

THE IMPLEMENTATION OF SETS INTEGRATED WITH BYOD TO INCREASE STUDENT'S CRITICAL THINKING SKILL ON VIBRATION AND WAVE STUDY

Thoriqi Firdaus^{*}, Mochammad Ahied, Nur Qomaria, Dwi Bagus Rendy Astid Putera, Maria Chandra Sutarja
Natural Science Education Department, Faculty of Education, Trunojoyo University of Madura, Bangkalan, 69162, Indonesia

*Email: thoriqifirdaus9119@gmail.com

Abstract

Critical thinking is one of the skills needed to face life's challenges. The SETS learning model is centered on surrounding problems by integrating the four elements of SETS, while BYOD can be used to complete tasks anywhere and anytime. The integration of SETS and BYOD is expected to be able to increase students' critical thinking skills on vibration and wave study. This study aims to determine the improvement of students' critical thinking skills by implementing the SETS model integrated with BYOD on vibration and wave study for class VIII SMP. The research method used in this study is a quasi-experimental research design with a nonequivalent control group design which was carried out at SMP Negeri 1 Lenteng, Sumenep Regency, for the 2021/2022 Academic Year. Hypothesis testing using the Mann-Whitney test, and analysis of increased students' critical thinking skills using the N-Gain Score test. The results showed that the implementation of the learning implementation of SETS model Integrated with BYOD was a very good category. The implementation of the SETS model Integrated with BYOD affects student's critical thinking skills. The increase in students' critical thinking skills based on the N-Gain Score test in the experimental class is a medium category, while the control class is a low category. The results of the student response questionnaire to the implementation of the SETS model Integrated with BYOD are in the good category. This study concludes that the implementation of the SETS model Integrated with BYOD on vibration and wave study can make students increase critical thinking skills.

Keywords: BYOD, Critical Thinking Skills, SETS, Vibrations and Waves

Accepted: July 2022, Revised: August 2022, Published: October 2022

INTRODUCTION

The era of society 5.0 is an era that makes technology as a medium to access virtual space to become like physical space. The era of society had a significant impact on the realm of education. The use of the internet which is very easy and fast in various types of science has made a digital literacy movement born in the field of education in the current era (Nastiti & 'Abdu, 2020). It is because technology in the digital world can be applied to learning systems and methods by using the internet as a liaison between teachers and students (Rahayu, 2021). Therefore, education has an important role in facing challenges in the era of society 5.0.

The role of education according to Nurhaddi & Budiyanto (2020) is the main factor to improve the quality of human resources in facing the era of society 5.0. One of the efforts that can be done in facing the current era is by applying to learn oriented to higher order thinking skills (Wibawa & Agustina, 2019). The concept of higher order thinking skills is in the spotlight to improve the quality of human resources, one of which is critical thinking skills (Puspitasari & Nugroho, 2020).

Critical thinking is a reflective way of thinking that focuses on the decision-making process that must be carried out (Ennis, 1993). The critical thinking process in making decisions is to solve a problem through analysis and find solutions to the problems at hand, so critical thinking is a skill that needs to be applied to science learning (Kartika et al., 2020). One effort to improve critical thinking skills is by applying a learning model that can train students to actively find solutions to a problem, one of which is the SETS learning model (Sylviana et al., 2019). SETS learning can improve students' critical thinking skills towards environmental problems and be reflective in decision-making by involving a systematic analysis process to solve problems (Rini et al., 2020).

SETS learning model can also be combined with interactive multimedia in science learning (Widiantini et al., 2017). Widiantini et al (2017) revealed that currently students like something related to technology, so the effort that can be done is by utilizing technology in learning. So that way, the concept of Bring Your Own Device (BYOD) in the learning process at both the junior high and high school levels can already be applied, even allowing it to be applied at the elementary level (Rudyanto et al., 2019). BYOD implementation in learning can use mobile devices and smartphones to support learning activities inside or outside the classroom (Sokolova et al., 2021).

SETS learning model can be combined with interactive multimedia using an internet-connected mobile device, it can train students' critical thinking skills by simulating activities virtually to solve problems and gain

knowledge not only in books (Widiantini et al., 2017). Science, Environment, Technology and Society (SETS) is a learning model that connects elements of science, environment, technology, and society that are integrated into science learning (Putri et al., 2021). The application of the SETS learning model requires the selection of appropriate materials. Vibration and wave material is one of the science materials that requires students to connect learning concepts based on everyday life, so that they can overcome problems in the surrounding environment based on discovery-based learning (Rohmah & Nurita, 2017).

Students can gain their knowledge based on the problem-solving process in SETS learning (Suci et al., 2020). The SETS learning model can be integrated with BYOD on vibration and wave material which according to Hakami (2020) states that BYOD can also create a new learning environment so that it can create interactive learning and make students active in analyzing a problem.

Based on the problems described above, the purpose of this study is to (1) determine the implementation of learning the BYOD integrated SETS model on vibration and wave materials, (2) determine the effect of the BYOD integrated SETS learning model on vibration and wave materials, (3) find out improvement of students' critical thinking skills after the implementation of the BYOD integrated SETS learning model on vibration and wave materials, and (5) knowing students' responses to the BYOD integrated SETS learning model in vibrations and waves. This research is hoped that it can add insight regarding the implementation of BYOD's integrated SETS in vibration and wave material in optimizing students' critical thinking skills so that they can integrate technology into their hands in the teaching and learning process. In addition, it can be used as a reference in an effort to improve the implementation of teaching and learning activities and as a source of information and further reference for further research.

RESEARCH METHODS

The research method used in this research is Quasi-experimental design. The research location is at SMP Negeri 1 Lenteng in Sumenep Regency with a population of all class VIII students, namely class VIII-A as the Experiment class for the implementation of the BYOD integrated SETS learning model on vibration and wave material, while and class VIII-D as the Control class using the lecture method on vibrations and waves. The number of students in classes VIII A and VIII D is 20 students per class. The sample selection technique is using Non-Probability Sampling by using the Purposive Sampling technique. The research design used is the Nonequivalent Control Group Design.

The research instrument consisted of (1) learning implementation instruments, namely syllabus, lesson plans, and worksheets, and (2) data collection instruments, namely learning implementation observation sheets, critical thinking test questions, and student response questionnaires. Data collection techniques consisted of implementation observations, tests, questionnaires, and documentation. Data analysis techniques consist of an analysis of research instruments, data analysis of learning implementation observation sheets, data analysis of students' critical thinking skills, data analysis of student response questionnaires. The analysis of the research instrument is in the form of a validity test which is calculated using Aiken's formula and the reliability test using the inter-rater reliability method. The data analysis of the implementation observation sheet that has been filled in by the observer can be interpreted using the formula:

$$\% \text{ Learning Implementation} = \frac{\text{Score obtained}}{\text{Score maximum}} \times 100$$

(Jamaluddin et al., 2020)

The percentage of critical thinking test results to determine students' critical thinking skills was obtained using the formula:

$$P = \frac{\sum \text{Value obtained}}{\sum \text{Value maximum}} \times 100\%$$

(Modification of Wati et al., 2019)

SETS integrated BYOD learning model was analyzed using the Mann-Whitney test using the SPSS 22 for Windows program. This test is used after the data obtained are not normally distributed.

According to Sulaiman (2013) Decision making in the hypothesis to reject or accept H_0 on the Mann-Whitney Test is as follows.

1. Asymp Sig. < 0.05 → Reject H_0
2. Asymp Sig. > 0.05 → Accept H_0

While the increase in students' critical thinking skills is calculated using the N-Gain Score test which is calculated using the formula:

$$G = \frac{S_f - S_i}{S_{maks} - S_i}$$

(Hake Modification, 1999)

Information:

- G = N-Gain Score
- S_f = Posttest score
- S_i = Pretest score
- S_{maks} = Maximum score

In addition, the completed student response questionnaire can be interpreted using the formula:

$$P = \frac{F}{n} \times 100\%$$

(Turahmah et al., 2022)

Information:

- P = The percentage of questionnaire data
- F = Total score obtained
- N = Total maximum score

RESEARCH RESULTS AND DISCUSSION

The results obtained in the form of an observation sheet on the implementation of learning using the BYOD integrated SETS learning model, the results of the critical thinking skills test, and the results student response questionnaire to the implementation of the BYOD integrated SETS learning model. The recapitulation of learning implementation scores can be seen in Table 1.

Table 1. Analysis of Learning Implementation Observation Results

| Meeting to - | Percentage Execution (%) | | | Category |
|----------------|--------------------------|------------|---------|-----------|
| | Observer 1 | Observer 2 | Average | |
| 1 | 100 | 100 | 100 | Very Well |
| 2 | 95.24 | 95.24 | 95.24 | Very Well |
| 3 | 100 | 100 | 100 | Very Well |
| Average | | | 98.41 | Very Well |

The percentage of learning implementation scores obtained based on the assessments of observer 1 and observer 2 at meeting 1 and meeting 3 was obtained by a percentage of 100% with a very good category, it was because all the learning steps were carried out. Meeting 2 obtained a percentage of 95.24% with a very good category, the percentage of implementation did not reach 100% because there was one learning step that was not carried out during the closing activity, namely ending the learning activity with a prayer together. However, the average implementation of learning in all meetings is 98.41% with a very good category.

BYOD integrated SETS learning model on the vibration and wave material in this study was carried out very well at every meeting. SETS learning steps guide students to be able to think to solve problems that occur in the surrounding environment and related to the community, so that if SETS learning is carried out in an organized manner in learning activities, students' critical thinking skills can increase (Destini et al., 2022). Therefore, to determine the improvement of students' critical thinking skills in this study, using a critical thinking test.

The critical thinking test used is in the form of a description of the vibration and wave material which consists of 3 questions with each question containing 5 indicators of Ennis' critical thinking. According to Ennis (1985) states 5 indicators of critical thinking, namely (1) Giving a simple explanation (elementary clarification). (2) Building basic skills (basic support). (3) Making inference (inference). (4) Provide further explanation (advance clarification). And (5) Set strategies and tactics (strategies and tactics). Before the test questions were used in the experimental class and the control class, the questions were validated first by the validator to determine the validity and reliability of the test instrument to be used.

The data obtained from the results of the study on the pretest and posttest values of the experimental class were not normally distributed because the significance value obtained after being tested using the SPSS program was <0.05, so in this study using a non-parametric test, namely the Mann-Whitney test. This test uses

the assumption that the data does not have to be normally distributed and also does not have to be homogeneous. This test was conducted to determine the differences in students' critical thinking skills in the experimental class and control class before and after learning. The data used in the Mann-Whitney test are the pretest scores of the experimental class and control class students, as well as the posttest scores of the experimental class and control class students. The results of the calculation of the hypothesis test based on the results of the pretest scores of the experimental class and the control class can be seen in table 2.

Tabel 2. Mann-Whitney Test Results Pretest

| | Hasil Pretest |
|--------------------------------|----------------------|
| Mann-Whitney U | 193,500 |
| Wilcoxon W | 403,500 |
| Z | -,178 |
| Asymp. Sig. (2-tailed) | 0,859 |
| Exact Sig. [2*(1-tailed Sig.)] | 0,862 ^b |

Based on table 2 could is known that results asymp sig obtained _ which is 0.859. Interpretation to score significant n si refers to the provisions if score asymp sig < 0.05 then H₀ is rejected, however if score asymp sig > 0.05 then H₀ is accepted. Based on the data obtained that score asymp sig 0.859 > 0.05 then H₀ is accepted. So that could could said that no there are difference results between of pretest students in the experiment class and control class.

The results of the calculation of the hypothesis test based on the results of the post-test scores for the experimental class and the control class can be seen in table 3.

Table 3. Mann-Whitney Test Results Posttest

| | Posttest Results |
|--------------------------------|-------------------------|
| Mann-Whitney U | 17,000 |
| Wilcoxon W | 227,000 |
| Z | -4,964 |
| Asymp. Sig. (2-tailed) | 0.000 |
| Exact Sig. [2*(1-tailed Sig.)] | 0.000 ^b |

Based on table 3 could is known that the results asymp sig were obtained i.e. 0.000. Interpretation to score significant refers to the provisions if score asymp sig < 0.05 then H₀ is rejected, however, if score asymp sig > 0.05 then H₀ is accepted. Based on the data obtained that score asymp sig 0.000 > 0.05 then H₀ is rejected. So that there are different results post-test students in the experiment class and control class.

Difference results score post-test in the experiment class and control class caused by the influence of the applied learning model different. It because the score pretest from the experiment class and control class get the average value is almost same. In class, control apply method lecture, while in experiment class applies the learning model SETS integrated BYOD. The influence of difference learning model Among experiment class and control class could cause different results score post-test in the experiment class and control class.

Influence learning in control class that uses method lecture on skills think critical student tend experience enhancement not so significant, even there are 7 students with skills think critical no experience increase. This thing because of the learning process in control class applied with how the teacher conveys Theory by direct without existence discussion group and without giving the issue the problem that happened environment around, so that student no trained for look for solution solving the problem. Lack of room student for explores Theory learning in activity observing, looking for information, discussing, collecting data, and communicating make the critical thinking skills student becomes low (Destini et al., 2022).

Differences in learning models with class oak s experiment that is with the implementation of learning model SETS integrated Demanding BYOD _ student for active in learning and exploring breastfeeding Theory learning through stages of the decision-oriented SETS model decision in solve the problem that happened environment around, so that makes student active in learning (Sylviana et al., 2019). Using BYOD in learning as interactive media for students, can be used by students for exploring Theory learning so that could support the learning process teach with make student active in learning (Hakami, 2020). This thing is different with method lectures that make students not enough active in learning (Wibawa & Agustina, 2019).

Learning model SETS integrated with BYOD could make students think by actively in investigating and analyzing problems in the environment around them (Indri, 2021). It takes effect to results posttest Skills think critical students, so the student could think by critically. The learning process could give a good impact _ when the teacher involves the student in activities for find something current concept _ studied (Ekantini, 2020). because of that, students could develop Skills to think critical by maximum based on the influence of the learning model, because Skills think critical students no will experience development if student passive in learning.

N-Gain score test is also done based on results score test think critical on each indicator think critical skills. It was conducted for knowing enhancement Skills think critical of every indicator before and after learning in the experiment class and control class. Recapitulation results calculation score N-Gain Score in each indicator think critical in the experiment class could be seen in table 4.

Table 4. N-Gain Score in every indicator think critical in experiment class

| No | Indicator | N-Gain Score | Category |
|----|--|--------------|-----------|
| 1 | Give a simple explanation (elementary clarification) | 0.44 | Currently |
| 2 | Building basic skills (basic support) | 0.51 | Currently |
| 3 | Making inferences (Inferences) | 0.63 | Currently |
| 4 | Give further explanation (advanced clarification) | 0.42 | Currently |
| 5 | Set strategies and tactics (strategies and tactics) | 0.43 | Currently |
| | Average | 0.49 | Currently |

Based on table 4 shows that enhancement Skills think a critical student at each indicator on a experiment class that is all indicators think critical obtained category medium. Maximum value enhancement thinks critical student that is on the indicator make an inference with results N-Gain score is 0.63, while upgrade minimum value thinks critical student that is on the indicator gives explanation carry on with results N-Gain score 0.42. Besides that, recapitulation results calculation score N-Gain Score in every indicator think critical in control class could be seen in table 5.

Table 5. N-Gain Score in every indicator think critical in control class

| No | Indicator | N-Gain Score | Category |
|----|--|--------------|----------|
| 1 | Give a simple explanation (elementary clarification) | 0.18 | Low |
| 2 | Building basic skills (basic support) | 0.17 | Low |
| 3 | Making inferences (Inferences) | 0.25 | Low |
| 4 | Give further explanation (advanced clarification) | 0.18 | Low |
| 5 | Set strategies and tactics (strategies and tactics) | 0.18 | Low |
| | Average | 0.19 | Low |

Based on table 5 show that enhancement Skills think a critical student at each indicator on control class that is all indicators think critical obtained category low. Maximum value enhancement critical thinking student that is on the indicator make inference with results N-Gain score 0.25, while upgrade minimum value think critical student that is on the indicator build Skills base with results N-Gain score 0.17. Based on the N-Gain score test that has been done, then could is known that learning in experiment class and control class could increase Skills think critical students. However, improvement in experiment class and control class have difference score N-Gain score with category in class _ experiments and categories low on class control class.

Based on the results of the N-Gain Score of each indicator on the experimental class critical thinking test, it shows that the increase in critical thinking skills that has the highest increase is the indicator of making inferences. This is because during the learning process, students are trained to connect the material with elements of science, environment, technology, and society, so that students can be trained in making inferences. While the indicator for improving critical thinking skills is the lowest, namely providing advanced explanations, this is because during the learning process students are less than optimal in conducting experiments. The cause of the less than optimal students at this stage, because after the students conducted the experiment and took the data, they were not equipped with questions that could train students to provide advanced explanations on the results of the experiments carried out.

Based on the results of the average value of the N-Gain Score, it shows that the improvement of students' critical thinking skills in the experimental class is better than the control class. The implementation of the BYOD integrated SETS model in learning makes students' critical thinking skills improve better. This

is because the SETS learning model is a student-centered learning model and is oriented towards decision-making in solving problems (Sylviana et al., 2019). In addition, the integration of BYOD in the SETS learning model can improve student learning experiences through interactive learning innovations along with technological developments (Sokolova et al., 2021). Based on this, the BYOD integrated SETS learning model can improve students' critical thinking skills, because students can actively analyze problems and find solutions with extensive learning experiences using personal technology tools.

BYOD integrated SETS learning model in this study was implemented in groups but each student still brought his own personal device. This is in accordance with Vygotsky's constructivism learning theory which emphasizes more on the social aspects of learning. According to Vygotsky, communicating and solving problems depends on students' cognitive development so that they can help students think, because students' mentality will develop through the process of social interaction so that they construct knowledge collaboratively (Mujtahidin, 2014).

In addition, the BYOD - integrated SETS learning model that can connect learning with elements of science, environment, technology and society by integrating BYOD in making students' learning experiences wider by utilizing technological developments, is also related to Piaget's theory of cognitivism. Piaget stated that students' interactions with their environment can improve students' cognitive development (Hasanuddin, 2017).

The material used in this research is vibration and wave material. According to Febrianti et al (2021) revealed that vibration and waves are one of the materials that require interactive media to visualize the shape of vibrations and waves because the material is abstract and difficult to understand. Therefore, in its implementation in learning it is integrated with BYOD as an interactive media to visualize vibration and wave material, namely through the vibratory and wave telegram bot as well as the vibration and wave mobile virtual lab application for junior high school students launched by the Ministry of Education and Culture and also using the Phet virtual experiment. Colorado. In addition to requiring interactive media in learning, vibration and wave material is also discovery-based material so that it requires critical thinking skills to support learning activities (Rohmah & Nurita, 2017) .

The implementation of the BYOD integrated SETS model on vibration and wave materials at SMP Negeri 1 Lenteng class VIII is appropriate because it can improve students' critical thinking skills. This is supported by the data and theories that have been described showing that the implementation of the BYOD integrated SETS model on vibration and wave materials can improve students' critical thinking skills. In addition to being given a test to determine the improvement of students' critical thinking skills, this study was also given a student response questionnaire to find out how students responded to the implemented learning model.

Student response questionnaires were given to the experimental class (VIII-A), which is the class used to implement the BYOD integrated SETS learning model on vibration and wave materials. The student response questionnaire was used to determine the score on the response questionnaire that was applied. The recapitulation of the results of the student response questionnaire scores in the experimental class can be seen in table 6.

Table 6. Obtaining Student Response Questionnaire Scores in the Experimental Class

| No | Indicator | Percentage (%) | Category |
|----|--|----------------|-----------|
| 1 | Interest in Learning Models | 90.63 | Very good |
| 2 | The Suitability of the Learning Model with the Presentation of Materials | 92.19 | Very good |
| 3 | Language Usage | 88.44 | Very good |
| | Average | 90.42 | Very good |

Based on the data obtained show that the results response student to implementation of SETS models integrated BYOD on material vibrations and waves are very good. It by percentage average yield questionnaire response student which is 90.42% with category very good. If outlined based on the response students on each indicator, then the percentage acquisition score on indicator interest on the learning model used is 90.63% with the category very good. The result shows that students very interested so that could conclude that implementation of SETS models integrated with BYOD on material vibrations and waves could increase the interest student in learning.

Based on the data obtained from the results acquisition score on indicator suitability of the model with presentation Theory is 92.19% with category very good. It could be interpreted that the suitability of the learning model with presentation Theory very appropriate. Learning model SETS integrated BYOD is a

learning model that teaches students to solve problem with combine elements of science, environment, technology, and society so that by life daily students. Whereas Theory vibrations and waves are Theory in IPA lessons that apply easy found in life every day, so Thing the make response student to indicator the suitability of the learning model SETS integrated BYOD with presentation Theory vibrations and waves categorized as very good or very appropriate.

Based on the data obtained on the indicator use language that is 88.44% with category very good. Using good and correct language in communication could avoid from a misunderstanding (Madina et al., 2019). Using good language could make student could understand the material presented by the teacher so that the material presented could easy understood. Analysis result questionnaire response student show existence uses very language well in learning. So, Thing the makes use of language in learning using the learning model SETS integrated BYOD on material vibrations and waves categorized as very good.

Response student to implementation of learning model SETS integrated BYOD on material vibrations and waves very good. Based on the results acquisition the average value of all indicator questionnaire response students that is on the indicator interest to the learning model, the suitability of the learning model with presentation material, and also in use language get great response good from students. So that could conclude that student very like activity learning in research and make students active in learning because students like related learning with the environment around, even with existence integration with BYOD make students could explore breast milk Theory study.

CONCLUSIONS AND RECOMMENDATIONS

A. Conclusion

The implementation of learning with the implementation of the BYOD integrated SETS model on vibration and wave material was very well carried out with an average percentage of learning implementation which was 98.41% in the very good category. The results of hypothesis testing using the Mann-Whitney test showed that there were no differences in the results of the pretest students in the experimental class and the control class, but there were differences in the results of the posttest students in the experimental class and the control class. Improving students' critical thinking skills based on the N-Gain Score test the experimental class is better in the medium category, compared to the control class in low category . Student responses to the implementation of the SETS model integrated BYOD on vibration and wave material with an average percentage of student responses that is 90.42% very good category.

B. Recommendations

Suggestions in this study are on the implementation of the learning model SETS integrated BYOD requires longer study hours, so that expected in research next system management time more noticed. Besides, bring device private during class hours, preferably students also have stable internet connection. _ Apart from that, workmanship question pretest, posttest, and filling questionnaire response student should be separated with activity learning so that time on activities learning.

ACKNOWLEDGEMENT

The author expresses his gratitude to Mrs. Sri Handayani, S.Pd. as a science teacher and Mrs. Tutik Kurniawati, M.Pd as head of SMP Negeri 1 Lenteng school who has been giving opportunity and ease writer for taking research data . Furthermore, the researcher would like to thank the students of class VIII-A and VIII-D SMP Negeri 1 Lenteng as research subject who has participated and provided a very good response in learning to make this research successful.

REFERENCES

- Destini, F., Yulianti, D., Lilik, S., Alben, A., & Rochmiyati. (2022). Implementation of the Science, Environment, Technology, and Society (SETS) Approach to the Critical Thinking Ability of Elementary School Students. *Journal of Basicedu* , 6 (1), 253–261.
- Ekantini, A. (2020). Effectiveness of Online Learning in Science Subjects in the Covid-19 Pandemic Period: Comparative Study of Offline and Online Learning in Middle School Science Subjects. *Journal of Madrasa Education*, 5 (November 2020), 187–193.
- Ennis, RH (1985). A Logical Basis for Measuring Critical Thinking Skills. *Educational Leadership* , 43 (2), 44–48.
- Ennis, RH (1993). Critical thinking assessment. *Theory Into Practice* , 32 (3), 179–186. <https://doi.org/10.1080/00405849309543594>

- Febrianti, NS, Utomo, AP, & Supeno. (2021). Critical Thinking Ability of Junior High School Students in Science Learning Using Vibration and Wave Android Application Media . *Optics: Journal of Physical Education* , 5 (1), 26–33.
- Hakami, M. (2020). Using Nearpod as a Tool to Promote Active Learning in Higher Education in a BYOD Learning Environment. *Journal of Education and Learning* , 9 (1), 119. <https://doi.org/10.5539/jel.v9n1p119>
- Hake, RR (1999). Analyzing Change/Gain Scores. *Area-D American Education Research Association's Division D, Measurement and Research Methodology* , 1.4.
- Hasanuddin. (2017). *Biopsychology of Learning Theory and Applications* . Banda Aceh: Syiah Kuala University Press.
- Indri, J. (2021). Application of the Sets Learning Model (Science Environment Technology and Society) to Improve Students' Mastery of Science Concepts. *Primary: Journal of Primary School Teacher Education* , 10 (2), 410–417. <https://doi.org/10.33578/jpfkip.v10i2.8263>
- Jamaluddin, Asfar, AMIT, & Asfar, AMA (2020). *Training in Higher Order Thinking with the GO CAR Learning Model* . Sukabumi: CV Trace.
- Kartika, AT, Eftiwin, L., Fitri Lubis, M., & Walid, A. (2020). Profile of Critical Thinking Ability of Class VIII Junior High School Students in Science Subjects. *JARTIKA: Journal of Technology Research and Educational Innovation* , 3 (1), 1–10. <https://doi.org/10.36765/jartika.v3i1.46>
- Madina, LO, Pattiwael, M., Lahallo, FF, Rupilele, F., & Palilu, A. (2019). Good and Correct Use of Indonesian in Communicating . *J-DEPACE (Journal of Dedication to Papua Community)* , 2 (2), 157–170.
- Mujtahidin. (2014). *Learning and Learning Theory* . Surabaya: Salsabila Pen.
- Nastiti, FE, & 'Abdu, ARN (2020). Readiness of Indonesian Education in Facing the Era of Society 5.0. *Edcomtech : Journal of Educational Technology Studies*, 5 (1) . 61–66.
- Nurhaddi, RP, & Budiyanto, M. (2020). Natural science learning based on high order thinking skills to face the era of society 5.0. *Journal of Science Education* , 8 (3), 282–287.
- Puspitasari, YD, & Nugroho, PA (2020). Improving Higher Order Thinking Skills and Cognitive Abilities in Students through Science, Environment, Technology and Society Approaches Assisted by Learning Modules. *Journal of Science & Science Learning* , 4 (1), 11–28. <https://doi.org/10.24815/jipi.v4i1.14608>
- Putri, IA, Widiyanto, R., & Mahmud, M. (2021). The Effectiveness of SETS Learning Model on Critical Thinking Ability in Low Ability Students (Single Subject Research). *Elementar: Journal of Elementary Education* , 1 (2), 141–160.
- Rahayu, KNS (2021). Educational synergy to meet Indonesia's future in the era of society 5.0. *Education: Journal of Basic Education* , 2 (1), 87–100.
- Rini, IM, Widodo, W., & Budijastuti, W. (2020). Development of Science Teaching Materials Based on Science Environment Technology and Society (Sets) to Practice Critical Thinking Skills for Class IV Students *Journal of Education and Learning* , 8 (2), 584–590. <http://journal.ipts.ac.id/index.php/ED/article/view/1850>
- Rohmah, FA, & Nurita, T. (2017). Critical Thinking Skills for Junior High School Students on Vibration and Waves Material . *E-Journal of Pensa* , 05 (03), 222–225.
- Rudyanto, H. E., Marsigit, Wangid, M. N., & Gembong, S. (2019). The use of bring your own device-based learning to measure student algebraic thinking ability. *International Journal of Emerging Technologies in Learning*, 14(23), 233–241. <https://doi.org/10.3991/ijet.v14i23.11050>
- Sokolova, A. P., Gromova, L. Y., Takucheva, I. V., Kocherevskaya, L. B., & Dmitrieva, E. G. (2021). The Influence of BYOD Concept on Development of Learning Process in Universities. *Propósitos y Representaciones*, 9(3), 1271.
- Suci, NKA, Pudjawan, K., & Parmiti, DP (2020). The Effect of SETS-Based CORE Learning Model on Science Learning Outcomes of Fifth Grade Elementary School Students. *Indonesian Education Board (MPI)* , 1 (3), 297–308.
- Sulaiman, W. (2013). *Non-Parametric Statistics Case Study Examples and Their Solutions with SPSS* . Andi.
- Sylviana, M., Kusuma, M., & Widiyanto, B. (2019). Profile of Students' Critical Thinking Ability with the Implementation of the Probing-Prompting-Based SETS Learning Model. *PSEJ (Pancasakti Science Education Journal)* , 4 (2), 137–142. <https://doi.org/10.24905/psej.v4i2.14>
- Turahmah, F., Febrini, D., & Walid, A. (2022). Development of Problem Based Learning (P BL) Modules to Improve Critical Thinking Skills for Junior High School Students. *Essay: Journal of Education, Learning and Development* , 04 (01), 74–87.
- Wati, K., Hidayati, Y., Yuniasti, A., & Wulandari, R. (2019). Effect of Core Learning Model (Connecting

- Organizing Reflecting Extending) to Improve. *Natural Science Educational Research* , 108–116.
- Wibawa, RP, & Agustina, DR (2019). The Role of Higher Order Thinking Skills (HOTS)-Based Education at the Junior High School Level in the Society 5.0 Era as a Determinant of the Progress of the Indonesian Nation. *Equilibrium* , 7 (2), 137–141.
- Widiantini, NNAS, Putra, M., & Wiarta, IW (2017). Learning Model Sets (Science, Environment, Technology, Society) Assisted by Virtual Labs Affects Science Knowledge Competence. *Journal of Education Technology* , 1 (2), 141. <https://doi.org/10.23887/jet.v1i2.11776>