form of audio-visual, while the posttest test was carried out after being given the treatment in the form of audio-visual in science subjects. The value criteria used as a reference in this study are as follows:

Table 2. Range Criteria Value

Criteria	Mark
Greatly Improved	86 - 100
Enough	70 - 85
Not enough	<70

Adoption: (Firdaus et al., 2020)

The data analysis technique in this study is the normality test and one test sample T-test using the one sample test method with the help of SPSS.

Results and Discussion

This study aims to identify students' critical thinking skills through information obtained from pretest and posttest assessments when given 5 questions at cognitive level 4-6 (HOTS). This research was carried out in 3 stages, namely 1) distributing pretests before starting learning activities, 2) conducting learning using audio-visual media, 3) distributing posttests

after learning activities. The results of calculating the average pretest and posttest scores can be seen in table 3 below.

Table 3. Pretest and Posttest Average Value

Paired Samples Statistics

		Means	N	std. Deviation	std. Error Means	
Pair 1	PRE-TEST	57.5000	30	13.56657	2.47690	
	POST TESTS	88.4333	30	4.87558	,89015	

Source : SPSS calculation version 25

Based on the average pretest and posttest scores , it shows that there is an average increase in critical thinking skills when using audio visual. This can be seen from the average pretest of 57.50 before using audio-visual media. And the average value of the posttest students after using audio-visual media is 88.43.

In addition, researchers used SPSS 25 to perform a normality test on the results of the data before and after the test. The normality test was carried out to see whether the independent and dependent variable regression models were normally distributed or not Ghozali I, (2016) . If the significance value is > 0.05, the data is said to be normally distributed , and if the significance is <0.05, the data is not normally distributed. The normality test is shown in table 4 below:

Table 4. Normality test

One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residuals
N		30
Normal Parameters a,b	Means	,0000000
	std. Deviation	4.11387948
Most Extreme Differences	absolute	, 121
	Positive	, 121
	Negative	-.071
Test Statistics		, 121
Asymp . Sig. (2-tailed)		,200c ,d

a. Test distribution is Normal.
Source : SPSS calculation version 25

The basis for decision making is the Normality Test , namely H_o: if the significance value is <0.05, the data is not normally distributed. H_a: if the significance value is > 0.05 then the data is normally distributed. From the results of the normality test , namely 0.200 > 0.05, it can be concluded that H_a it is accepted and H_o rejected or in other words the data is normally distributed. After that, a hypothesis test will be carried out on students' critical thinking skills before and after the animation video is applied using the one sample T-test using the one sample test method using SPSS 25 which can be seen in table 5 below.

Table 5. Test *One Sample-Test*

Paired Samples Test

		Paired Differences							
		Means	std. Deviation	std. Error Means	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
					Lower	Upper			
Pair 1	PRE TEST - POST TEST	-30.93333	11.69714	2.13560	-35.30112	-26.56555	-14,485	29	,000

Source: SPSS Calculations Version 25

Decision-making Sample T Test, namely:

1. The significance value (2-tailed) <0.05 indicates a significant difference between pretest and posttest. This shows that there is a significant effect on the difference in the treatment given to each test.
2. The significance value (2-tailed) > 0.05 indicates that there is no significant difference between the pretest and posttest . This shows that there is no significant effect on the difference in the treatment given to each test.

The one sample T test that the researchers have done, it shows that there is an influence in using the problem based model audio-visual based learning . It can be seen from the significance value (2-tailed) 0.000 <0.05 indicating a significant difference between the pretest and posttest , so it can be concluded that there is an influence in the use of problem based models audio-visual based learning . It can be concluded that critical thinking skills have an impact on 5th grade students of MI Muhammadiyah 5 Surabaya by applying the audio-visual assisted PBL model. Test the hypothesis in this study that is H_a accepted and H_o rejected. The hypotheses tested in this study are:

1. H_o: There is no effect of audio-visual-based problem-based learning models on the critical thinking skills of MI Muhammadiyah 5 Surabaya Class 5 students.
2. H_a: There is an influence of the problem based learning model based on audio visual on the critical thinking skills of MI Muhammadiyah 5 Surabaya class 5 students.

The research is the same as this research which was carried out by (Susilowati et al., 2018) with the results of the research showing that there was an increase in students' critical thinking skills through Audio Visual Media. This can be seen from the value of critical thinking skills in the first cycle of 54.8 and increased in the second cycle of 93.1. Another study was conducted by (Hendra et al., 2022) with the results showing that there was an increase in critical thinking skills. This can be seen from the average value of critical thinking skills which increased from 76.18 to 86.76 (Hendra et al., 2022) .

Based on previous research, the difference between this article and previous articles is that researchers want to develop learning with existing technology to develop students' critical thinking attitudes. From this explanation, it can be seen that: 1) the average critical thinking ability of students before using problem-based learning based on audio-visual media, 2) the average value of students' critical thinking skills and learning using problem-based learning based on audio-visual media is 88, 43. The results of the one sample test data analysis using the one sample T technique yield a significance value of Sig (2-tailed) 0.000 <0.05. This shows

that there is an influence of critical thinking skills in class 5 students of MI Muhammadiyah 5 Surabaya by using the audio-visual assisted problem-based learning model.

Conclusion

Based on research that has been conducted at MI Muhammadiyah 5 Surabaya in class 5 B, it can be seen that the audio-visual-assisted problem-based learning model influences students' critical thinking skills because through this learning model, their critical thinking skills greatly increase before and after learning. This can be seen from the calculation results through the SPSS version 25 application, the pretest average value is 57.50, while the posttest average value is 88.43. The results of the one sample test data analysis using the one sample T technique yield a significance value of Sig (2-tailed) 0.000 <0.05. This shows that there is an influence of critical thinking skills in grade 5 students of MI Muhammadiyah 5 Surabaya by using the audio-visual assisted PBL model. The conclusion of this study is that learning using problem-based learning models based on audio-visual can improve elementary students' critical thinking skills.

Bibliography

Afiani, KDA, & Faradita, MN (2022). Understanding of Mathematical Concepts for Class III Students at Surabaya Elementary School Material of Fractions Assisted by Media Folding Paper. *Gentala Journal of Basic Education* , *7* (1), 89–97. https://doi.org/10.22437/gentala.v7i1.17862

Alsubaie, MA (2022). Distance education and the social literacy of elementary school students during the COVID-19 pandemic. *Heliyon* , *8* (7), e09811. https://doi.org/10.1016/j.heliyon.2022.e09811

Ariani, RF (2020). The Influence of Problem Based Learning Learning Model on Critical Thinking Ability of Elementary School Students in Science Content. *Scientific Journal of Education and Learning* , *4* (3), 422–432.

Cahyo, Y., & Prasetyo, T. (2020). The Effectiveness of Problem Based Learning and Discovery Learning Models on the Critical Thinking Ability of Elementary School Students. *Basicedu Journal* , *4* (2), 228–238.

Darmady Hamid. (2013). *Educational and Social Research Methods* . Alphabet.

Faradita, MN (2019). Improving Science Learning Outcomes in Elementary Schools Using the PQ4R Method. *Improving Science Learning Outcomes In Elementary School Using The Pq4r Method*, *3* (1), 7–13. https://doi.org/10.21067/jbpd.v3i1.2893

Firdaus, FZ, Suryanti, S., & Azizah, U. (2020). Development of Interactive Multimedia Based on SETS Approach to Improve Critical Thinking Ability of Elementary School Students. *Basicedu Journal* , *4* (3), 681–689. https://doi.org/10.31004/basicdu.v4i3.417

Gay, LR Mills, GE Airasian, P. (2012). *Educational Research: Competencies for Analysis* . Person Education.

Gheorghe, G. (2021). *Critical Thinking – Impressions of Students from High School Level* . *XXI* (1), 296–304.

Ghozali I. (2016). *Multivariate Analysis Application with IBM SPSS 23 Program* (Imprint to). Diponegoro University Publishing Agency, 2011.

Hendra, H., Rosleny, B., Muhajir, M., & Hendra, Rosleny B, M. (2022). The Effect of Using the Guided Inquiry Learning Model Assisted by Audio Visual Media on Critical Thinking Ability and Learning Outcomes of Class V SD Cluster II Elementary School in Bungaya Region. *Procedure Of Basic Education National Seminar* , *November* , 72–80.

Herzon, HH, Budijanto, B., Utomo, DH, & Malang, GUN (2018). Effect of Problem-Based Learning (PBL) on Critical Thinking Skills. *Journal of Education: Theory, Research, and Development* , *3* (1), 42–46.

Indrayani, N., Purnomo, B., & Oktaniati, O. (2023). The relevance of the national education system in the educational thinking of Ki Hajar Dewantara. *Social Harmony: Journal of Social Studies Education* , *10* (1), 55–62.

Istiqlal, M. (2017). Development of Interactive Multimedia in Learning Mathematics. *JIPMat* , *2* (1). https://doi.org/10.26877/jipmat.v2i1.1480

Kadek, N., Virgiantini, P., Suryawan, AJ, Nirmayani, LH, Acarya, JD, Studies, P., Teacher, P., Basic, S., High, S., Hindu, A., Mpu, N ., Singaraja, K., Virgiantini, NKP, Suryawan, AJ, & Nirmayani, LH (2022). Problem Based Learning Model Assisted by Audio Visual Media to Improve Social Studies Learning Outcomes for Class V Students. *Widyajaya: Journal of PGSD Study Program Students* , *2* (1).

Kartono, K., Arumsasi, PD, Mariani, S., Kartono, A., Mariani, PD, & Mariani, S. (2019). Analysis of studentsâ€ ™ mathematical reflective thinking on problem based learning (PBL) based from learning styles. *Unnes Journal of Mathematics Education* , *8* (1), 34–41. https://doi.org/10.15294/ujme.v8i1.24239

Lemay, DJ, Bazelais, P., & Doleck, T. (2021). Transition to online learning during the COVID-19 pandemic. *Computers in Human Behavior Reports* , *4* , 100130. https://doi.org/10.1016/j.chbr.2021.100130

Mari či ć , S., & Špijunovi ć , K. (2015). Developing critical thinking in elementary mathematics education through a suitable selection of content and overall student performance. *Procedia-Social and Behavioral Sciences* , *180* (November 2014), 653–659. https://doi.org/10.1016/j.sbspro.2015.02.174

Mirnawati, LB (2017). The Influence of the Group Investigation Type Cooperative Learning Model on the Creativity of First Semester Students of PGSD UM Surabaya in Introductory Education Management Courses. *Pedagogy : Journal of Education* , *6* (1), 84–97. https://doi.org/10.21070/pedagogia.v6i1.598

Mirnawati, LB, Hamidah, F., 'Izzah, W., & Hamidah, F. (2020). The Process of Developing an Innovative Learning Model Using Mind Mapping in Narrative Writing Learning in Elementary Schools. *Proceedings of UMSurabaya* , 263–270.

Nurkhasanah, D., Study, P., School, P., Indarini, E., Study, P., & School, P. (2019). *Application of Problem Based Learning Models to Improve Critical Thinking Skills of Class V Elementary School Students* . *XXXV* (1), 33–41.

Prayekti, H., & Utomo, U. (2018). The Effect of Numbered Heads Together (NHT) Model Assisted with Audio Visual Media On The Learning Outcomes of Identifying Story Elements of Students Grade V. *Journal of Primary Education* , *8* (2), 232–237.

Purbarani, DA, Dantes, N., & Adnyana, PB (2018). The Effect of Problem Based Learning

Assisted by Audio Visual Media on Critical Thinking Ability and Science Learning Outcomes in Elementary Schools. *PENDASI: Indonesian Journal of Basic Education* , *2* (1), 24–34.

Rahmayanti, AA, Agustiana, IGAT, & Simamora, AH (2020). The Effect Of The Creativity Learning Model On Natural Science Learning Outcomes And Self Efficacy. *Jurnal Pajar (Education and Teaching)* , *4* (4), 780–791. https://doi.org/10.33578/pjr.v4i4.8038

Ssemugenyi, F. (2023). Teaching and learning methods compared: A pedagogical evaluation of problem-based learning (PBL) and lecture methods in developing learners' cognitive abilities. *Cogent Education* , *10* (1), 2187943. https://doi.org/10.1080/2331186x.2023.2187943

Sugiyono. (2018). *Evaluation Research Methods (Quantitative, Qualitative, and Combination Approaches)* (Y. Yuyun (ed.)). Alphabet.

Susilowati, R., Relmasira, SC, & Hardini, ATA (2018). Application of the Problem Based Learning Model Assisted by Audio Visual Media to Improve Critical Thinking in Grade 5 Elementary School. *Scientific Journal of Education and Learning* , *2* (1), 57–69.

Suyadi, & Selvi, ID (2022). Online learning and child abuse: the COVID-19 pandemic impact on work and school from home in Indonesia. *Heliyon* , *8* (1), e08790. https://doi.org/10.1016/j.heliyon.2022.e08790

Utami, MT, Koeswati, HD, & Giarti, S. (2019). Problem Based Learning (PBL) Model Assisted by Audio Visual Media to Improve Critical Thinking Skills in Grade 5 Elementary School Students. *ADVANCE: Scientific Journal of Mathematics Education* , *6* (1), 80–91.

Vera, K., & Wardani, KW (2018). Improving Critical Thinking Skills Through Problem Based Learning Models Assisted by Audio Visual in Grade IV Elementary School Students. *Journal of Educational Technology and Innovation Research (JARTIKA)* , *1* (2), 33–45.