

FEASIBILITY OF SCHOOLY-BASED BLENDED LEARNING MEDIA IN RESPIRATORY SYSTEM OF XI GRADE TO TRAIN SCIENTIFIC LITERACY SKILL

Risa Akbar Fitria

Biology Education, Faculty of Mathematics and Natural Sciences
Universitas Negeri Surabaya
email: risafitria@mhs.unesa.ac.id

Sifak Indana

Biology Education, Faculty of Mathematics and Natural Sciences
Universitas Negeri Surabaya
email: sifakindana@unesa.ac.id

Abstract

Scientific literacy is the ability to use knowledge, identify problems, draw conclusions, and make decisions. Scientific literacy is trained through scientific experiments. Scientific experiments take a long time because students must understand the concept and orientation of the problem, carry out practical activities, and analyze data, hence there is a need for learning that can meet those needs. One solution is to use blended learning. The aim of this research was to describe the feasibility of media Schoology-based blended learning in the respiratory system of XI grade based on validity, practicality, and effectiveness to train scientific literacy skill. This research was developmental research used the Research and Development (R & D) model which consisted of problem and potential analysis, data collection, product design, product design validation, product design revision, product testing, and 1st product revision. Limited testing done in 20 XI grade students of SMA Negeri 1 Kedungpring. The research instruments used were learning media validation sheets, observation sheets of student activities, evaluation test sheets, student response sheets, and activity sheets for scientific literacy skills. The research data were analyzed descriptive quantitatively. The results showed that the learning media developed was very valid with a score of 3.88. Learning media was very practical based on the activities of students with a percentage of 93.19% and practical based on the activities of scientific literacy skills with a score of 80.5. Learning media was effective based on the results of learning completeness with a percentage of 80%, effective based on the achievement of learning indicators with a percentage of 75%, and very effective based on student responses with a percentage of 97.94%.

Keywords: scientific literacy; respiration system; blended learning; schoology

INTRODUCTION

Scientific literacy is the knowledge ability that has been gained by students, identifies problems, draws conclusions based on scientific evidence, and makes the right decisions (OECD, 2006). The assignment of scientific literacy is one of the 21st Century challenges (Sudarisman, 2015). According to Mahardika (2016) there needs to be generations that are literate in science or have scientific literacy skills. The student literacy skills level was still relatively low based on the results of tests conducted by the Program for International Student Assessment (PISA) in 2015, Indonesia ranks 64th out of 72 countries (PISA, 2016).

Graduates students in Industry 4.0 is era expected have a good quality, able to compete globally, and master the development of technology which is based on information literacy (Kanematsu and Barry, 2016). While in the 21st Century according to Abidin (2014) students must have learning skills and bring new ideas, master the media and information technology, and basic abilities that support the life and career that will be lived.

One of the material discussed in the biology learning XI grade is respiratory system. Based on Permendikbud 2016 Number 24 Appendix 7, the respiratory system in basic competence 3.8 (basic knowledge competence) and basic competence 4.8 (basic skills competency). In the basic competence 3.8 possessed learners are able to analyze the relationship between network structure constituent organ of the respiratory system in relation to the bioprocess and malfunctioning which may occur in the respiratory system of human, while basic competence 4.8 presents the results of analysis of the effects of air pollution disorder on the structure and function of the human respiratory organs based on the study of literature. These basic competence demands can be used to train scientific literacy skill using experimental or practicum methods. However, due to the learning process with the experimental method requires a very long time so it requires an appropriate learning.

Blended Learning is a system that utilizes electronic learning (e-learning), technology-based education and management learning systems otherwise known as Learning Management Systems (LMS)

(Austria, et al, 2015). Blended learning combines online learning with face-to-face learning between teachers and students. Sicat (2015) states that blended learning is a learning system that can be accessed anytime, thus overcoming various learning problems related to the learning stages, place, and limited time. Face-to-face learning can be done using experimental or practicum methods. While, one of the LMS media that can be used to implement blended learning is media schoology.

Schoology is a combination of several social network features and LMS features (Aminoto et al., 2014). Schoology can access on <http://www.schoology.com>. Schoology has many feature to facilitate the student to study. Into schoology, teacher can add many information resources to improve the student knowledge before doing some practicum or experiment. Schoology can access anytime and anywhere with internet connection.

One of media can use for facilitate blended learning on face-to-face learning is student worksheet. Student worksheet can contain practicum or experiment guide. For support student scientific literacy into student worksheet need scientific literacy strategy. One of scientific literacy strategy is graphical setting. Scientific literacy has some graphical setting that function help student to map their understating of information (Anjarsari, 2014). One of graphical setting of scientific literacy is Know-Want-Learn (KWL). KWL Graphical setting can help the student to know their initial knowledge, what they want to learn, and what they have learned after learning (OECD, 2015).

Based on the research conducted by Adi, et al. (2017) proving that Blended Learning has a significant influence in improving scientific literacy in the trials of biology students at the State University of Malang. Based on the description above, a research was conducted on "Schoology-based Blended Learning in Respiratory System of XI Grade to Train Scientific Literacy Skills". The holding of this research, it is expected that students can maximum exploit the learning and obtain a lot of information from face-to-face learning in the form of discussions through student worksheet and obtain information from various sources of online learning, so that students can practice to build their scientific literacy skills.

The aim of this research was to describe the feasibility of schoology-based blended learning media in respiratory system of XI grade based on validity, practicality, and effectiveness to train scientific literacy skill.

METHOD

This was developmental research using the Research and Development (R & D) model which consisted of ten research stages, namely: problem and potential analysis, data collection, product design, product design validation, product design revision, product testing, 1st product revision, without usage testing, product revision 2, and mass production. The research was limited test for 20 XI grade students of Kedungpring 1 High School. The limited test were blended learning trials consisted of learning used student worksheet for face-to-face learning and schoology media for online learning. 1st student worksheet (Sub-material factors that affect volume and lungs capacity) and 2nd student worksheet (Sub- material dysfunction of human respiratory system). Both of the student worksheets used Know-Want-Learn (KWL) graphical setting as scientific literacy strategy. Schoology media contained videos, powerpoint, and online students discussions. The research instruments used were student worksheet validity and Schoology media sheets, student activities observation sheets, evaluation test sheets, data collection techniques consisted of observation tests sheets, and questionnaires.

The data analysis technique consisted of an analysis of learning media validity which assessed based on expert judgment. Data were analyzed using average with this following formula:

$$\text{Validity Score} = \frac{\sum \text{score that obtained}}{\sum \text{validator}}$$

The media was determine valid when obtaining average score of ≥ 2.51 . Interpretation score of validation shown in **Table 1**.

Table 1. Interpretation of Validation

Score	Category
1,00 – 1,50	Less valid
1,51 – 2,50	Valid enough
2,51 – 3,50	Valid
3,51 – 4,00	Very valid

(Adapted from Sugiyono, 2015)

Practicality of learning media was assessed based on the student activities. There were two kinds of activities, the first was student activities when using student worksheet and media schoology and the second was student scientific literacy activities. Data of student activities when using student worksheet and schoology were analyzed using percentage with this following formula:

$$\text{Percentage of student activities (\%)} = \frac{\text{total of implementation aspect}}{\text{total all aspect}} \times 100\%$$

The media was determine practical when obtaining percentage score of $\geq 71\%$. Interpretation percentage of student activities shown in **Table 2**.

Table 2. Interpretation of Student Activities

Percentage	Category
30 – 50%	Less practical
51 – 70%	Practical enough
71 – 85%	Practical
86 – 100%	Very practical

(Adapted from Sugiyono, 2015)

Data of student scientific literacy skill activities were analyzed using score mode with this following formula:

$$\text{Score of scientific literacy skill activities} = \frac{\sum \text{student worksheets score}}{\sum \text{maximum score}} \times 100$$

The media was determine practical when obtaining score mode of ≥ 61 . Interpretation score of student scientific literacy skill activities shown in **Table 3**.

Table 3. Interpretation score of student scientific literacy skill activities

Score	Category
0-20	Not practical
21-40	Less Practical
41-60	Practical enough
61-80	Practical
81-100	Very practical

(Adapted from Sugiyono, 2015)

Effectiveness of learning media assessed based on learning outcomes, completeness of indicators, and students responses. Data were analyzed using percentage with this following formula:

$$\text{Completeness of learning outcomes percentage (\%)} = \frac{\sum \text{Students who passed the test}}{\sum \text{all students}} \times 100\%$$

$$\text{Completeness of learning indicators percentage (\%)} = \frac{\sum \text{completeness of tests' indicators}}{\sum \text{tests' indicators}} \times 100\%$$

$$\text{Percentage of student responses (\%)} = \frac{\sum \text{Positif response to all aspects}}{\sum \text{all students}} \times 100\%$$

The media was determine effective when obtaining percentage score of $\geq 71\%$. Interpretation percentage of effectiveness shown in **Table 4**.

Table 4. Interpretation of Effectiveness

Percentage	Category
30 – 50%	Less effective
51 – 70%	Effective enough
71 – 85%	Effective
86 – 100%	Very effective

(Adapted from Sugiyono, 2015)

RESULTS AND DISCUSSION

The results of this research that have been carried out produce schoology-based blended learning media that trains scientific literacy skill. The developed learning media consisted of two student worksheet, namely 1st student worksheet about factors that affect lung capacity and 2nd student worksheet about dysfunction of the respiratory system. The students worksheet consisted of scientific literacy steps, namely identify scientific question, designing scientific experiment, and interpreting data based on scientific evidence. Scientific literacy strategy has 19 graphical settings. One of graphical setting on scientific literacy strategy that used on the student worksheets was Know-Want-Learn (KWL). Graphical setting KWL helped the student to know their initial knowledge, what they want to learn, and what they have learned after learning.

The development of learning media includes made instructions for using schoology and used Schoology page which was filled with various material about the material of the respiratory system in humans, namely organs into respiratory system and its functions powerpoints, volume and lungs capacity, and dysfunction of the respiratory system; respiratory mechanism videos and practicum videos of lung capacity factors, as well as the effects of smoking on lung health; and articles about the dysfunction of the respiratory system, how to maintain the health of the respiratory system, and other reading sources.

The feasibility of learning was assessed based on the validity, practicality, and effectiveness of learning media. The validity of student worksheets and media Schoology of blended learning was assessed by media experts, material expert, and biology teachers. The average of learning media validity was 3.88 included in very valid category. Almost all aspects got score of 4, except on student worksheet instuction, use of language and sentences, and resource feature were score of 3.67 (Table 5).

The presentation of the validation aspect student worksheet validator according to the instructions for use student worksheet lack of clarity on the relationship between blended learning used Schoology and student worksheet on-face-to-face learning. According to the Ministry of National Education (2004), a good student worksheet requirements include the title that is in accordance with the material being taught, clear learning instructions, there are competencies to be achieved, sources of information, publication and work procedures. The improvements that have been made were adding an explanation of the relationship between Schoology and student worksheet used in the introductory section of the student woksheets.

Table 5. Recapitulation of Student Worksheets and Schoology Media of Blended Learning Validity

No.	Validity aspect	Score			Average	Category
		V1	V2	V3		
Student worksheet presentation						
1.	Title writing	4	4	4	4	Very valid
2.	The relevancy between cover and topic	4	4	4	4	Very valid
3.	Time management	4	4	4	4	Very valid
4.	Student worksheet instruction	4	3	4	3.67	Very valid
5.	Learning objectives	4	4	4	4	Very valid
6.	Bibliography writing	4	4	4	4	Very valid
Average					3.94	Very valid
Student worksheet content						
1.	The relevancy between material and concept	4	4	4	4	Very valid
2.	Know-Want-Learn (KWL) stage	4	4	4	4	Very valid
3.	Content aspect of scientific literacy into student worksheet	4	4	4	4	Very valid
4.	Competency aspect of scientific literacy into student worksheet	4	4	4	4	Very valid
5.	Context aspect of scientific literacy into student worksheet	4	4	4	4	Very valid
Average					4	Very valid
Student worksheet language						
1.	Use of language	4	4	3	3.67	Very valid
2.	Use of sentences	4	4	3	3.67	Very valid
Average					3.67	Very valid
Schoology Media						
1.	Information is easy to access	4	4	4	4	Very valid
Student worksheet presentation						
2.	The utilization of information and communication technology	4	4	4	4	Very valid
3.	Discussion feature	4	4	4	4	Very valid
4.	Resource feature	4	4	3	3.67	Very valid
5.	Quiz feature	4	4	4	4	Very valid
Average					3.93	Very valid
Average of all aspects					3.88	Very valid

Next, the language and sentences used in the student worksheet which were considered to be still not consistence and less effective. Repaired language and sentence used more precise, effective, and accordance with the rules of Indonesia. According to Damayanti (2013) a good student worksheet must fulfill construction aspects, namely aspects of language usage, vocabulary, sentence structure, difficulty level, and clarity that should be easily understood by students as users of the student worksheet. Next, it is about the contents of resource features into Schoology media, the validator assesses that the source that uploaded information was still lacking because many students need related learning resources to fill the student worksheet as well as learning material. According to Widiatoro and Rakhmawati (2015) the resource feature serves to provide learning resources that can be used by students. So that the improvements made were sources of information was add electronic books about the respiration system in pdf format, videos and articles about diseases and disease mechanisms that can attack the respiratory system organs.

The feasibility learning media based on practicality assessed from the activities of students when using blended learning. The activity was divided into

two, namely the students activities when doing blended learning from the results of observations and activities of scientific literacy skills which were assessed from the student's working on student worksheet. There were 18 aspects of students activities on blended learning which were combination of online activities used schoology media and face-to-face activities in the classroom used student worksheet.

There were two sets of blended learning activities carried out. On 1st Blended Learning, students did online learning by read powerpoints about organs and functions, volume and lungs capacity, videos about respiratory mechanisms, and made discussions that available in Schoology media, and face-to-face activities in the classroom using student worksheet which contains experimental factors that affect to the human lungs capacity. In 2nd Blended Learning, students did online learning by read powerpoints about dysfunction of human respiratory system and made discussions that available in Schoology media, on face-to-face activities in the classroom using student worksheet which contains experiments on the effects of smoking on lungs health. The observation of the students activities when did blended learning can be seen in **Table 6**.

Table 6. Recapitulation of Blended Learning Activities

No.	Students activities	Observation Result	
		Percentage (%)	
		1 st Blended Learning	2 nd Blended Learning
1.	Logging in on their Schoology account.	100	100
2.	Reading powerpoint and watching videos on schoology.	90	100
3.	Following online discussion.	55	75
4.	Reading student worksheet instruction.	85	85
5.	Reading the learning objectives.	100	75
6.	Writing what their known on K (Know) column.	85	100
7.	Writing what their want to know on W (Want) column	90	100
8.	Reading provided article on student worksheet.	85	85
9.	Observing and analyzing images.	100	100
10.	Formulating a problem statement.	90	95
11.	Formulating a hypothesis.	95	95
12.	Watching practicum videos.	95	100
13.	Designing experiments.	100	100
14.	Doing experiments.	100	100
15.	Analyzing experimental data.	100	85
16.	Drawing conclusions based on experiments.	100	95
17.	Discussing on the application of literacy.	100	95
18.	Writing what has been learned in L (Learn) column.	100	100
Average		92.77	93.61
Average of all activities		93.19	

Based on the result (Table 6), the average of blended learning activities was 93.19% included in very practical category. Percentage of student participation in the discussion in 1st blended learning was 55%, while in 2nd blended learning was 75%, the meaning that there was an increase 20% of student activity. Online discussion require internet network. Many of them had difficulty operating schoology because there was network problems and couldn't operate schoology yet, it relevant with the response given to the response questionnaire. The internet connections and the ability of students or teachers in the operate learning media is a lack of learning activities that use blended learning

models (Catalano, 2014). Some of them only listened, but did not participate in the discussion. So before teach blended learning, teachers should provide adequate facilities to do blended learning and teach students to be able to operate Schoology until students can operate it well.

The practicality of learning media was also assessed from the activities of scientific literacy skills assessed by the work of the student worksheet. The activities assessed were the activities of formulating problems, formulating hypotheses, compiling experimental designs, presenting data, analyzing data, and concluding the results of experiments. The results of the recapitulation of scientific literacy skill activities can be seen in **Table 7**.

Table 7. Recapitulation of Student Scientific Literacy Skill Activities

No.	Student scientific literacy activities	Average	Category
1.	Formulating problems	95,83	Very practical
2.	Formulating hypotheses	79,17	Practical
3.	Compiling experimental designs	100	Very practical
4.	Presenting data	100	Very practical
5.	Analyzing data	79,17	Practical
6.	Concluding the result of experiments	75	Practical
Mode		80,5	Practical

Based on the result, the mode was 80.5 include practical category. The scientific literacy indicators developed from the scientific literacy competencies based on the PISA. Competencies chosen were identifying scientific questions, designing scientific investigations, and interpreting data based on scientific evidence (OECD, 2015). Indicators that used in this research were identifying scientific questions consist of indicators formulating problems and hypotheses; scientific investigations consist of designing and conducting experiments indicators; and interpreting data based on scientific evidence consist of indicators analyzing data and drawing conclusions. Experiments activities can train the students hypothetical skills, analyze phenomena, analyze results, and draw conclusions (Suprihatiningrum, 2013). According to Rohmawati (2017) experiments or practicums will provide opportunities for students to learn about certain processes as a way to introduce phenomena that occur in real life, and students more easily communicate the results of the experiments they have done rather than applying the material concepts to the experiments they are doing. Because the average skill score was considered practical, the blended

learning was considered to be able to practice scientific literacy skills practically.

Furthermore feasibility learning media assessed from effectiveness, it measured based on student learning outcomes, completeness of indicators, and responses of students after followed the blended learning. Students stated complete if their learning outcomes score was ≥ 75 and the class stated complete if the percentage of completeness was $\geq 71\%$. Base on the learning outcomes there were 16 students who passed the test and four students who didn't pass the test. The percentage of learning outcomes completeness was 80% included effective category (Table 8).

Table 8. Recapitulation of the Value Students Learning Outcomes

No	Student	Score	Category
1.	PD1	81,43	Complete
2.	PD2	72,86	Not complete
3.	PD3	64,29	Not complete
4.	PD4	82,86	Complete
5.	PD5	88,57	Complete
6.	PD6	84,29	Complete
7.	PD7	88,57	Complete
8.	PD8	61,43	Not complete
9.	PD9	85,71	Complete
10.	PD10	92,86	Complete
11.	PD11	84,29	Complete
12.	PD12	92,86	Complete
13.	PD13	67,14	Not complete
14.	PD14	90,00	Complete
15.	PD15	92,86	Complete
16.	PD16	92,86	Complete
17.	PD17	90,00	Complete
18.	PD18	84,50	Complete
19.	PD19	90,00	Complete
20.	PD20	81,43	Complete
Percentage		80%	Effective

Learning outcomes can determine the effectiveness of blended learning. The evaluation test provided 8 subjective questions. The subjective form of test more effective, because it gives the participants their freedom to be able to express their reasoning, so that the answers given can show their ability to think in complex ways (Susongko, 2010). These questions contain elements of scientific literacy in the form of content, context, and competencies aspects related to the respiratory system. The function of questions was test the students' understanding and apply scientific literacy that has been trained into aspects of scientific literacy based on society problems.

The Completeness of learning outcomes can be caused by students obtaining a lot of information through blended learning, namely understanding the concept of the respiration system through online

learning and practicum conducted on face-to-face learning. Kusairi (2013) in his study concluded that blended learning can improve completeness of students concepts taught and reasoning.

The effectiveness was also measured based on completeness of learning indicators. There were five learning indicators were associate between the structure and function of organs in the respiratory system, distinguish the mechanism of inspiration and expiration on respiratory system, analyze the process of exchanging oxygen and carbon dioxide in the respiratory system, analyze the factors that affect the lungs capacity, and analyzing dysfunction of respiratory system. There were eight questions on the test were the function of organs into nasal cavity, difference between inpiration and ekspiration, respiratory mechanism, lungs capacity, case study of Bajo tribe, choke mechanism, designing experiment about cigarette, and given solution of air pollution problem that lead dysfunction of human respiratory system. Out of eight question there were two question that were not complete, namely difference between inpiration and ekspiration and case study of Bajo tribe. Learning stated effective if the learning indicator completeness results were $\geq 71\%$. The results of completeness of learning indicators which can be seen in **Table 9**.

Table 9. Recapitulation of the Learning Indicator Completeness Results

Learning indicators	Number	The number of students who complete	Percentage (%)	Category
Associate between the structure and function of organs in the respiratory system.	1	17	85	Complete
Distinguish the mechanism of inspiration and expiration on respiratory system.	2	14	70	Not complete
Analyze the process of exchanging oxygen and carbon dioxide in the respiratory system.	3	17	85	Complete
Analyze the factors that affect the lungs capacity.	4	17	85	Complete
Analyzing dysfunction of respiratory system.	5	11	55	Not complete
	6	20	100	Complete
	7	16	80	Complete
	8	18	90	Complete
Percentage		75%		Effective

Based on the result (Table 9), the percentage of completeness of the indicator was 75% included in effective category. The completeness of learning indicators was an element that also becomes an assessment for the effectiveness of blended learning. The completeness of each learning indicator was an important thing that must be used by the teacher to find out what learning indicators were achieved or not. According to Agustina (2013), completeness of indicators was made based on consideration of the average level of ability of students and the ability of supporting facilities in learning activities. The average indicator that is not complete because in answering the questions students only answer a part of it and some answer correctly but without the right reasons. Based on the problem, need to emphasize the command from the teacher before student working on the evaluation test.

The effectiveness of learning media was also assessed from the students responses. The student

responses obtained of two aspects, namely face-to-face learning with student worksheet and online learning with Schoology media. The highest percentage was 100% obtained by almost aspects. The lowest percentage was in the online learning aspect, namely the operation of Schoology media which only gets an 80% percentage (Table 10). Students still have difficulty in operating Schoology media because learning using Schoology was a new thing for them. The ability of students or teachers in the operation of learning media was a lack of learning activities that use blended learning models (Catalano, 2014). In addition, there needs to be adequate facilities from the tools used to access learning media. The teacher must guide students before to operate the media schoology, so that students have no difficulty in using it.

Table 10. Recapitulation of student responses to the blended learning result

No.	Aspect	Assessment		Percentage (%)	Category
		Yes	No		
Face-to-face learning					
1.	Student worksheet has an interesting presentation.	20	-	100	Very efective
2.	Questions and sentences used are easy to understand	20	-	100	Very efective
3.	The instructions for the activity are clear and easy to understand	20	-	100	Very efective
4.	The learning atmosphere uses the student worksheet is interesting and pleasant respiratory.	17	3	85	Efective
5.	Learning face-to-face using student worksheet can train the ability to identify problems.	20	-	100	Very efective
6.	Face-to-face learning using student worksheet can train to formulate problems and hypotheses.	20	-	100	Very efective
7.	Face-to-face learning using student worksheet can help you to train to do experiment.	20	-	100	Very efective
8.	Face-to-face learning using student worksheet can train you in collecting and analyzing data.	20	-	100	Very efective
9.	Face-to-face learning using student worksheet can train you to formulate conclusions.	20	-	100	Very efective
10.	Face-to-face learning using student worksheet can train the ability to analyze problems and provide solutions.	20	-	100	Very efective
Online Learning					
1.	Learning about respiration online with schoology is new to you.	20	-	100	Very efective
2.	Schoology media can be operated easily.	16	4	80	Efective
3.	Media Schoology can be accessed anywhere and anytime.	20	-	100	Very efective
4.	The discussion feature on Schoology media can facilitate you in conducting discussions outside of school.	20	-	100	Very efective
5.	Learning resources provided in the resource feature can be used to add information about the respiratory system.	20	-	100	Very efective
6.	Schoology media is suitable when compared to face-to-face learning using student worksheet.	20	-	100	Very efective

Schoology-based blended learning media in training scientific literacy skills had two stages, namely online learning as a learning facility for students in fulfilling aspects of content literacy in respiratory system material. Furthermore, the face-to-face learning stage uses students worksheet which acts to fulfill competency aspects in experimental activities/practicum and context aspects in the form of discussion activities based on problems in the community.

According to the results of Oliver (2005), the blended learning method in learning includes 4 activities or learning phases, namely presenting information, guiding the learner, practicing and assessing learning. The phase of presenting information in this research was obtained from the use of Schoology media which contains learning resources and information sharing between friends in online discussion activities. The phase guides students in learning and doing practice using students worksheet respiratory systems on face-to-face meetings. Assessment phase of learning conducted online evaluation with Schoology media.

Balitbang (2006) suggested that scientific learning be carried out through scientific discovery/experiment learning, students have the ability to think scientifically, work scientifically, and communicate results that have been scientifically proven. Zuriyani (2012) stated one of the weaknesses of scientific/discovery-based learning that was requires relatively much time because the process was quite a lot so that the teacher has difficulty adjusting it to the time determined by the institution. In addition, scientific/discovery-based learning also requires considerable learning resources. So that the users of Schoology media as providers of respiratory system material content carried out online can be used as learning resources for students that can be accessed anytime and anywhere, outside of school. So that when face-to-face learning use student worksheet, students can experiment and analyze the results of these experiments based on material content that has been studied online.

CONCLUSION

Based on the results of data analysis and discussion, it can concluded that schoology-based blended learning media in the respiratory system of XI grade to train scientific literacy was feasible based on validity with score of 3.88 included very valid category. Schoology-based blended learning media in respiratory system of XI grade to train scientific literacy was feasible based on practicality of the observation student blended learning activities with

percentage of 93.19% included very practical category and the students activities of scientific literacy skills with score of 80.5 included practical category. Schoology-based blended learning media in respiratory system of XI grade to train scientific literacy was feasible based on effectiveness assessed from student learning outcomes was 80% included effective category, achievement of learning indicators was 75% included effective category, and students responses was 97.94% included very effective category.

ACKNOWLEDGMENTS

The researchers would like to thanks to Dr. Raharjo, M.Si., Ulfi Faizah, S.Pd., M.Si., and Suprpto, M.Pd. as the validator and all students of MIA 2 XI grade of SMA Negeri 1 Kedungpring who participated on this research.

REFERENCES

- Abidin. (2014). *Desain sistem Pembelajaran dalam Konteks Kurikulum 2013*. Bandung: Refika Aditama.
- Adi, W. C., Suwono, H., & Suarsini, E. (2017). Pengaruh Guided Inquiry-Blended Learning Terhadap Literasi Sains Mahasiswa Biologi. *Jurnal Pendidikan: Teori, Penelitian, dan Pengembangan*, 2(10), 1369—1376.
- Agustina, E. T. (2013). Implementasi Model Pembelajaran Snowball Throwing Untuk Meningkatkan Hasil Belajar Siswa Dalam Membuat Produk Kria Kayu Dengan Peralatan Manual. *Jurnal Invotec*, 9(1), 17-28.
- Aminoto, Tugiyo, and Pathoni, H. (2014). Penerapan Media E-Learning Berbasis Schoology Untuk Meningkatkan Aktivitas dan Hasil Belajar Materi Usaha dan Energi Di Kelas XI SMA N 10 Kota Jambi. *Jurnal Sainmatika*, 8 (1).
- Anjarsari, P. (2014). *Literasi Sains dalam Kurikulum dan Pembelajaran IPA SMP*. Yogyakarta: Universitas Negeri Yogyakarta.
- Austria, M. M., Dasig, D. D., dan Valderama, A. M. (2015). Exploratory Study on Learner-Driven Blended Learning Environment (online). *Proceeding Journal of Education, Psychology and Social Science Research*. Diakses dari www.e-journaldirect.com.
- Balitbang. (2006). *Badan Penelitian dan Pengembangan*. Jakarta: Kemen Han.
- Catalano, H. (2014). The Opportunity of Blended Learning Training Programs in Adult Education Ascertainning Study. *Journal Social and Behavioral Sciences*, 142 (762-768).
- Damayanti, D. S. (2013). Pengembangan Lembar Kerja Siswa (LKS) Dengan Pendekatan Inkuiri Terbimbing Untuk Mengoptimalkan Kemampuan Berpikir Kritis Peserta Didik Pada Materi Listrik Dinamis SMA Negeri 3

- Purworejo Kelas X Tahun Pelajaran 2012/2013. (Online) diakses dari (<http://ejournal.umpwr.ac.id/index.php/radiasi/article/view/658>), diakses 20 Mei 2019).
- Kanematsu, H., & Barry, D. M. (2016). *STEM and ICT Education in Intelligent Environments*. London: Springer International Publishing Switzerland.
- Kusairi, S. (2012). *Implementasi Blended Learning*. Malang: Universitas Negeri Malang Press.
- Organization for Economic Co-Operation and Development (OECD). (2006). *Assessing Scientific, Reading, and Mathematical Literacy: A Framework for PISA 2006*. Paris: OECD Publication.
- PISA. (2016). *Assessing Scientific, Reading, and Mathematical Literacy*. Paris: OECD Publication.
- Rohmawati, L., Eka W., and Suliyannah. (2017). Pengembangan lembar kerja berbasis inkuiri terbimbing untuk melatih keterampilan proses sains pada siswa pada pokok bahasan hukum newton di SMA Negeri 1 Driyorejo. *Jurnal Pendidikan Fisika (JIPF)*, 6 (3), 258-264.
- Sicat., A. S. (2015). Enhancing College Student's Proficiency in Bussiness Writing Via Schoology. *Internasional Journal of Education and Research*, 3(1): 160-178.
- Sudarisman, S. (2015). Memahami Hakikat Dan Karakteristik Pembelajaran Biologi Dalam Upaya Menjawab Tantangan Abad 21 Serta Optimalisasi Implementasi Kurikulum 2013. *Jurnal Florea*, 2 (1), 29-35.
- Sugiyono. (2015). *Metode Penelitian Pendidikan*. Bandung: Alfabeta.
- Suprihatiningrum, J. (2013). *Strategi Pembelajaran (Teori dan Aplikasi)*. Jogjakarta: Ar-Ruzz Media.
- Susongko, P. (2010). Perbandingan Keefektifan Bentuk Tes Uraian dan Testlet dengan Penerapan Graded Response Model (GRM). *Jurnal Penelitian dan Evaluasi Pendidikan*, 14 (2).
- Widiantoro, B. dan Rakhmawati, L. (2015). Pengembangan Media Pembelajaran e-Learning Berbasis Schoology Pada Kompetensi Dasar Memahami Model Atom Bahan Semikonduktor di SMKN Negeri 1 Jetis Mojokerto. *Jurnal Pendidikan Teknik Elektro*, 4 (2), 501-506.
- Zuriyani, E. (2012). Literasi Sains dan Pendidikan (Online). Diakses dari <http://sumsel.kemenag.go.id>, diakses 25 Mei 2019.