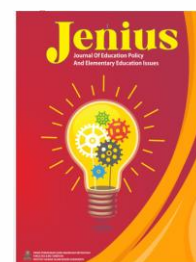




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Improving Scientific Literacy through Cooperative Learning: EclipseCrossword for Students in the Border Area of Indonesia

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ABSTRACT

This study intends to improve students' scientific literacy through cooperative learning using EclipseCrossword from Rumah Belajar application developed by Pusdatin Kemdikbud. This Classroom Action Research (CAR) was carried out in two cycles. It involved 12 fourth-grade students at SDN 29 Idai, Sintang Regency, West Kalimantan, Indonesia. The stages of this research are planning, acting, observing, and reflecting. The results indicate that the students' scientific literacy in Cycle I was 51%, categorized as 'poor'. It was increased to 78%, categorized as 'good' in Cycle II. The increase in students' scientific literacy was depicted in the aspect of applying scientific knowledge by 16%, concluding information based on analysis by 33%, analyzing information from each representation by 29%, and explaining the benefits of scientific knowledge for society by 24%. The increase in students' scientific literacy in cooperative learning using EclipseCrossword proves its merits as an alternative learning model for schools located in the Frontier, Outermost, and Disadvantaged (3T) areas.

INTRODUCTION

SD Negeri 29 Idai is located in an underdeveloped area in Sintang Regency, West Kalimantan. Because it is located on the border between Indonesia and Malaysia, it has several challenges in online learning during the Covid-19 pandemic. Based on the Secretary-General of the Ministry of Education and Culture Number Circular Number 15 of 2020, schools are ordered to implement distance learning to prevent the transmission of Covid-19. In carrying out this order, students, schools, and teachers at SDN 29 Idai encounter challenges such as no electricity because the solar panels can only illuminate the office, a limited number of classrooms that one is separated by a board to make two classrooms, fear of the spread of Covid-19 due to the lack

of awareness in implementing health protocols, and far distance of approximately 12 hours from health infrastructure and public services. The transition from offline to online learning is a challenge for teachers in Indonesia, particularly in 3T (Foremost, Outermost, and Disadvantaged). Meanwhile, despite the increasingly rapid development of science and technology, students' literacy competence in the 3T area remains relatively low (Pardosi, Manurung, & Firdianti, 2021).

PISA results indicate that Indonesia is one of the countries with a low scientific literacy with a score of 403, while the OECD average is 493 (Narut & Supradi, 2019). These unsatisfactory results indicate that there is a scientific literacy gap in Indonesia. As a result, the teacher's involvement in developing a culture of student literacy, particularly scientific literacy, is critical. The severe challenges that teachers experienced at SDN 29 Idai did not lessen their loyalty, nationalism, or efforts to enhance scientific literacy among students. Teachers at SDN 29 Idai have embraced the importance of the teacher's role in educating the nation's youth. The desire to develop, apply, and optimize mobile devices as a learning medium for students to acquire scientific literacy, reading-writing literacy, and digital literacy motivates teachers to optimize the utilization of offline applications.

The Covid-19 pandemic offers an opportunity to transform education by optimizing and leveraging technology to facilitate online learning, as well as maximizing the role of parents as mentors or distance learning partners (Atsani, 2020). According to this viewpoint, instructors must be able to innovate and adapt to changes in learning that emerge as a result of the pandemic. Priyani and Nawawi (2021) report During the pandemic, 40% of teachers in 3T areas favored problem-based learning, 30% preferred collaboration-based learning, 20% preferred discussion, and 10% selected learning-based learning. projects, whereas 60% prefer to give students assignments such as giving tasks from textbooks. During the pandemic, teacher creativity in shifting learning to online learning is increasingly being questioned, particularly in science learning. This is because science is an abstract subject that requires media in its implementation, such as practicum (Anggrella, Rahmasiwi, & Purbowati, 2021). Handayani and Jumadi (2021) added that science learning requires media in learning during a pandemic.

Scientific literacy is one of the benchmarks for students' success in learning science to improve their 21st century skills (Efendi & Barkara, 2021). There are four aspects of scientific literacy: 1) science as a body of knowledge, 2) science as a way of thinking, 3) science as a way of investigating, and 4) the interaction between science, technology, and society (Fitria, 2017). Science will be more significant if it is taught to students in a more engaging, enjoyable, and

technologically advanced way that conforms with the progress of the industrial revolution era 4.0 (Yuliati & Saputra, 2019). One of the uses of technology in education during the distance learning that has been provided by the Indonesian government by the Center for Educational Data and Statistics of the Ministry of Education and Culture (Pusdatin Kemendikbud) is an application named “Rumah Belajar” that can be accessed online or downloaded from the Google Play store. The was developed to optimize learning activities on the online system during a pandemic (Lathifah & Utami, 2021). Educators can apply several learning methods by utilizing some of the features available (Aini, 2021). According to Warsita (2020), Rumah Belajar can improve the quality of learning, because it may be used as a learning resource, a tool for facilitating online learning, and a tool for improving learning outcomes.

One use of Rumah Belajar is personalized learning using students' smartphones, specifically EclipseCrossword. EclipseCrossword is a simple educational game in the style of a crossword puzzle (TTS) that may be used to help students learn a vocabulary concept (Zulisa, 2021). Crossword puzzles are entertainment products or games that have the form of black and white boxes with horizontal and vertical lines (Anggraeni & Sole, 2020). According to Irawati, Haryati, & Meirawan (2020), students can increase their memory in studying by using crossword puzzles as a learning strategy. Crossword puzzles can be used in schools in the 3T area by developing questions and answers in the EclipseCrossword application, which is then printed for students to work on offline.

EclipseCrossword is a crossword puzzle that helps students' cognitive understanding by connecting the material presented with the game. Various studies regarding the advantages of using EclipseCrossword applications in improving learning (Zulisa, 2021) over the conventional methods (Irawati et al., 2020). According to Anggraeni & Sole (2020), physics learning using EclipseCrossword can develop creative thinking skills of students in STKIP Weetebula. As a result of past study results, the EclipseCrossword application can be utilized as an alternative learning tool.

During the pandemic, media-assisted learning will be more effective if implemented through a cooperative learning model for 21st century students' competencies (Alimudin, Wahyuningsih, & Sina, 2022). The cooperative learning model is a miniature of social life in which students can learn to recognize each other's strengths and weaknesses (Suparmi, 2012). Cooperative learning models can help students develop concepts and solve issues by working in groups to achieve the best results (Nuraeni, 2017). Astrissi, Sukardjo, and Hastuti (2014) indicated that cooperative learning is more successful when combined with a crossword puzzle

(EclipseCrossword).

This research was carried out in elementary schools located in the 3T area. The area is bordering Malaysia. In this study, the teacher's smartphone was used to utilized to access EclipseCrossword from Rumah Belajar initiated by the Pusdatin Kemdikbud to improve scientific literacy and learning achievement. The same study has never been done before, especially on the fourth-grade students of SD Negeri 29 Idai.

METHOD

This Classroom Action Research (CAR) uses the model proposed by Kemmis and McTaggart (Garinalis, Nurasiah, & Lyesmaya, 2018) that includes planning, acting, observing, and reflecting. The research was carried out for two cycles in the odd semester of the academic year 2020/2021 at SDN 29 Idai involving 12 fourth-grade students consisting of 4 female students and 8 male students. The indicators for the success of this CAR are; 1) Improvement of learning achievement in scientific literacy with $\geq 75\%$ of students meeting the KKM of 75; 2) The teacher and student learning activities achieve the set target of 90%. The first stage of learning was by planning learning activities in the form of lesson plans of the cooperative learning model. In this stage, the researcher analyzed the initial conditions of students before learning activities through their learning outcomes and competency. The activities to be carried out in the first cycle and the second cycle was developed. Next, the teacher installed the Rumah Belajar as well as selected materials and videos on the 'learning resource' feature for further download. Questions were created using the EclipseCrossword application. The next stage is making students' observation sheets. After the preparation was done, classroom learning was carried out using a device that has been installed with EclipseCrossword. After that, tests and reflections on the learning were carried out. The reflection results obtained in the first cycle were used to improve the second cycle. Following reflection in the second stage, the researcher decides whether to terminate classroom action research in cycle I or to continue study in the following cycle.

Data collection used an instrument in the form of an integrated test in the EclipseCrossword to determine students' scientific literacy scores. The results were presented in percentage with the guidelines for the classification of the scientific literacy ability, which can be seen in Table 1.

$$\text{Percentage: } \frac{\text{The number of Scientific Literacy scores that often appear in each aspect} \times 100\%}{\text{Total score of Scientific Literacy}}$$

Table 1. Classification of Scientific Literacy Ability

Mastery Level	Prediction
86-100%	Very Good
76-85%	Good
60-75%	Sufficient
55-59%	Poor
≤ 54%	Very Poor

Source: (Lestari, 2018)

Meanwhile, the indicators of scientific literacy competence can be seen in Table 2.

Table 2. Indicators of Scientific Literacy Competency

Competence	Indicator
Explaining the problem scientifically	<ul style="list-style-type: none"> Applying appropriate scientific knowledge Formulate questions based on the focus of the problem
Interpreting data scientifically	<ul style="list-style-type: none"> Presenting data using an appropriate variety of representations Analyzing information from each representation
Communicating scientific information	<ul style="list-style-type: none"> Summarizing information based on analysis Explaining the benefits of scientific knowledge to society
Carrying out scientific research	<ul style="list-style-type: none"> Identifying, using, and producing clear models and representations Identify assumptions, evidence, and reasoning in the reading
Evaluating scientific investigation	<ul style="list-style-type: none"> Evaluating how to explore questions scientifically Evaluating scientific arguments and evidence from various sources

Source: Setiawan & Saputri (2020)

Quantitative data was obtained from assignments and scientific literacy observation sheets. The data were analyzed using descriptive statistic presentation by computing the score per student, the mean score, and the percentage of scientific literacy scores. The data were described and conclusions were drawn based on the specified criteria.

RESULTS AND DISCUSSION

The EclipseCrossword application is immensely useful and makes it easier for teachers to construct test questions in the form of crosswords since it can create column answers horizontally and vertically based on the questions and answers wanted. The teacher can print the complete crossword puzzles and instruct students to fill in the lines provided. The learning theme was "Care for Living Creatures" with a sub-theme of "Animals and Plants in My Home Environment". The learning was more fascinating and was able to reduce the boredom of the fourth-grade students of SDN 29 Idai in the 3T area. In cycle 1 of the classroom action research, students' interest in learning using a device began to appear. Students begin to learn by completing crossword puzzles after watching the video that the teacher has downloaded, rather than by listening to the teacher's explanation. Boredom in studying reduces students' concentration, preventing them from receiving the lesson (Pawicara & Conilie, 2020).

Scientific literacy in elementary schools emphasizes the ability to apply learning experiences to daily activities (Setiawan & Saputri, 2020). The researcher discovered that in Cycle 1 after the teacher briefly presented the learning objectives and material, students do not appear to understand the use of Rumah Belajar, but students are very enthusiastic about watching video shows downloaded on the teacher's device. Students try to answer crossword questions after watching the video. The activities carried out in class can be seen in Figures 1 and Figure 2.

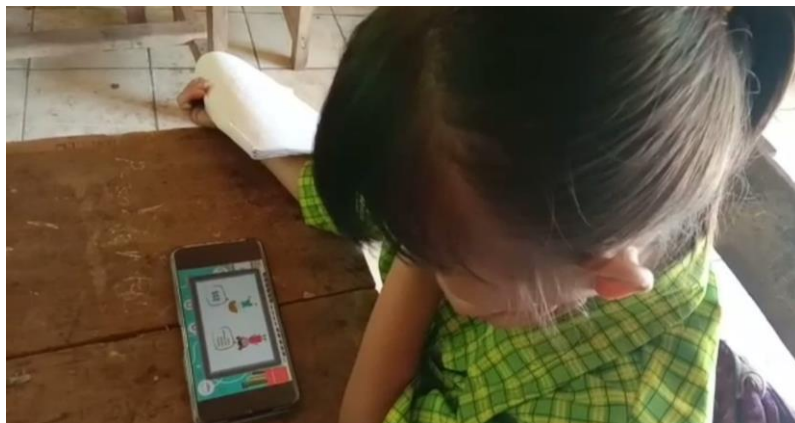


Figure 1. Students are Watching Video Shows from Rumah Belajar



Figure 2. Students are writing Notes while Watching Video from Rumah Belajar

Measurement of the results of scientific literacy observations using the EclipseCrossword application is depicted in Table 3.

Table 3. Observation Results of Scientific Literay in Cycle I and Cycle II

No	Scientific Observation	Literacy Indicators that emerge from observations	Observation Results Cycle 1	Observation Results Cycle 2
1	Students watch videos from Rumah Belajar to gain knowledge of scientific literacy	Applying appropriate scientific knowledge	59%	75%
2	Students write down important things from video in Rumah Belajar	Summarizing information based on analysis	50%	88%
3	Students can link the knowledge they got from the video with their previous knowledge	Analyzing information from each representation	42%	71%
4	Students can understand the benefits of plants for student life and the environment	Explaining the benefits of scientific knowledge for society	55%	79%
Average percentage of per-cycle scientific literacy			51%	78%
Difference between Cycle 1 and Cycle 2			27%	

Based on the results of observations, it was found that students could apply their scientific knowledge by watching the video in Rumah Belajar. This can be seen from the observation that in Cycle 1, scientific literacy skills observed is 51% and increase to 78% at the

end of Cycle 2. A description of the maximum value, minimum value, and Mean value in each cycle can be seen in Figure 3.

Based on the results of the assessment at the end of Cycle 1 of the 1st and 2nd meetings, the mean score were 49.17 and 57.50. In Cycle 1, there were 9 students at the 1st meeting and 7 students at the 2nd meeting who could not pass the passing grade for the minimum mastery criteria (KKM). The percentage in Cycle I of the 1st meeting was 25.00% and the percentage of Cycle I of the 2nd meeting was 41.67%. There are still many students who have not met the criterion, therefore the researchers proceed to the second cycle, where students become accustomed to using the EclipseCrossword. The mean score of Cycle 2 in the 1st meeting was 62.92 and the score of Cycle 2 in the 2nd meeting was 70.83. The percentage increased from 58.33% to 75.00% at the end of Cycle 2 of the 2nd meeting. The maximum value, minimum value, and mean value can be seen in Figure 3.

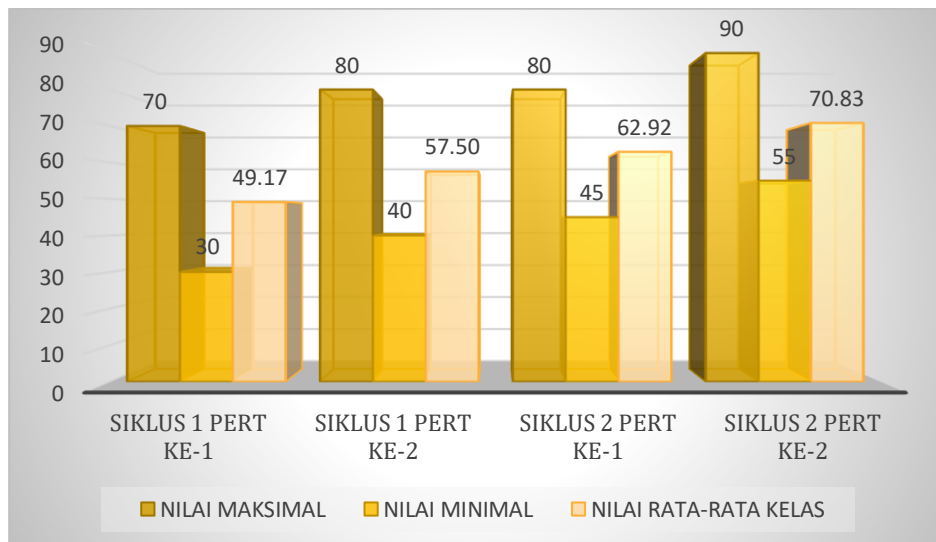


Figure 3. Maximum Value, Minimum Value, and Mean Value of Cycle 1 And Cycle 2

The reflection of Cycle I revealed problems. For instance, some students are still unable to complete the crossword puzzles and are passive, and did not consult their difficulties with the teacher. In Cycle II, students have understood the idea of using the application, but assistance is still required in comprehending complex lessons. In addition, Rumah Belajar does not have many videos, and the video content is still limited. The results of the reflection of Cycle 1 and Cycle 2 are presented in Table 3.

Table 3. The Reflection of Cycle 1 And Cycle 2

Cycle	Problems	Suggestion
1	<ul style="list-style-type: none"> • Some students could follow the instructions given, but still found it difficult to complete the crossword puzzle. • Some students are passive in asking questions 	<ul style="list-style-type: none"> • Researchers need to motivate students to be more active. • Researchers should manage time allotment
2	<ul style="list-style-type: none"> • Students have understood how to access Rumah Belajar but need assistance in understanding complex content. • Rumah Belajar does not provide a lot of videos and the video content is still limited 	<ul style="list-style-type: none"> • It takes patience and skill in guiding students to complete their assignments. • Researchers must download videos according to the theme being taught.

Scientific literacy is the ability to identify problems with scientific phenomena and be able to draw conclusions based on the sources and methods used (Rohmah, Zakaria Ansori, & Nahdi, 2019). Scientific literacy is taught to students at SDN 29 Idai through video. Students were found to be quite enthusiastic while learning while watching videos on the teacher's smartphone. This confirms a previous study (Setiawan & Saputri, 2020) that students' internal motivation is highly crucial during learning to attain the necessary skills; the stronger the internal motivation, the stronger the initiatives that appear to reach maximum results.

Learning with EclipseCrossword can help students to gain factual scientific knowledge through video. Video explanations were easily understood by students. It made learning more interesting. Students could connect the information received with the reality around them, such as the characteristics of flowers, plants, and their benefits for everyday life. The role of the teacher is also critical in linking the information received from the videos by presenting the benefits of plants for students' daily needs, such as consumption. Students from the Dayak tribe pick fern shoots for cooking and use wood in the forest to make houses. It will train students to strengthen their scientific literacy abilities through activities carried out by students. Fitria (2017) argues that scientific literacy should be developed beginning in elementary school so that students become accustomed to evaluating problems and applying them in everyday life. Another previous study (Qusthalani & Muharti, 2019) confirms the results of this study the use of virtual classes and virtual laboratories in Rumah Belajar using the Flicla Proling learning

model and the Si Asseb evaluation system can increase student activity and learning outcomes. Similar results were obtained by another study (Hardini, 2019) that cooperative in the form of Teams Games Tournament with Crossword Puzzles affected on learning outcomes.

This is proven based on the results presented in Figure 1 and Figure 2. Students were intent on listening to the explanation of the material from the home study application. In Cycle 2, the teacher invites students to be sensitive to the environment by always taking care of the plants around them. The advantages of using EclipseCrossword from Rumah Belajar in improving scientific literacy are its offline feature to be used at schools in the border areas, its interesting features, facilitating scientific literacy knowledge construction, and ease of measuring students' comprehension using crossword puzzles.

There are difficulties experienced by teachers in conducting classroom action research in the 3T area. Researchers had to walk for two hours to Lubuk Pantak village to look for internet the connection and download videos needed for learning activities. Because not all students own smartphones, they must take turns watching videos from Rumah Belajar. Weather conditions that are often gloomy and rainy make charging solar panels to recharge smartphone batteries difficult for researchers.

CONCLUSION

In this classroom action research, a series of activities in cooperative learning through EclipseCrossword from Rumah Belajar triggers students to be more enthusiastic about learning. It improved the scientific literacy of students at school in the border area of Indonesia, particularly the fourth-grade students at SD Negeri 29 Idai. Given that the scientific literacy level of elementary school students remains low, particularly in the 3T area, educators and education practitioners in Indonesia must address science literacy empowerment. To determine its benefits in learning, a study to optimize the utilization of Rumah Belajar from the Pusdatin Kemendikbudristek by integrating various learning models on scientific literacy should be conducted.

REFERENCES

- Aini, Y. I. (2021). Pemanfaatan rumah belajar pada pembelajaran di masa adaptasi kebiasaan baru. *Jurnal Teknodik*, 25(1), 81–93. <https://doi.org/10.32550/teknodik.v25i1.785>
- Alimudin, A., Wahyuningsih, E. D., & Sina, I. (2022). Pengaruh model pembelajaran kooperatif berbantuan media sosial terhadap motivasi belajar dan kompetensi abad 21 di masa

pandemi. *Jurnal Ilmiah Pendidikan Matematika*, 7(1), 30–41.
<https://doi.org/10.26877/jipmat.v7i1.9199>

- Anggraeni, D. M., & Sole, F. B. (2020). Developing creative thinking skills of STKIP weetebula students through physics crossword puzzle learning media using eclipse crossword app. *Journal of Physics: Conference Series*, 1521(2), 1–5. <https://doi.org/10.1088/1742-6596/1521/2/022045>
- Anggrella, D. P., Rahmasiwi, A., & Purbowati, D. (2021). Eksplorasi kegiatan praktikum ipa pgmi selama pandemi covid-19. *SAP (Susunan Artikel Pendidikan)*, 6(1), 76–83. <https://doi.org/10.30998/sap.v6i1.9612>
- Astrissi, D., Sukardjo, J., & Hastuti, B. (2014). Efektivitas model pembelajaran teams games tournament (TGT) disertai media teka teki silang terhadap prestasi belajar pada materi minyak bumi siswa kelas x sma negeri 3 sukoharjo tahun pelajaran 2012/2013. *Jurnal Pendidikan Kimia (JPK)*, 3(2), 22–27. Retrieved from <https://media.neliti.com/media/publications/126433-ID-none.pdf>
- Atsani, L. G. M. Z. (2020). Transformasi media pembelajaran pada masa pandemi covid-19. *Al-Hikmah: Jurnal Studi Islam*, 1(1), 82–93. Retrieved from <http://ejournal.kopertais4.or.id/sasambo/index.php/alhikmah/article/view/3905>
- Efendi, N., & Barkara, R. S. (2021). Studi literatur literasi sains di sekolah dasar. *Jurnal Dharma PGSD*, 1(2), 57–64. Retrieved from <http://ejournal.undhari.ac.id/index.php/judha/article/view/193>
- Fitria, Y. (2017). Pembelajaran literasi sains untuk level dasar. *Seminar Nasional Pendidikan Guru Sekolah Dasar*, 30–40. Retrieved from <http://repository.unp.ac.id/id/eprint/15728>
- Garinalis, W., Nurashiah, & Lyesmaya, D. (2018). Penerapan pendekatan experiential learning dalam pembelajaran ipa untuk meningkatkan berpikir kritis pada siswa sekolah dasar. *Attadib Journal Of Elementary Education*, 2(1). <https://doi.org/10.32507/attadib.v2i1.249>
- Handayani, N. A., & Jumadi, J. (2021). Analisis pembelajaran ipa secara daring pada masa pandemi covid-19. *Jurnal Pendidikan Sains Indonesia*, 9(2), 217–233. <https://doi.org/10.24815/jpsi.v9i2.19033>
- Hardini, A. (2019). Pengaruh penggunaan crossword puzzle pada pembelajaran kooperatif tipe teams games tournament terhadap hasil belajar peserta didik. Retrieved from <http://repository.uinjkt.ac.id/dspace/handle/123456789/46523>
- Irawati, I., Haryati, I., & Meirawan, D. (2020). Efektifitas penggunaan aplikasi eclipse crossword (teka teki silang) pada peningkatan hasil belajar siswa kelas vi sd negeri 56 tolobali kota bima. *Jurnal Pendidikan Bahasa*, 10(2), 4–13. Retrieved from <http://www.ejournal.tsb.ac.id/index.php/jpb/article/view/369%0Ahttp://www.ejournal.tsb.ac.id/index.php/jpb/article/download/369/254>
- Lathifah, Z. K., & Utami, I. I. S. (2021). Bimbingan teknis aplikasi portal rumah belajar pada praktik pembelajaran daring di masa pandemi covid-19. *Warta LPM*, 24(2), 367–379. <https://doi.org/10.23917/warta.v24i2.13529>

- Lestari, S. P. (2018). Analisis literasi sains mahasiswa program studi pendidikan biologi uin raden intan lampung. Retrieved from <http://repository.radenintan.ac.id/id/eprint/3499>
- Narut, Y. F., & Supradi, K. (2019). Literasi sains peserta didik dalam pembelajaran ipa di indonesia. *Jurnal Inovasi Pendidikan Dasar*, 3(1), 61–69. Retrieved from <http://jurnal.unikastpaulus.ac.id/index.php/jipd/article/view/214>
- Nuraeni, D. (2017). Pentingnya pembelajaran kooperatif dalam aktivitas belajar pada siswa dewi. *Prosiding Seminar Nasional Mahasiswa Kerjasama Direktorat Jenderal Guru Dan Tenaga Kependidikan Kemendikbud 2016*, 4(1). Retrieved from <http://pasca.um.ac.id/conferences/index.php/index/search/titles?searchPage=24>
- Pardosi, B. Y. A., Manurung, L. M. R., & Firdianti, R. (2021). Peran mahasiswa sebagai volunteer dalam meningkatkan kualitas literasi di desa 3T. *Aksara: Jurnal Ilmu Pendidikan Nonformal*, 7(2), 81–92. <https://doi.org/10.37905/aksara.7.2.589-596.2021>
- Pawicara, R., & Conilie, M. (2020). Analisis pembelajaran daring terhadap kejenuhan belajar mahasiswa tadris biologi iain jember di tengah pandemi covid-19. *ALVEOLI: Jurnal Pendidikan Biologi*, 1(1), 29–38. <https://doi.org/10.35719/alveoli.v1i1.7>
- Priyani, E. N., & Nawawi, N. (2020). Pembelajaran ipa berbasis ethno-stem berbantu mikroskop digital untuk meningkatkan keterampilan proses sains di sekolah perbatasan. *WASIS: Jurnal Ilmiah Pendidikan*, 1(2), 99–104. <https://doi.org/10.24176/wasis.v1i2.5435>
- Priyani, E. N., & Nawawi, N. (2021). Analisis pembelajaran stem di daerah terluar tertinggal terdepan indonesia selama masa pandemi. *Pancasakti Science Education Journal PSEJ*, 6(1), 30–37. <https://doi.org/10.24905/psej.v6i1.30>
- Qusthalani, Q., & Muharti, M. (2019). Analisis pembelajaran materi hukum newton melalui model flicla proling berbasis portal rumah belajar terintegrasi si asseb. *Jurnal IPA & Pembelajaran IPA*, 3(2). <https://doi.org/10.24815/jipi.v3i2.14577>
- Rohmah, U. N., Zakaria Ansori, Y., & Nahdi, D. S. (2019). Pendekatan pembelajaran stem dalam meningkatkan kemampuan literasi sains siswa sekolah dasar. *Seminar Nasional Pendidikan*, 1, 471–478. Retrieved from <http://prosiding.unma.ac.id/index.php/semnasfkip/article/view/68>
- Setiawan, A. R., & Saputri, W. E. (2020). Pembelajaran literasi saintifik untuk pendidikan dasar. *Media Penelitian Pendidikan : Jurnal Penelitian Dalam Bidang Pendidikan Dan Pengajaran*, 14(2). <https://doi.org/10.26877/mpp.v14i2.5794>
- Suparmi, S. (2012). Pembelajaran kooperatif dalam pendidikan multikultural. *Jurnal Pembangunan Pendidikan: Fondasi Dan Aplikasi*, 1(1), 108–118. <https://doi.org/10.21831/jppfa.v1i1.1055>
- Susilawati, E. (2018). Dampak program diklat online tik guru pustekkom terhadap aksesibilitas konten pembelajaran pada fitur rumah belajar. *Jurnal Pendidikan*, 19(2), 84. <https://doi.org/10.33830/jp.v19i2.687.2018>
- Warsita, B.-. (2020). Pemanfaatan portal rumah belajar untuk meningkatkan kualitas pembelajaran. *Jurnal Teknodik*, 23(1), 65–78. <https://doi.org/10.32550/teknodik.v0i0.355>

- Yuliati, Y., & Saputra, D. S. (2019). Pembelajaran sains di era revolusi industri 4.0. *Jurnal Cakrawala Pendas*, 5(2), 167–171. <https://doi.org/10.31949/jcp.v5i2.1389>
- Zulisa, E. (2021). Pengaruh penggunaan game edukasi eclipse crossword terhadap hasil belajar mahasiswa kebidanan program sarjana untuk mata kuliah. *Prosiding SEMDI-UNAYA (Seminar Nasional Multi Disiplin Ilmu UNAYA)*, 4(1), 168–176. Retrieved from <http://jurnal.abulyatama.ac.id/index.php/semiunaya/article/view/2396>