Al-Ishlah: Jurnal Pendidikan
Vol.15, 2 (June, 2023), pp. 2182-2191
ISSN: 2087-9490 EISSN: 2597-940X, DOI: 10.35445/alishlah.v15i2.2791

Development of Blended Learning-Based Science Module on Sound Material to Improve Learning Outcomes of Fourth-grade Elementary School Students

Pramyta Nur Insani[1], Su'ad[2], Ahmad Hariyadi[3]

[1] Universitas Muria Kudus, Kudus, Indonesia; 1st.pramyta@gmail.com
[2] Universitas Muria Kudus, Kudus, Indonesia; suad@umk.ac.id
[3] Universitas Muria Kudus, Kudus, Indonesia; ahmad.hariyadi@umk.ac.id

ARTICLE INFO

Keywords:

Module;
Blended Learning;
Learning Outcomes

Article history:

Received 2022-09-19
Revised 2022-11-04
Accepted 2023-05-16

ABSTRACT

This research is motivated by the lack of learning resources that can support learning during the learning process, both face-to-face and independently, which causes a decline in student learning outcomes. This study aims to design and analyzing the effectiveness of blended learning-based science learning modules on sound material to improve learning outcomes of fourth-grade elementary school students. This study is a research and development (R &D) by Borg and Gall, with an operational test design using a pretest-posttest control group design. There are 33 students in an experimental class and 31 students in a control class in grade IV. The results showed the module is valid and effective with good criteria, for the experimental class with pretest results of 53.5 and posttest of 71.5 with n-gain of 0.47 medium criteria. Meanwhile, in the control class, pretest results were obtained of 53.1 and posttest of 61.8 with n gains of 0.19 low criteria. Compared to the control group, the experimental group saw a greater improvement in learning outcomes in the test of the materials' efficacy. The blended learning module created for this research can be used as a resource for both students and educators to help them reach their educational goals.

Corresponding Author:
Pramyta Nur Insani
Universitas Muria Kudus, Kudus, Indonesia; 1st.pramyta@gmail.com

1. INTRODUCTION

Today's education needs to be accessible at any time and from anywhere. The (typical) classroom is not the only place where one can acquire knowledge. Technology's role in establishing a teaching and learning process throughout this pandemic is crucial. Simply said, face-to-face instruction has its limitations. Many people have opted to learn through technological means (e-learning) during the epidemic. While the advantages of technology-based education are undeniable, there are still negatives

that must be considered. One reason not all primary school kids can use e-learning is inadequate infrastructure. The learning process and the outcomes achieved by elementary school pupils cannot be fully understood without direct direction and contact from the instructor (face-to-face). Therefore, what is now called blended learning—a combination of traditional (face-to-face) and online education—is necessary. According to MacDonald (Amin, 2017), blended learning incorporates digital tools into the classroom while also giving traditional classroom time and attention.

One of the things that need to be underlined is that blended learning can be used not only during a pandemic but also in normal learning. Blended learning also needs to be considered, because students and teachers can continue to connect or communicate online, not only during class hours in class. Blended learning complements the shortcomings or weaknesses of face-to-face learning, not replaces it. So it can be concluded that one of the uses of blended learning can eliminate the shortcomings between face-to-face and online learning models to a minimum.

Field observations suggest that the lack of teacher-student connection during learning during the pandemic has negatively impacted student achievement. There was a continued emphasis on the role of the instructor in the classroom. Students learn only from their teachers, but educators still have a lot to learn before they can effectively employ offline and online resources to supplement their students' education. As a result, blended learning is a viable option for continuing education despite the epidemic. The analysis results indicate the need for novel approaches to creating modules or other forms of educational content to compensate for the shortcomings of traditional educational resources. According to Majid (2017: 176), the module is a textbook designed to help students learn on their own or with minimal instructor involvement. The ability of a module to pique a student's curiosity and inspire them to learn is also crucial.

Several researchers, including Holden (2010), Perwitasari (2017), Haryadi (2017), Islam (2018), and Nirahua (2020), have created instructional modules or materials with the goal of enhancing students' knowledge retention, enthusiasm for learning, and capacity for critical analysis. Blended learning has been used successfully by numerous researchers, including Owston (2013), Bernard (2014), Nortvig (2018), Alfi (2016), Isti'anah (2017), and Zainuddin (2018). The two together can pique students' curiosity and enthusiasm for learning, improving students' performance in class. Teachers remain the sole reliable resource for student education in light of the current pandemic implementation. In addition, current textbooks continue to fall short of students' requirements. Some of the shortcomings of textbooks include the fact that they do not help students understand the material independently, that they only present basic knowledge, that they do not provide any illustrations, and that they do not include any evaluation questions to measure students' understanding and skills.

As a result, new approaches are required in the development of learning modules for blended learning, which can mitigate the drawbacks of traditional learning resources. Modules are organised in a way that takes into account each student's unique qualities and educational requirements. The transmission of educational content can be bolstered by the creation of modules. Previous studies have shown that a mixed-learning approach can help students achieve their educational goals. By fusing the best features of online learning with those of traditional face-to-face education, we can develop learning that is not constrained by factors such as location or time.

In their research, Bock et al. (2018) developed an electronic module based on blended learning . Bock used a questionnaire to determine the response of dental students to the use of blended learning-based electronic modules, where the electronic modules developed were considered "excellent". Shown through the improvement of student evaluation results. The results showed that students were very satisfied with the approach. The application of blended learning can meet the requirements of a new generation of students and transform traditional lectures into modern, sustainable, and technologically enhanced learning experiences. Some education practitioners also develop blended learning-based learning modules. Mayer et al. (2015) also developed a blended learning-based electronic learning module for students of the Master of Oncology study program. Mayer stated that blended learning combined with electronic modules positively impacts student

evaluation results. The development of electronic modules also received a positive response. Mayer combines face-to-face learning through seminar activities and online-based learning to help students understand the material presented.

Edmodo-based modules for Basic Physics courses were developed by Hamka, Defrizal, and Noverta Effendi (2019), and they were deemed feasible by experts, validated by material and media experts with 86% and 85% respectively, reviewed by experts with 79%, tested in small groups with 82%, and evaluated in the field with 81%. In order for fundamental physics concepts to be conveyed using Edmodo-based blended learning media. Then, Yunindar, Nina, et al. (2015) created a biology module for secondary-level education (SMA) that uses blended learning and integrates the scientific method with literacy exercises. Expert-created modules were deemed genuine, effective, and practically relevant, indicating that module development was successful. With a gain score of 0.62 (moderate), this learning has been implemented and received positive student feedback. Susanti and Suci (2014) created a blended-learning science unit with a guided inquiry method for students in high school tenth grade. Susanti created some supplementary learning material in the form of a video link and a module. Experts in education validated a result of 2.85; experts in the area, 2.83; an expert in materials, 2.45; media professionals, 2.65; and students, 2.56. Statistical evidence suggests that the designed modules enhance students' learning outcomes and metacognitive skills.

Teachers, under the definition, are responsible for designing and implementing curricula that are tailored to the specific needs of their students at any given time. This may involve, for instance, developing modules that may be used for both direct instruction and self-paced study. To better serve students in fourth grade, this study created a blended learning science module based on pedagogically sound content. A probable impetus is a reduction in student learning results brought about by the absence of adequate learning resources to support learning during the learning process, whether that process takes place in a classroom setting or in the student's own time.

2. METHODS

This study is a research and development (R &D) by Borg and Gall, with an operational test design using a pretest-posttest control group design. There are ten stages of Borg and Gall, but this study is only limited to seven stages due to the limited research time. Starting from collecting data by conducting observations and interviews to analyze the needs of teachers and students regarding the products developed. Continued the planning and product development stages by drafting blended learning-based modules validated by material and media experts. Then a small-scale trial was carried out on ten students for module improvement before being tested operationally on a large scale to determine the effectiveness of the module in improving student learning outcomes.

The effectiveness of modules based on blended learning using the true experimental design method involves two experimental and control classes. The large-scale trial design was carried out with the pretest-pottest control group design, there were 33 fourth-grade students as an experimental class who used blended learning modules in learning and 31 fourth-grade students as a control class using the K13 book from the Ministry of Education and Culture. Both classes were given pretest and posttest. This aims to find more accurate student learning outcomes, because it can compare the differences in learning outcomes between classes that get treatment and those that do not.

3. FINDINGS AND DISCUSSION

The description of the research data includes the learning outcomes of students of the experimental class and control class in science learning. The experimental class uses a Blended Learning-based science module, and the control class uses the K13 book from the government. Based on the results of the analysis of research data as follows:

3.1 Validity of Learning Module

Module development is carried out to meet the learning needs of students and the teaching needs of teachers. Validation from material and media experts is needed before the module is ready to be used in learning. Media expert lecturers carried out media validation, namely NF Lecturer of the PGSD Study Program, Faculty of Teacher Training and Education, Muria Kudus University. Meanwhile, the validation of the material was carried out by material expert lecturers, namely YR lecturers in the same study program, faculty and university.

Some suggestions based on material expert assessments for improving module development include not yet appearing blended learning in the description of the material in the module, the use of science and technology, which is still lacking so that it has not led to student-centred learning, as well as the addition of relevant sources to the image, so it needs some revision. After the revision, the following are the assessment results from material expert validators on the development of blended learning-based science learning modules.

Table 1. Material Expert Validation Results

No.	Descriptors	Validation Result Score
1	Eligibility of Contents	26
2	Feasibility of Presentation	18
3	Language Eligibility	18
4	Feasibility of Graphics	16
Number of Scores		78
Maximum Score		92
Score Generation Percentage		85%
Criterion		Very Valid

Based on the results of the material expert validation test after making revisions, the assessment percentage was obtained at 85%, meaning that the modules that have been developed are very suitable for use in learning. Meanwhile, some suggestions and inputs from media validators during the draft development process are to adjust the cover design according to the criteria on the assessment grid, such as colour selection and illustrations to make it more attractive, the source in the image in the module needs to be included, and the systematics of presentation needs to be improved. The suggestion is used as material for improving the preparation of the module. The following are the final results of media expert validation of the development of blended learning-based science learning modules.

Table 2. Media Expert Validation Results

No.	Aspects	Descriptors	Validation Result Score
1	Module Size	The physical size of the module	4
2	Module Cover Design	Module cover layout	19
		Module cover typography	12
		Module cover illustration	12
3	Module Content Design	Layout consistency	20
		Typography of the contents of the module	15
		Illustration of the contents of the module	12
Number of Scores			92
Maximum Score			110
Score Generation Percentage			84%
Criterion			Very Valid

The data in the product validation table shows the assessment of media experts with a percentage score of 84%, and the assessment of material experts shows a percentage of assessment score of 85%. Based on both data, the average validation score of the two experts is 84,5% with decent or very valid criteria. It can be concluded that the blended learning-based science learning modules that have been developed can be used in science learning in class IV.

3.2 Students Learning Outcomes

An operational test of the module is carried out to determine the effectiveness of the learning modules that have been developed in improving the learning outcomes of science class IV elementary schools. With a sample of 33 students of SDN Sambung 1 as an experimental class and 31 students of SDN Mlekang 2 as a control class. The improvement of science learning outcomes is obtained from the pretest (before) and posttest (after) scores of carrying out learning using blended learning-based science learning modules. The learning outcomes were first tested using a normalized gain test to see the effectiveness of using modules in learning.

The learning outcomes analysed in this study were only focused on the cognitive realm which was obtained based on the results of student pre-test and post-test, both in control classes and experiments. A summary of learning outcomes at the stage of large-scale product trials is presented in the following table.

Table 3. Control Class Pretest and Posttest Results and Experiments on Large-Scale

Group	Action	Max	Mean	Average	KKM	Complete-ness	Percentage (%)
Experimental	Pre test	77	40	56,3	70	7	21%
	Post test	90	67	71,5	70	30	91%
Control	Pre test	77	40	55,7	70	6	19%
	Post test	87	50	61,8	70	21	68%

The data in the table shows that the pretest results of students in both the control class and the experiment are not much different. However, there is a significant difference in the completion of the posttest learning outcomes of control and exhibition class students, where the completion of learning outcomes in the experimental class can be completed by 91% (30 out of 33 students are complete). Meanwhile, in the control class, the percentage of completion of learning outcomes only reached 68% (21 out of 31 students completed). This means that there are still 9% of students (3 out of 33 students) who have not completed, while in the control class, there are 32% (10 out of 31 students) who have not completed learning sound material. Based on these results, it can be concluded that there are differences in student learning outcomes between pretest and posttest both in the control and experimental classes. And there are differences between learning before and after getting treatment (the use of blended learning-based science learning modules)

3.3 Result of Normality and Homogeneity Test

The normality test used the Kolmogorov-Smirnov Test at a significance level of 0.05 using the SPSS 25 application.

Table 4. Result of Normality Test

Class	Kolmogorov-Smirnov		
	Statistic	df	Sig
Pretest Experiment	0,132	33	0,156
Posttest Experiment	0,144	33	0,082
Pretest Control	0,147	31	0,088
Posttest Control	0,134	31	0,169

Based on the results of the normality test analysis with SPSS 25 using the Kolmogorov-Smirnov test in Table 4, it can be seen that the significance value of learning outcomes both at the pretest and posttest stages in the experimental and control classes has a significant value greater than 0.05 (sig > 0.05). This shows that learning outcomes at the pretest and posttest stages in the experimental and control classes are normally distributed.

The homogeneity test was carried out with the Independent Sample T-Test using SPSS 25. Decision-making and drawing conclusions on the hypothesis test were carried out at a significant level of 0.05.

Table 5. Result of the Homogeneity Test

		Levene's Statistic	df1	df2	Sig.
Learning Outcomes	Based on Mean	1,909	1	62	0,172

Based on the homogeneity test table with SPSS 25 using the Levene test with a significance level of 5% obtained a significance value of 0.172, meaning that the significance value based on mean shows a sig value > 5% then Ho was accepted. This suggests that the posttest data in both the experimental and control classes are homogeneous (derived from the same variance).

3.4 Result of Normalized Gain Test

The final stage of this study was conducted testing to find out the improvement of learning outcomes from test. The improvement of science learning outcomes is obtained from the pretest (before) and posttest (after) scores of carrying out learning using blended learning-based science modules. The learning outcomes from the experiment class and control class were first tested using a normalized gain test to see the effectiveness of using modules in learning. The results of the N-Gain test are presented in the following table.

Table 6. Results N Gains of Experimental and Control Classes

Group	Average		N Gain	Criteria
	Pretest	Posttest		
Experimental	53,5	75,5	0,47	Middle
Control	53,1	61,8	0,19	Low

The data in table 6 showed that the N-gain results in the experimental class were 0.47 with medium criteria ($0.3 \leq g \leq 0.7$), while in the control class it showed 0.19 with low criteria ($g < 0.3$). So based on these results, it can be concluded that there is an increase in learning outcomes in the experimental and control classes, but the increase in learning outcomes in the experimental class is higher than in the control class. In other words, the learning modules that have been developed are quite effective in improving student learning outcomes.

3.5 Result of Independent Sample T-Test

Based on prerequisite tests, it was shown that the learning outcomes in the experimental and control classes were normally distributed and came from the same or homogeneous variance. So based on the number of samples in each class, to test the effectiveness of blended learning-based science learning modules, it was analyzed using an independent sample t-test statistical test using SPSS 25, because the number of samples in the experimental and control classes was different.

In hypothesis testing, there are several determinations in concluding. This provision states that if t count < t table or sig value > 0.05, then H0 is accepted, which means there is no difference between the learning outcomes of students who use blended learning-based science learning modules and those

who do not. However, if t count > t table or sig value < 0.05, then H0 is rejected, so Ha is accepted, which means there is a difference between the learning outcomes of students who use blended learning-based science learning modules and those who do not.

This study consisted of 64 samples, then the value of the degree of freedom (dk) = n – 2 = 64 – 2 = 62 with an error rate of 5% for the two-party test, then the table t value = 1.998 was obtained. The results of the independent sample t-test analysis using SPSS 25 are presented in the following table.

Table 7. Result of Independent Sample T-Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Learning Outscomes	Equal variances assumed	1.909	.172	8.723	62	.000	16.269	1.865	12.541	19.997
	Equal variances not assumed			8.643	55.209	.000	16.269	1.882	12.497	20.041

Based on the data in Table 7, the results of the two-party test analysis obtained a calculated t value of 8,723 with a significance value of 2-tailed 0.000, meaning that t count > t table and a significance value of < 0.05, thus Ho was rejected and Ha was accepted, there was a difference between student learning outcomes using blended learning-based science learning modules on sound material and student learning outcomes using blended learning-based science learning modules on sound material and student learning outcomes that did not use blended learning-based science learning modules.

Discussion

Many factors, such as the utilisation of learning models and resources, contribute to the complexity of learning processes. The quality of education is influenced by several external factors, including the instructional paradigms and materials used. Preliminary data analysis suggests that science education has not been implemented effectively, especially in light of the current pandemic. The lack of learning resources used during the pandemic, a lack of teacher knowledge about appropriate learning models, and a lack of teachers' ability to develop their own learning resources (modules) that are in accordance with student characteristics and situations and conditions are all obstacles teachers and students face in the science learning process, especially during this pandemic.

When educators don't have the background information to pick the best learning model, students don't get the best possible education. Classroom instruction plays a larger role. The data shows that all teaching and learning resources in science classrooms originate with the teacher. Learning resources, as defined by Warsita (2020), are a system comprised of a collection of materials or scenarios designed to facilitate independent study. Learning resources include textbooks, as stated by the Association for Educational Communications and Technology (AECT) and Banks in Komalasari (2014:108). Preliminary research reveals a dearth of learning resources and a consequent inability on the part of educators to create their own learning materials, such as modules. According to the data, the science classroom exclusively uses student thematic books with practise questions from the Ministry of Education and Culture and LKS. The quality of education can suffer when teachers are unable to make

their own lessons due to a lack of resources. According to Imron in Mussadad (2015), a teacher's knowledge of his subject matter is reflected in the quality of his students' learning experiences. Teachers that know what they're doing will help their students learn as much as possible.

Based on the finding data from large-scale product trials, it was proven that blended learning-based science learning modules on sound materials are effectively used in learning. The effectiveness of using this module can improve student learning outcomes (understanding of the material). These results are in line with Toharudin et al. (2011: 27), which state that the purpose of preparing teaching materials, among others, can help develop or improve student learning outcomes. In addition, the teaching materials developed can help teachers and students during the learning process and make it easier for students to learn the competencies they must master.

In this study, to test students' understanding was carried out at the beginning (prestest) and end (posttest) for the experimental and control classes. Based on the results of data analysis, it can be seen that the modules developed are effective in improving student understanding, as evidenced by improving learning outcomes. This is shown through a normalized gain test (N gain) to determine the improvement of student learning outcomes. The improvement of student learning outcomes is in accordance with Nilasari et al. (2016), which state that there are differences in student learning outcomes in control and experimental classes using learning modules, which is evidenced by the acquisition of final test results in experimental classes higher than in control classes.

In addition, Puspitasari et al. (2022) show that the application of blended learning models effectively increases student motivation and learning outcomes, as evidenced by significant differences in average motivation and learning outcomes between learning outcomes in control and experimental classes. The improvement in student learning outcomes occurs because the module developed on the theme "Indahnya Kebersamaan" is one of the themes that is close to students' daily lives with the material in the real world presented in accordance with the development of the digital era where students try new things in presenting material through videos to support student understanding directly when used independently at home. Task work can also be carried out online in accordance with technological developments, but without reducing the advantages of conventional or face-to-face learning that is still carried out, creating effective learning so that the learning process runs optimally and meaningfully.

This is in line with Hidayah (2020), who stated that the best method to accommodate the advantages of conventional (face-to-face) and online methods is blended learning, which is more ideal and synergistic in the learning process. Students not only take part in online learning, which is very helpful in certain conditions, but also follow the face-to-face process, which is still in great demand because it can build dynamic and interactive communication in the classroom.

4. CONCLUSION

Based on the study's results, it can be concluded that the blended learning-based science learning module on sound material effectively improves student learning outcomes. Based on the results of the two-average similarity test on the improvement of student learning outcomes, it was shown that the experimental class had a higher increase in learning outcomes than the control class. However, the modules developed contained only one basic competency in one learning content and the product trials only reached the limited trial stage with 33 students as samples. This study is one of the limitations because of the limited research time. Thus, there is a need for further development considering the results of the gain score, which is still moderate. Further development can be done by creating similar modules but with different materials. In addition, it is important to modify the module so that it can accommodate all student learning styles.

Acknowledgements: The author would like to thank all parties who have supported this research, including all teachers and elementary school students in the Sudirman General Cluster, Biddikbud Region, Gajah District, who have been willing to be respondents. The author would also like to thank

the supervisors and expert validators of Muria Kudus University for providing guidance in the implementation of this research.

REFERENCES

Alfi, Cindya, Sumarmi, Ach. Amirudin. 2016. Pengaruh Problem-Based Geography Learning With Blended Learning Towards Critical Thinking Ability of High School Students. Journal. Journal of Education: Theory, Research, and Development Volume: 1 Number: April 4, 2016 Pages: 597—602.

Amen, Ahmad Kholikul. 2017. Conceptual Study of Web-based Blended Learning Models to Improve Learning Outcomes and Learning Motivation. Journal. Edutama Education Journal, Vol 4, No2 July 2017. Downloaded on November 25, 2020 at 20:44.

Bernard, Robert M. , et al. 2014. A Meta-Analysis of Blended Learning and Technology Use in Higher Education: From the General to The Applied. Journal. J Comput High Educ (2014) 26:87–122 DOI 10.1007/s12528-013-9077-3.

Bock, A., et al. 2018. Blended Learning Modules for Lectures on Oral and Maxillofacial Surgery. Journal. British Journal of Oral and Maxillofacial Surgery.

Hamka, Defrizal and Noverta Effendi. 2019. Development of Edmodo-Based Blended Learning Media in Basic Physics Courses in the Science Education Study Program. Journal. https://studylibid.com/doc/193515/pengembangan-modul-pembelajaran-biologi-berbasis. Downloaded on November 13, 2020 at 12.15 WIB.

Haryadi, Sandi, Ery Tri Djatmika, Punaji Setyosari. 2017. Supplement to the Thematic Textbooks of Alternative Energy Materials and Natural Resources Contextually Based on Grade IV Elementary Schools. Journal. Journal of Education: Theory, Research, and Development Volume: 2 Numbers: October 10, 2017 Pages: 1330—1337.

Hidayah, Nurul. 2020. Effectiveness of Blended Learning in Learning. Journal of Enlightenment, Vol. 1 (2020): Enlightenment.

Holden, J. T. & Westfall, P. J. L. (2010). An instructional media selection guide for distance learning - Implication for blended learning featuring an introduction to virtual worlds. Boston: United States Distance Learning Association.

Islam, Syaiful. 2108. To Boost Students' Motivation and Achievement through Blended Learning. Journal. Journal of Physics: Conf. Series (2018) 012046 doi :10.1088/1742-6596/1114/1/012046.

Isti'anah, Arina. 2017. The Effect of Blended Learning to The Students' Achievement in Grammar Class. Journal. IJEE (Indonesian Journal of English Education). http://journal.uinjkt.ac.id/index.php/ijee.

Majid, A. 2017. Learning planning, developing standards of teacher competence. Jakarta: PT. Rosda Works.

Mayer, Benjamin, et al. 2015. *Creating a Blended Learning Module in an Online Master Study Programme in Oncology*. Paper. Diunduh pada http://www.educationforhealth.net on Saturday, November 14, 2020, IP: 103.253.26.123.

Mussadad, A. 2015. Model Manajemen Pembelajaran Sejarah Terintegrasi Pendidikan Multikultural untuk Membangun Wawasan Kebangsaan. *Paramita.* 25 (2): 247-260.

Nilasari, E., Ery, T. D., and Anang S. 2016. The Effect of The Use of Contextual Learning Modules on The Learning Outcomes of Grade V Elementary School Students. Journal of Theoretical, Research, and Development Education, 1 (7): 1399-1404.

Nirahua, Juliana, Jony Taihuttu, and Venty Sopacua. —Development of Teaching Materials Based on Blended Learning and Critical Thinking Skills in Astrophysics Courses in Welcoming the Era of the Industrial Revolution 4.0.‖ Jambura Physics Journal 2, no. 1 (2020): 24–36.

Nortvig, A. M., Petersen, A. K., & Balle, S. H. (2018). A literature review of the factors influencing e-learning and blended learning in relation to learning outcomes, student satisfaction and engagement. Electronic Journal of E-Learning.

Owston, Ron, Dennis York, and Susan Murtha. 2013. Student perceptions and achievement in a university blended learning strategic initiative. Journal. Internet and Higher Education 18 (2013) 38–46.

Perwitasari, Suci, Wahjoedi, and Sa'dun Akbar. 2018. Development of Contextual-Based Thematic Teaching Materials. Journal. Journalof Education: Theory, Research, and Development Volume: 3 Numbers: March 3, 2018 Pages: 278—285.

Puspitasari, Siska, Kulsum Nur Hayati, and Ary Purwaningsih. 2022. Effectiveness of The Use of Blended Learning on Learning Motivation and Social Studies Learning Outcomes. Basicedu Journal Vol. 6 No. 1 of 2022 P. 1252-1262.

Susanti, Holy. 2014. Development of Circulatory System Module with Guided Inquiry Based on Blended Learning to Improve Metacognitive Skills and Learning Outcomes of Class XI Students of SMA Negeri 1 Malang. Thesis. Digital Library, State University of Malang. http://library.um.ac.id.

Suwono, H., *et al.* 2017. Guided Inquiry Facilitated Blended Learning to Improve Metacognitive and Learning Outcome of High School Students. *Prosiding*. *IOP Conf. Series: Journal of Physics: Conf. Series 824 (2017) 012068 doi:10.1088/1742-6596/824/1/012068*.

Toharudin, U., Hendrawati, S., & Rustaman, A. 2011. Building Students' Science Literacy. Bandung: Humanities

Warsita, Bambang. 2020. Teknologi Pembelajaran, Landasan, dan Aplikasinya. Jakarta: Rineka Cipta.

Yunindar, Nina, Mimien Henie Irawati, and Susilowati. 2015. Development of Blended Learning-Based Biology Learning Modules with the Integration of Scientific Approaches and Teaching Science Literacy Material Regulatory Systems for High Schools. Thesis. Digital Library, State University of Malang. http://library.um.ac.id.

Zainuddin, Zamzami and Cut Muftia Keumala. 2018. Blended Learning Method Within Indonesian Higher Education Institutions. Journal. Journal of Humanities Education Volume 6, Number 2, June 2018, pp. 69–77.