JISIP (Jurnal Ilmu Sosial dan Pendidikan)
Vol. 9 No. 4 November 2025
e-ISSN : 2656-6753, p-ISSN: 2598-9944
DOI: *10.36312/jisip.v9i4.9513/http://ejournal.mandalanursa.org/index.php/JISIP/index*

The Effect of Implementing PJBL-Based E-Learning in the Independent Curriculum in Improving Science Literacy

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Article Info
Article history:
Received: 1 October 2025
Publish: 1 November 2025

Keywords:
Based E-Learning;
PJBL;
Independent Curriculum;
Science Literacy.

Abstract
The curriculum of STKIP Harapan Bima establishes the course Science Learning in Elementary Schools, with a lecture duration of 60 minutes per course. Such a limited time demands the achievement of indicators: students are able to explain, apply, and analyze material related to science learning. The use of textbooks or e-books does not always succeed in encouraging students to gain prior understanding before starting class sessions. Students rarely read the provided materials. Some of them struggle to grasp the meaning of the content. In fact, many students do not even open the files given. As a result, they lack prior understanding when beginning classroom learning. The main objective of this study is to determine the effect of implementing E-Learning based on Project-Based Learning (PjBL) to improve scientific literacy skills. The method used in this research is a quasi-experimental method. A quasi-experimental method is a research method in which the implementation does not use random assignment, but rather utilizes existing groups. The learning provided had a positive, significant, and equitable impact on student learning outcomes. The large average increase, the improvement of minimum scores eliminating low-achieving students, and the consistency of score distribution indicate that learning objectives were effectively achieved. Based on the results of the Kolmogorov-Smirnov and Shapiro-Wilk tests, it can be concluded that the research data were normally distributed ($p > 0.05$). From Levene's Test, it can be concluded that the pretest and posttest scores had homogeneous variances ($p > 0.05$). This strengthens the validity of using parametric tests in analyzing the differences in students' learning outcomes before and after the learning treatment. The results of the paired t-test indicate that there is a significant difference between pretest and posttest scores ($t = 38.1054$; $p < 0.05$). This proves that the applied learning treatment or method was effective in improving students' learning outcomes. The use of e-learning based on Project-Based Learning (PjBL) was proven effective with an average score achievement of 80.88. This demonstrates that the learning model was able to significantly enhance students' learning outcomes while also supporting the mastery of 21st-century competencies such as critical thinking, collaboration, and problem-solving.

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1. INTRODUCTION

Teaching science to students is a challenging and complex process. The reason is that science is considered as a group of subjects which is difficult and boring. In addition, teachers must be aware that learning

Science often involves basic knowledge that students already bring with them. This basic knowledge can sometimes help students understand science, sometimes also leads to scientific misunderstanding [1]. Attempts to creating a conducive and enjoyable learning atmosphere is necessary interesting learning. Students do not feel burdened by the material must be mastered. If students themselves search, process and draw conclusions about the problems being studied, the knowledge gained will last longer. stick in the mind. Teachers as facilitators have the ability to choose effective learning methods to improve thinking skills students[2].*E-Learning* is a process of instruction or learning that involves the use of electronic equipment in creating, helping development, conveying, assessing and facilitating a learning process teaching where the student is the center and is done interactively anytime and anywhere [3].*E-learning* facilitate interaction between participants educate with learning materials/subjects[4]. Its meaning *E-learning* develops as a result there is a need[5]. This project-based learning focuses more on meaningful life problems for students, the role of the teacher is to present the problem, ask questions, and facilitate students in designing a project what they do[6]. This project-based learning focuses more on meaningful life problems for students, the role of the teacher is to present the problem, ask questions, and facilitate students in designing a project which they do[7]**.** Scientific literacy is a skill that must be possessed in designing scientific activities and applying the concepts owned in real life[8]. Scientific literacy is divided into three dimensions, namely: content (scientific knowledge), process (scientific competence), and context (scientific application)[9].

The STKIP Harapan Bima curriculum establishes elementary school science learning courses, where the duration of lecture hours is 60 minutes per course. That's a long time short demands to achieve indicators: students are able to explain, apply and analyze materials related to science learning. The use of textbooks/e-books is not always successful in encouraging Students have an initial understanding before starting lectures in class. Students rarely read the material given. Some of them have difficulty understand the meaning of the content of the material. In fact, most students do not open the given file. As a result, students do not have a prior understanding when starting class. A short time only spent explaining the material. So that some parts of the session student activities are not conveyed and missed. This problem attract the attention of researchers to implement PJBL-based E-Learning in Independent Curriculum in Improving Science Literacy Skills, where learning is carried out using PJBL-based e-learning and The learning process in the PJBL-based learning model is carried out by paying attention to learning styles and being able to improve students' scientific literacy. This learning was designed directly by researchers based on the material in each lectures. Learning using project-based e-learning for Improving scientific literacy by implementing E-Learning will be very suitable and assisting with the condition of STKIP Harapan Bima students in Science Lessons SD. The main objective of this study is to determine the effect of implementing E PJBL-based learning to improve science literacy skills.

The problem above is that learning must be carried out with an orientation for students, including by implementing learning using E PJBL-Based Learning. PJBL-based learning is a technique that provide innovation in the art of teaching. teaching methods that use problems in the system with the aim of making it easier for students in the process of understanding and absorbing the theory provided. This model using a contextual approach and developing student skills in critical thinking. So that you are able to consider the best decision which is taken as a solution to the problem that is received. Considering the pros and cons of a decision used as a solution also included in the theory given. PJBL work is often interpreted as work that is composed of several tasks and is based on questions and problems that require students to tend to think critically in searching the solution. The problem-solving steps taken by students can used as a basis for conducting an assessment. The main objective of this research is to to determine the influence of implementing PJBL-based E-Learning to improve science literacy skills

Table 1. STATE OF THE ART and NOVELTY

Article Title	Author, Year of Publication, Journal Name	Research Differences as a Basis for Research Implementation
E-Learning Model Development for Improving Students' Academic Achievement in the Ability to Use Digital Educational Audio Media Through Websites	Russian. (2016), Kwangsan, 4(1), 1–15.	In this study, an e-learning based learning model was developed. learning to improve student learning outcomes in the MKDK Curriculum and Learning Course. The research above only focuses on the development and learning outcomes of students, there are updates made, namely PJBL-based E-learning to improve Science Literacy skills.

The Influence of Project-Based Learning Model on Creativity and Learning Outcomes of Elementary School Science Education of Pgsd Students at Undiksha UPP Singaraja.	Rati, N. W., Kusmaryatni, N., & Rediani, N. (2017), JPI (Journal of Indonesian Education), 6(1), 60–71. https://doi.org/10.23887/jpi-undiksha.v6i1.9059	This study examines the effect of project-based learning models on student creativity and learning outcomes, both partially and simultaneously. This study utilizes e-learning directly, and includes a PJBL-based learning process, allowing students to learn according to their own learning styles to improve their literacy skills. student science

Efforts to Improve Students' Science Literacy Through Local Excellence-Based Learning.	Ofiana, M., & Julianto, T. (2018), Biosphere: Journal of Biology Education, 9(1), 24. https://doi.org/10.24042/biosf.v9i1.2876	The results of previous research on the scientific literacy profile of junior high school students in Purwokerto city show that students' scientific literacy in terms of content, context, and process is still relatively low. Low scientific literacy causes students to be less responsive to developments and issues in their environment, especially those related to natural phenomena, local regional advantages, and environmental problems. Therefore, the researcher conducted this study with the following questions: E-Learning Implementation Update

		Based on PJBL in the Independent Curriculum in Improving Science Literacy Skills because the average research that is raised is more directed at knowing and understanding how E-Learning works, but in this research, learning directly uses E-Learning and there is a PJBL-based learning process where students can learn according to their own learning style so they can improve literacy skills. student science

2. RESEARCH METHODS

The method used in this study is a quasi-experimental method. The quasi-experimental method is a research method that in its implementation does not use random assignment but rather uses existing groups. The use of this quasi-experimental method is based on the consideration that in the implementation of this study learning takes place naturally, and students do not feel experimented on, so that with such a situation it is expected to contribute to the level of validity of the study. In this study there are two variables, namely the independent variable and the dependent variable. The use of PJBL-based E-Learning in the experimental class is the independent variable (X). While student learning outcomes in the cognitive domain, namely aspects of knowledge, understanding, and application, are placed as the dependent variable (Y). The relationship between variables can be seen in the following table..

Table 2 Table of Relationships Between Variables

Independent Variable / Dependent Variable	Experimental Class (X1)
Learning Outcomes in Knowledge Aspect (Y1)	X1Y1
Learning Outcomes for Understanding Aspect (Y2)	X1Y2
Learning Outcomes for Application Aspect (Y3)	X1Y3

Information

:
X1Y1: Implementation of PJBL-Based E-Learning in the Independent Curriculum to Improve Science Literacy;
X1Y2: Implementation of PJBL-Based E-Learning in the Independent Curriculum to Improve Science Literacy;
X1Y3: Implementation of PJBL-Based E-Learning in the Independent Curriculum to Improve Science Literacy.

This research was conducted in the Elementary School Teacher Education Study Program, at STKIP Harapan Bima. The research objects were students of the Elementary School Teacher Education Study Program class of 2022, with the assumption that this class is considered representative of the student population as a whole and has more or less obtained or been introduced to E-Learning Https://Elearning.Habi.Ac.Id/ this becomes the basis for students to at least know how to use E-Learning in learning.

3. RESEARCH RESULTS AND DISCUSSION

3.1.Research result

1.Descriptive Statistical Analysis

Table 3 Statistics Descriptive

Statistics	Pretest Score	Nilai posttest
Number of students (n)	25	25
Maximum Value	76	96
Minimum Value	60	80
Total Amount (∑X)	1716	2126
Rate rate ($\bar{X}$)	68.64	85.04
Standard Deviation (s)	≈4.87	≈4.79

BasicallyIn general, in Table 3, there is a significant increase in student learning outcomes, as seen from the statistical comparison of Pretest and Posttest Scores. The number of students (n) for both tests is the same, namely 25 people. This ensures that the comparison is carried out on the same sample group. Average Increase: There was a clear increase in the average score. The average Pretest score was 68.64. The average Posttest score increased sharply to 85.04. The average increase of 85.04−68.64=16.40 indicates a strong positive impact of the learning materials provided. The highest score increased from 76 (Pretest) to 96 (Posttest). This increase indicates that at least one student achieved a very high score (near perfect) after learning. Meanwhile, the lowest score also increased from 60 (Pretest) to 80 (Posttest). This increase in the minimum score is very important because it indicates that no students are below 80, which could be the passing grade or the target for mastery of the material. in Standard Deviation (Standard Deviation): The standard deviation value shows the distribution of data from the average score. The pretest score has a standard deviation ≈ 4.87. The posttest score has a standard deviation ≈ 4.79. The standard deviation values of these two tests are very similar. This indicates that the level of heterogeneity or diversity of student scores is relatively unchanged even though the average score has increased overall. In other words, the group of students still has a consistent level of distribution of scores, but the distribution has "shifted" to a higher range of scores. These data indicate that the learning carried out is very effective in improving student learning outcomes. The main evidence is the large increase in the average score (from 68.64 to 85.04)

and the significant increase in the minimum score (from 60 to 80), which indicates that all students have achieved a much better level of mastery of the material.

2. Prerequisite Analysis Test

Data Normality Test

The prerequisite test for the analysis carried out was the data normality test using the tes Kolmogorov-Smirnov and Shapiro and data homogeneity test using Levene Test. The results of the normality test on the data of science literacy skills obtained by students during the learning process are presented in Table 3 below. The prerequisite analysis tests carried out were the data normality test using the Kolmogorov-Smirnov test and the data homogeneity test using the Levene Test. The results of the normality test on the data of science literacy skills obtained during the learning process are presented in Table 4 below.

Table 4 Normality Test

Normality Test	N	Statistics	Say. (p-value)	Information
Kolmogorov-Smirnov	25	0.143	0.200	Data is normally distributed (p > 0.05)
Shapiro-Wilk	25	0.959	0.345	Data is normally distributed (p > 0.05)

Both statistical tests produce a significance value (Sig. or p-value) greater than 0.05 (p>0.05). Kolmogorov-Smirnov test: The p-value is 0.200. Since 0.200>0.05, the Null Hypothesis (H0) is accepted, meaning the data is normally distributed. Shapiro-Wilk test: The p-value is 0.345. Since 0.345>0.05, the Null Hypothesis (H0) is accepted, meaning the data is normally distributed.

Data Homogeneity Test

The results of the homogeneity test on the scientific literacy skills data obtained by students during the learning process are presented in Table 5 below.

Table 5. Homogeneity Test

Variables	Levene's stat	p-value	Interpretation (α=0.05)
prettest	0.8549	0.3648	Homogeneous (failed to reject H_0)
posttest	0.5431	0.4686	Homogeneous (failed to reject H_0)

The analysis results show that the data for the pretest and posttest variables are homogeneous. Homogeneity of variance is an important statistical assumption, especially in comparative analysis where scores in tested groups are equal. The test used to check this assumption is Levene's Test with a significance level (α) of 0.05. The decision-making criteria are: If the p-value>α (0.05), then the variance is homogeneous (fails to reject the Null Hypothesis/Ho). If the p-value≤α (0.05), then the variance is not homogeneous (rejects the Null Hypothesis/Ho). Variable of *pretest*: The p-value obtained is 0.3648. Since 0.3648>0.05, the data variance of *pretest* homogeneous, as well as the variables of *posttest*: The p-value obtained is 0.4686. Since 0.4686>0.05, the data variance of *posttest* homogeneous. Based on the results of Levene's Test, it can be concluded that the score variance for the variable *pretest* and *posttest* there is no significant difference. In other words, the assumption of homogeneity of variance is met for both variables.

3. Hypothesis Testing

To test whether this average increase is truly statistically significant, a t-test (generally *paired sample t-test* or paired sample t-test, considering that these are pretest and posttest scores from the same group)

t-Test Statistics	38.1054
p-value	0.0000 (very small, <0.05)
Significance Level (α)	0.05

Results:

1. Null Hypothesis (H0) and Alternative Hypothesis (Ha):
   H0: There is no significant difference between the average pretest and posttest scores.
   Ha: There is a significant difference between the average pretest and posttest scores.
2. Decision Making Criteria:
   H0 is rejected if p-value ≤α.
   H0 is accepted if the p-value >α.
3. Conclusion: Because the p-value (0.0000) is much smaller than the significance level α (0.05), H0 is rejected.

The decision to reject H0 leads to the conclusion that there is a significant difference between the pretest and posttest scores. The increase in the mean from 67.44 to 86.88 is not simply a coincidence or random variation, but rather represents a statistically significant impact of the intervention or treatment administered between the pretest and posttest periods. This result indicates that the intervention was effective in improving the measured outcome or performance.

3.2. Discussion

There was a significant increase in student learning outcomes after the instruction. The number of students in the pretest and posttest was the same, 25, so the comparison was made within the same group and was valid for assessing the changes. The average pretest score of 68.64 increased to 85.04 in the posttest. The difference of 16.40 points indicates a strong impact of the learning provided. This average increase confirms that students generally absorbed the material well after the intervention. The maximum score increased from 76 (pretest) to 96 (posttest). This indicates that some students achieved near-perfect scores after the learning process. Meanwhile, the minimum score increased from 60 (pretest) to 80 (posttest). This increase in the lowest score is very important, because it indicates that no students scored below 80. Thus, all students successfully achieved scores above the minimum achievement/completion limit. The standard deviation for the pretest was ≈ 4.87 and for the posttest was ≈ 4.87.≈ 4.79. The relatively similar standard deviation values indicate that the level of diversity in student scores has not changed significantly. In other words, although the average score increased overall, the distribution of student scores remained consistent. This means that the increase in scores occurred evenly across all students, not just a small percentage. These results provide evidence that the learning process was very effective in improving student mastery of the material. The significant increase in the average score, minimum score, and maximum score indicates overall improvement—for students with low, medium, and high abilities. This proves that the learning strategy implemented was able to encourage all students to achieve better competencies.

the results of the normality test using two methods, namely Kolmogorov-Smirnov and Shapiro-Wilk, with the number of samples (**N**) = 25 students. Kolmogorov-Smirnov Test, Test statistic = 0.143**,** p-value **=** 0.200, Because the p value > 0.05, the data is declared to be normally distributed. And the Shapiro-Wilk Test is the test statistic**=** 0,959**,**p-value = 0.345, because the p-value > 0.05, the data is also stated to be normally distributed**.** Both normality test methods produce the same conclusion, namely that the data is normally distributed.

The homogeneity test was conducted to determine whether the data had the same variance (homogeneous) between groups. Homogeneity of variance is one of the important assumptions in parametric tests, especially when analyzing mean differences. In this study, Levene's Test was used with a significance level (α) = 0.05. The Pretest variable Levene's statistic = 0.8549, p-value = 0.3648, Because p> 0.05, then H_0 fails to be rejected, meaning that the pretest data variance is homogeneous. In the Posttest Variable Levene's statistic = 0.5431, p-value**=** 0,4686**,** Because **p > 0,05**, then H_0 fails to be rejected, meaning the posttest data variance is also homogeneous. The test results show that both the pretest and posttest data have homogeneous variance. Thus, the homogeneity assumption is met, so the data is suitable for analysis using parametric tests, such as the paired t-test.

The paired t-test was used to determine whether there was a significant difference between students' pretest and posttest scores. This test was appropriate because the data came from the same group (the same students were tested before and after the treatment). The t-test statistic value The results of the analysis show the calculated t value**=** 38,1054**,** very large. This value indicates that there is a significant difference between the pretest and posttest averages. p-value Nilai p-value = 0,0000 (very small, far below α = 0.05). This means that the possibility that the difference in the averages occurred only by chance is very small. Significance Level (α) With a significance level of α = 0.05, the decision rule is: If $p \leq \alpha \rightarrow$ reject H_0 and If $p > \alpha \rightarrow$ failed to reject H_0 Because the p-value (0.0000) < 0.05, then H_0 is rejected. This result shows that there is a significant difference between the average pretest and posttest scores. In other words, the learning provided has a positive effect. which is real towards improving student learning outcomes.

The results of the study show that the implementation of e-learning based on Project Based Learning (PjBL) results in average value many students amounted to 80.88obtained from instrument of understanding the influence of implementing PJBL-based e-learning on the independent curriculum in improving scientific literacy. The average value is above the minimum completion category usually set in schools, so it can be interpreted that the majority of students have achieved the expected competencies.

1. **Effectiveness of PjBL-based E-learning**
   Project-Based Learning (PjBL) is a learning model that emphasizes active student involvement through real-world projects. Integrating this model into an e-learning platform provides flexibility in time and location, as well as facilitating student access to materials, instructions, and discussion forums. An average score of 80.88 indicates that this strategy is effective in improving conceptual understanding and problem-solving skills.
2. **Active Student Involvement**
   PjBL-based e-learning encourages students to actively seek information, discuss, and present project results online. This aligns with the principles of student-centered *learning*, where students do not only receive information passively, but build knowledge independently and collaboratively.

3. **Improving Learning Outcomes**
   The average score of 80.88 reflects that most students were able to successfully complete the project and gain a deep understanding of the material. This improvement also indicates that project-based learning in an e-learning format can bridge differences in student abilities, resulting in relatively equitable learning outcomes.
4. **Learning Implications**
   With these average scores, it can be concluded that the implementation of PjBL-based e-learning not only supports cognitive achievement but also other skills such as collaboration, communication, creativity, and responsibility. This success demonstrates that this method is worthy of consideration as an innovative learning strategy, especially in the digital age.

4. CONCLUSION

1. The learning provided had a positive, significant, and equitable impact on student learning outcomes. The significant average increase, the increase in minimum scores that eliminated low-achieving students, and the consistency of score distribution indicate that learning objectives were effectively achieved.
2. Based on the results of the Kolmogorov-Smirnov and Shapiro-Wilk tests, it can be concluded that the research data is normally distributed ($p > 0.05$).
3. Based on the results of the Levene's Test, it can be concluded that the pretest and posttest scores have homogeneous variance ($p > 0.05$). This strengthens the validity of using parametric tests in analyzing differences in student learning outcomes before and after the learning treatment.
4. Based on the results of the paired t-test, it can be concluded that there is the **difference significant** difference between pretest and posttest scores ($t = 38.1054$; $p < 0.05$). This proves that the applied treatment or learning method is effective in improving student learning outcomes. Based on the results of the paired t-test, it can be concluded that there is a significant difference between pretest and posttest scores ($t = 38.1054$; $p < 0.05$). This proves that the applied treatment or learning method is effective in improving student learning outcomes.
5. The use of e-learning based on Project Based Learning (PjBL) has proven to be effective with an average score of 80.88..This shows that this learning model is able to significantly improve student learning outcomes while supporting the mastery of 21st-century competencies such as critical thinking, collaboration, and problem solving.

5. ACKNOWLEDGEMENT

Thank you to the Directorate of Research and Community Service (DPPM), Ministry of Higher Education, Science, and Technology (Kemdiktisaintek), with contract number: 129/C3/DT.05.00/PL/2025, which has funded 100% of this research so that this research can be carried out well and smoothly, and can contribute to the improvement of science. Thank you to STKIP Harapan Bima for supporting the smooth process of this research process.

6. BIBLIOGRAPHY

[1] Nursa'ban, E., Masykuri, M., & Yamtinah, S. (2019). Improving student learning outcomes in science subjects through the implementation of PBL-based module. *JPBI (Jurnal Pendidikan Biologi Indonesia)*, *5*(2), 269–276. https://doi.org/10.22219/jpbi.v5i2.753

[2] Nursa'ban, E., Ewisahrani, E., & Fathurrahmaniah, F. (2021). Penggunaan Modul Kimia Berbasis Problem Based Learning (PBL) untuk Meningkatkan Hasil Belajar Siswa. *JISIP (Jurnal Ilmu Sosial Dan Pendidikan)*, *5*(2), 572–576. https://doi.org/10.58258/jisip.v5i2.2004

[3] Setiawardhani, R. T. (2013). Pembelajaran Elektronik (E-Learning) Dan Internet Dalam Rangka Mengoptimalkan Kreativitas Belajar Siswa. *Edunomic, Jurnal Ilmiah Pend. Ekonomi*, *2*, 82–96.

[4] Khatimi, H. (2006). Mengenal E-Learning Sebagai Salah Satu Bentuk Kegiatan Pembelajaran. *Info Teknik*, *7*(2), 72–81.

[5] Putri, D. P. E. (2019). Implementasi E-learning Sebagai Media Pembelajaran Pada Era Milenial.*Tarbawy: Jurnal Pendidikan Islam*, *6*(2), 86–92. https://doi.org/10.32923/tarbawy.v6i2.1238

[6] Nugraheni, D. (2018). Project Based Learning in Heat and Transfer Material to Increase Student's Creativity. *Jurnal Penelitian Pembelajaran Fisika*, *9*(2), 73–79.https://doi.org/10.26877/jp2f.v9i2.2798

[7] Anggraini, P. D., & Wulandari, S. S. (2020). Analisis Penggunaan Model Pembelajaran Project Based Learning Dalam Peningkatan Keaktifan Siswa. *Jurnal Pendidikan Administrasi Perkantoran (JPAP)*, *9*(2), 292–299. https://doi.org/10.26740/jpap.v9n2.p292-299

[8] Nursa'ban, E., & Ewisahrani, E. (2021). Pengaruh Model Pembelajaran Discovery Learning dan Self Efficacy Terhadap Keterampilan Literasi Sains. *JISIP (Jurnal Ilmu Sosial Dan Pendidikan)*, *5*(4). https://doi.org/10.58258/jisip.v5i4.2611

[9] Suciati,. et al. (2014). Identifikasi Kemampuan Siswa dalam Pembelajaran Biologi. Seminar *Nasional Pendidikan Sains IV 2014*.

[10] Rusman. (2016). Pengembangan Model E-Learning Untuk Meningkatkan Hasil Belajar Mahasiswa E-Learning Model Development For Improving Students' Academic Achievement Rusman Kemampuan Penggunaan Media Audio Pendidikan Digital Melalui Website. *Kwangsan*, *4*(1), 1–15.

[11] Rati, N. W., Kusmaryatni, N., & Rediani, N. (2017). Pengaruh Model Pembelajaran Berbasis Proyek Terhadap Kreativitas Dan Hasil Belajar Pendidikan IPA SD Mahasiswa PGSD Undiksha Upp Singaraja. *JPI (Jurnal Pendidikan Indonesia)*, *6*(1), 60–71. https://doi.org/10.23887/jpiundiksha.v6i1.9059

[12] Nofiana, M., & Julianto, T. (2018). Upaya Peningkatan Literasi Sains Siswa Melalui Pembelajaran Berbasis Keunggulan Lokal. *Biosfer : Jurnal Tadris Biologi*, *9*(1), 24. https://doi.org/10.24042/biosf.v9i1.2876