KONSTAN
JURNAL FISIKA DAN PENDIDIKAN FISIKA
Volume 7, Number 2, December 2022
E-ISSN : 2460-9129 dan P-ISSN : 2460-9110
http://jurnalkonstan.ac.id/index.php/jurnal

Development of Ethnoscience-Based Physics E-Module Using Kvisoft Flipbook Maker To Improve Students' Science Literacy Skills

Endang Yulyanti[1,*], Arif Maftukhin[2], R. Wakhid Akhdinirwanto[3]

[1,2,3] *Universitas Muhammadiyah Purworejo,Jawa Tengah, Indonesia*

* E-mail correspondence: endang110799@gmail.com

Article Info:

Sent:
Oktober 19, 2022
Revisi:
Dec 31, 2022
Accepted:
Dec 31, 2022

Keywords:

E-Module Physics, *Etnosains, Kvisoft Flipbook Maker,* Science Literacy

Abstract

Research on the development of an ethnoscience-based physics e-module using the kvisoft flipbook maker was carried out on business and energy materials which aims to determine the feasibility of the e-module in terms of validity, effectiveness, and practicality to improve students' scientific literacy skills. The 4D research model used in this research is (1) define or define, (2) design or design, (3) develop or develop, and (4) disseminate or disseminate. This research was conducted at SMA Negeri 1 Majenang with students of class X MIPA 4 who were used as research subjects in a limited trial totaling six students and a broad trial totaling 30 students. The instruments used in this study were validation sheets, lesson plans implementation sheets, student activity sheets, scientific literacy test sheets, student response questionnaires, and note sheets for learning activities constraints. Data analysis techniques are quantitative, n-gain, and t-test. The results of the study were (1) the validity of the ethnoscience-based physics e-module using the kvisoft flipbook maker was declared valid, (2) the practicality of the ethnoscience-based physics e-module using the kvisoft flipbook maker, which can be seen from the implementation of the lesson plan obtained an average score of 3.77 with categories convenient and the reliability test is 95.3% which is included in the very reliable category, (3) The effectiveness of the ethnoscience-based physics e-module using the kvisoft flipbook maker can be seen from the results of the increase in scientific literacy ability learning outcomes that get an N-gain value of 0.65 which is included in the moderate category, student response questionnaires in the outstanding category, and student activities in the outstanding category. The results of the ethnoscience-based physics module research using the kvisoft flipbook maker were declared feasible to improve students' scientific literacy skills.

INTRODUCTION

Education is an essential thing in the progress of the nation. Education is a process to influence learners to adjust to their environment [1]. The Indonesian government is trying to change the education system to face the century's development, namely the 21st century. One of these changes is the change in the learning curriculum [2]. The 2013 curriculum is a curriculum that is developing today in Indonesia. The learning applied to the 2013 curriculum develops knowledge, skills, and good attitudes. Physics is one of the branches of science considered very important because it not only discusses facts, concepts, and principles but also provides students with learning through direct experience. The purpose of explicit learning is scientifically understand the surrounding environment and nature [3].

Information and communication technology have contributed to the world's growth in the 21st century. The subjects of the 21st century consist of English, geography, history, government, mathematics, natural sciences, and world languages. The core theme of the 21st century is global awareness, but it also emphasizes financial, health, and environmental literacy [2]. Literacy skills in physics learning are referred to as science literacy. Science concepts and procedures applied to the surrounding environment are part of science literacy, namely science and understanding [4]. Building a new generation with rational thinking and a solid scientific mindset is strongly associated with science literacy, as is the case with efficiently disseminating scientific science and related research findings to the general public around their environment [3]. The younger generation in Indonesia must be literate in science literacy to interact with the local community [5]. The curriculum and education system, selection of teaching strategies and models by educators, learning facilities and infrastructure, learning resources, teaching materials, and other factors all have an impact on the low science literacy ability of students in Indonesia [4]. An educator must be able to learn, especially in choosing learning strategies, methods, and models. In the face-to-face learning process, educators use the lecture method and write on the blackboard, which causes students to quickly feel bored in the learning process. The teaching materials used are LKS and package books that can be borrowed in the library. However, the number of package books is limited which causes not all students to have them.

Based on observations and interviews with one of the physics teachers at a school in Cilacap, SMA Negeri 1 Majenang, information was obtained that teaching materials still use LKS and package books with an educator-centered learning model, so the students' science literacy skills are still lacking. Many schools only give assignments to LKS and package books in the library, and ask students to do their work at home. However, not all students can use LKS and package books because learning is monotonous, and the material's content remains that way from year to year. The teaching materials are also limited in quantity. As a result, learners work on tasks ineffectively and inefficiently so that many functions that are not submitted on time by learners are not even collected. One of the teaching materials that can support online learning is the Electronic Module (E-Module).

E-module is a change from standard modules that combine information technology to make existing modules more attractive [6]. Multimedia features (images, audio, and video) can also be incorporated into e-modules and equipped with test or learning evaluation facilities. Scanning paper documents or sheets usually create these e-modules as images (jpg, gif, bmp, or tif) [6]. This physics e-module is very easy to use in the online learning process. The advantage of online teaching materials is that they are more interesting because there are animations in them so that they are enthusiastic about learning; they are more interactive, namely being able to learn independently (being able to evaluate their learning outcomes), and multiplatform (can be used on laptops, computers, cellphones, etc.). *Kvisoft Flipbook Maker* is one of the many programs used to create interactive multimedia content, as it is available today. Because it not only focuses on text but also can integrate motion, video, and audio animations [7]. Because of its offline accessibility and low cost, the e-module using the kvisoft flipbook maker can be used anywhere and anytime because of its soft file shape. However, students only learn material and cannot connect physics material to the context of life in nature or in the surrounding environment or what is commonly called ethnoscience. Ethnoscience is a process of integrating scientific science into local knowledge systems [8]. According to a group of knowledge possessed by a particular nation, tribe, or society, its truth can be tested and accounted for, known as ethnoscience [9]. Students will understand more in learning activities if they learn science, especially physics, using this ethnoscience-based physics e-module [9]. In this study, researchers surveyed the development of ethnoscience-based physics e-modules using kvisoft flipbook makers to improve students' science literacy skills.

METHOD

4D Models [10] are a method used in this study. The 4D model consists of 4 stages, namely (1) defining or defining at this stage is often called needs analysis. Describing this stage is carried out using (a) early-end analysis and (b) material analysis. (2) the design at this stage is carried out (a)

media selection and (b) format selection. (3) Development or development at this stage, the concepts accumulated in the design stage are realized in the finished product. Activities at this stage (a) expert validation, (b) product revision, (c) trial 1, (d) trial 2, and (4) dissemination or dissemination at this stage represent the application of the product at SMA Negeri 1 Majenang.

The subject is students from SMA Negeri 1 Majenang class X MIPA 4 even semesters of the 2021/2022 school year participating in this research and development, with six students conducting limited trials and 30 conducting extensive tests. Variables related to validity, namely content validity consisting of teaching materials and learning tools, 2. Variables related to the practicality of the e-module are (1) the implementation of the RPP and (2) the constraints that arise. 3. Variables related to the effectiveness of e-modules, namely (1) increasing science literacy, (2) student response, and (3) student activity. The data obtained are then analyzed to see the practical value of learning devices. Two observers evaluated the implementation of the RPP, and the instrument they used to measure it was an observation sheet for the implementation of the RPP. Quantitative descriptive data analysis techniques for determining the validity data of learning tools such as physics e-modules, lesson plans, science literacy ability tests, and assessment devices. Two validators perform data validation scoring, using a four-point/four-scale scoring system to ensure that the data does not need to be updated before it is directly converted into scale criteria by looking like Table 1.

Table 1. Four Scale Reference Criteria

Score Interval	Interpretation
0,00-1,69	Bad
1,70-2,59	Not Good Enough
2,60-3,50	Good Enough
3,51-4,00	Good

Then, convert the score to a percentage to make comparing scores easier, as seen in equation 1.

$$NP = \frac{R}{SM} x100\% \quad (1)$$

Meanwhile, to find out students' positive responses by recapitulating the data from the positive response questionnaire of students, utilizing pers.1 to convert data into percentages and convert them into standards using the value criteria in Table 2.

Table 2. Assessment Guidelines Criteria

Percentage Rate	Predicate
86%-100%	Excellent
76%-85%	Good
60%-75%	Enough
55%-59%	Less
≤54%	Very Less

By recapitulation of student response information data from the observation sheet of learning activities and calculating the Percentage Agreement (PA), two observers observed the implementation of learning activities. Percentage Agreement (PA) is used to determine the reliability of the assessment results of the performance of learning activities. According to Borich, PA can be calculated using equation 2.

$$\textit{Percentage Agreement} = \left[1 - \frac{A-B}{A+B}\right] x100\% \quad (2)$$

The data were obtained using the average score for each aspect. The percentage criterion is used in the interpretation of the data. The improvement of students' science literacy skills is assessed using data from the initial (pre-test) and final (post-test) tests of these abilities. This data analysis uses the normalized gain equation in equation 3.

$$g = \frac{S_f - S_i}{100 - S_i} \quad (3)$$

In equation 3, the normalized gain calculation results are then transformed into normalized gain categories using the standard criteria listed in Table 3.

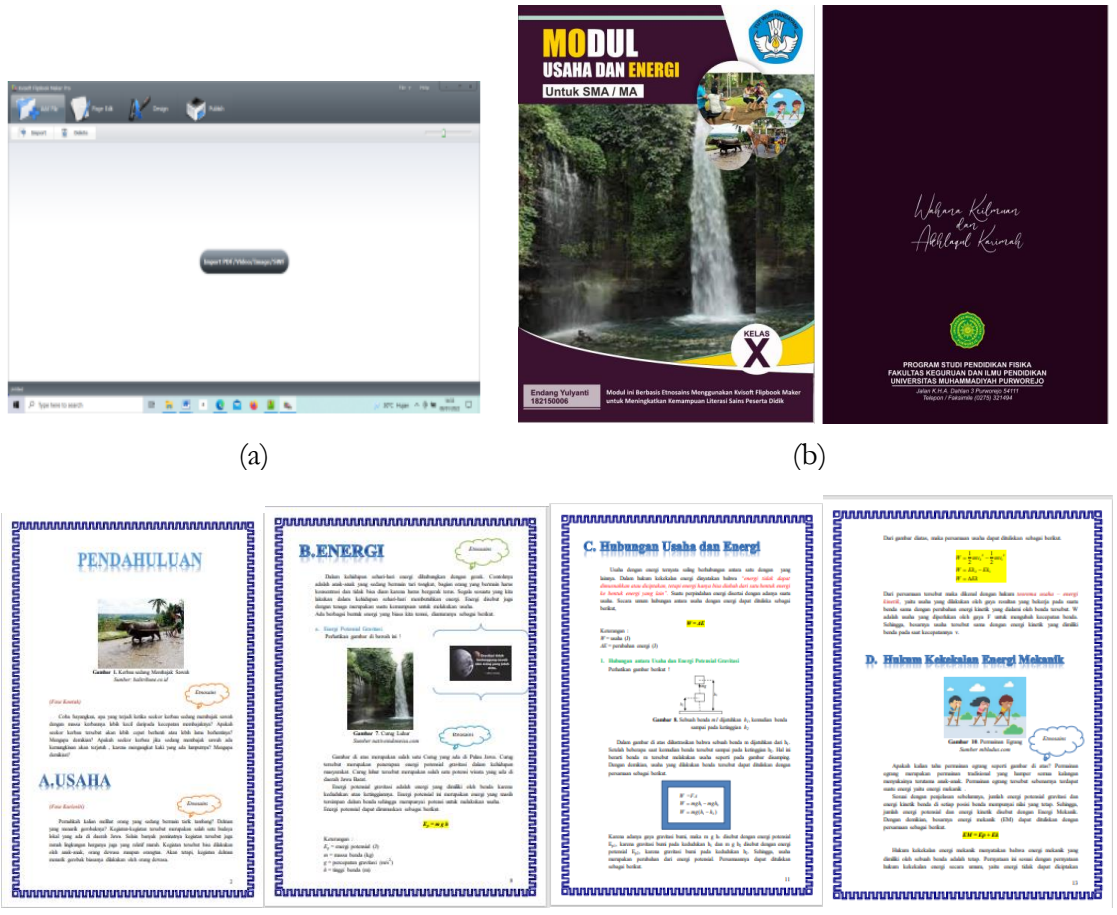
Tabel 3. Kriteria *normalized gain*

Kriteria	Kesimpulan
$g \geq 0{,}7$	Tinggi
$0{,}3 \geq g > 0{,}7$	Sedang
g<0,3	Rendah

RESULT AND DISCUSSION

A. Research Results

The results of this study so that this physics e-module can be said to be feasible to improve the science literacy ability of students, the validity, effectiveness, and practicality of ethnoscience-based physics e-modules are determined by utilizing the kvisoft flipbook maker application. Figure 1 shows the physics e-module product.



(a) (b)

(c)

Figure 1. Ethnoscience-Based Physics E-Module Products
(a) Kvisoft Flipbook Maker Display, (b) Module Cover, and (c) Material

Figure 1 is a product tested in class X MIPA 4 SMA Negeri 1 Majenang. The development follows the ethnoscience in the Majenang area, including business materials and energy.

Ethnosciences included in the matter of effort and power, such as buffalo plowing the fields, Delman carrying passengers, playing tug of war, minions pushing carts, playing engraving, etc. The following discussion is based on the findings of the study.

1. Validation Results

Two validators evaluate the validity of this learning device. The validation results of this physics e-module learning device are presented as the scores of the two validators, which are then converted into a scale of four. The results of evaluating several aspects of this e-module product can be seen in Table 4**.**

Table 4. Product Validation Results

Validation	Assessed aspects	Average Score	Percentage
Module	Benefit	7	87%
	Language	17	85%
	Content	12,5	78%
	Design	9,5	79%
	Servings	3,5	87%
	Total Actual Score	**49,5**	**83,2%**
Science Literacy Test	Construction	8	100%
	Content	7,5	94%
	Language	3	75%
	Readings	3,5	87%
	Total Actual Score	**22**	**89%**
RPP	Purpose	4	100%
	Content	17,5	85%
	Language	6,5	82%
	Time	6	75%
	Total Actual Score	**34**	**85,5%**
Student Response Questionnaire	Language	8	100%
	Servings	11	92%
	Design	6,5	87%
	Total Actual Score	**25,5**	**91,3%**

Table 4 shows the results of the evaluation of the validation assessment carried out by the two validators. The scores of the two module validators for this physics module are converted into a scale of four to find the validation results. The benefit validation results resulted in an average score of 7, with a percentage of 87% in the excellent category. The language aspect scored an average of 17, with a share of 85% in the excellent category. The content aspect scored an average of 12.5, with a rate of 78% in the outstanding category.

The design aspect obtained an overall score of 9.5 with a percentage of 79% in the good category. The serving part scored an overall score of 3.5 in the excellent category, with a rate of 87%. The overall score is 49.5, with an average overall percentage of 83.2%, with a good class.

The results of the validation evaluation of the science literacy ability test are presented as scores by two validators, which are then converted into a scale of four. The results of construction validation resulted in an average score of 8 to obtain a percentage of 100% with an excellent category. The content aspect resulted in an average score of 7.5 to get a rate of 94% in the outstanding category.

The language aspect yields an average score of 3 with a percentage of 75% in suitable categories. The reading aspect resulted in an average score of 3.5, with a rate of 87% in the excellent category. As for the average score of 61 overall, it has an average overall percentage of 89% in the outstanding category.

The validation assessment of the learning and implementation plan research results is presented as scores from two validators, which are then scaled to a scale of four. The development of the validation of the goal aspect got an average score of 4, a percentage of 100%, with excellent categories. The content element scored an average of 17.5 percent, 85%, with a good class.

language aspect scored an average score of 6.5, falling into the good category with a percentage of 82%. The time aspect scores an average of 6, a rate of 75%, with enough classes. As for the average overall score is 34, with an average overall percentage of 85.5% with a good category.

Validation assessment results of the student response provided by two validators in the student response at the time of the validation assessment were then changed to a scale of four. The validation results of the linguistic aspect got an average score of 8, a percentage of 100% in the excellent category. The serving part scored an average of 11, giving a rate of 92% of the outstanding class. The design aspect scored an average of 6.5 with a percentage of 82% in the excellent category. The overall score is 25.5, with an average overall rate of 91.3%, with an outstanding class.

2. Practicality Results

The experimental data of the e-module uses research instruments, RPP, and records the constraints of learning activities when the observer makes observations. Data on the results of the limited trial RPP observed by two observers can be seen in Table 5.

Table 5. RPP Implementation Results

Assessed aspects	Score		Average Score	Reliability
	Observers 1	Observers 2		
Introduction	27	27	27	100%
Core	17	20	18,5	92%
lid	8	7	7,5	94%
Total Actual Score	**52**	**54**	**53**	**95,3%**

Table 5 shows the results of the RPP implementation observations in the form of scores given by two observers and then changed to a scale of four. Validation of core aspects obtained results with an average score of 18.5 and a reliability of 92% in the excellent category. The primary element received results with an average score of 27 in the superb category with 100% reliability. The closing aspect obtained an average score of 7.5, so a reliability of 94% was obtained with a very reliable class. Then the average overall score is 53, so a reliability of 95.3% is obtained with a very reliable category.

3. Effectiveness Results

The results of effectiveness can be seen from the science literacy ability test in the form of N-gain, student response questionnaires and student activities are three aspects contained in ethnoscience-based physics e-modules that can be studied.

1.1 Improvement of Science Literacy Skills

In the extensive trial of learning activities with ethnoscience-based physics e-modules using kvisoft flipbook makers, pre-test and post-test were carried out, which functioned to improve students' science literacy skills to the maximum to see the effectiveness of this physics e-module. The average results of pre-test, post-test, and N-gain are presented in Table 6**.**

Table 6. Average Pre-test, Post-test, and N-gain Science Literacy Ability

Class	Material	Average		***N-gain***
		Pre-test	*Post-test*	
X MIPA 4	Work and Energy	68,26	88,93	0,65

Table 6 shows that in the broad trial stage of class X MIPA 4, which amounted to 30 students, 30 students had carried out pre-tests and post-tests. The pre-test results of students obtained an average score of 68.29, and the average post-test score received 88.93. So the N-gain criterion of 0.65 with the medium category was obtained. Shows that students' science literacy skills increase

after participating in learning activities. The calculation of paired t-sample tests on extensive preparation is the next step. In extensive practice, as many as 30 students carried out pre-tests and post-tests. The measure of paired sample t-test can be seen in Table 7.

Table 7. *Paired Samples Statistics*

Data	Mean	N	Std. Deviation	Std. Error Mean
Pre-Test	68.2667	30	4.54049	.82898
Post-Test	88.9333	30	3.55191	.64849

Table 7 shows that the pre-test results had an average score of 68.2667 out of 30 learners. The Standard Deviation was obtained at 4.54049, and the Standard Error was 0.82898. The post-test results had an average score of 88.9333 out of 30 students. The Standard Deviation was obtained at 3.55191, and the Standard Error was 0.64849. shows that the pre-test score is consistently lower than the average post-test score. The standard deviation and the default error for the post-test are smaller than the pre-test. The next step is calculating the correlation and significance of the pre-test and post-test values that 30 students have carried out. The results of the calculations can be seen in Table 8.

Table 8. *Paired Sample Correlation*

Data	N	Correlation	Sig.
PreTest & PostTest	30	.061	.749

Table 8 shows that the pre-test and post-test results obtained a correlation of 0.061 with a significance value of 0.749. The next step is to calculate the Paired Sample Test. The results of the calculations can be seen in Table 9.

Table 9. *Paired Sample Test*

Paired Differences					T	Df	Sig. (2-tailed)
Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
			Lower	Upper			
-2.06667E1	5.59145	1.02086	-22.75455	-18.57878	-20.244	29	.000

Table 9 shows the significance of the test of .000 with a t-test of -20,244 and a degree of freedom of 29. It suggests that H0 is rejected and H1 is accepted because of its significance result .000 < 0.05. Based on the paired sample test data, the difference in N-gain in science literacy tests can be inferred from the data presented in table 9 above. Influences the development of ethnoscience-based physics e-modules using kvisoft flipbook makers to improve students' science literacy skills. H0 is rejected, and H1 is accepted if the significance level is < 0.05.

The paired sample test data in table 9 above can be used to conclude that science literacy proficiency tests have different N-gains. Influences the development of ethnoscience-based physics e-modules using kvisoft flipbook makers in improving students' science literacy skills. The results of the Pre-test and Post-test assessments of students' science literacy skills following their indicators can be seen in Figure 2.

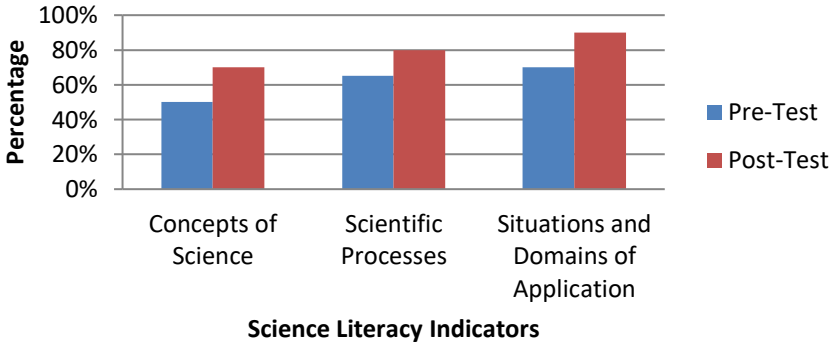


Figure 2. pre-test and post-test results bar chart

Figure 2 shows the pre-test and post-test results of ethnoscience-based physics e-modules using the kvisoft flipbook maker according to science literacy indicators. In the pre-test results for science concepts, a percentage of 45% was obtained, science processes obtained a rate of 65%, and the situation and realm of the application obtained a ratio of 70%. Meanwhile, the post-test results for science concepts obtained a percentage of 65%, science processes got a percentage of 80%, and the situation and realm of the application received a rate of 90%. Shows that there is an increase in the science literacy of students. The resulting product functions properly and effectively as a medium for physics learning activities based on the study's results.

1.2 Student Response

Data on the results of the student response questionnaire with ethnoscience-based physics e-modules using the kvisoft flipbook maker can be seen in Table 10.

Table 10. Student Response Questionnaire Data

Assessed aspects	Scores obtained	Percentage	Category
Easiness	310	86,1%	Excellent
Content	316	87,7%	Excellent
Language	215	89,6%	Excellent
Design	330	91,6%	Excellent
Average	**292,75**	**88,75%**	**Excellent**

Table 10 shows data on the results of the response questionnaire for class X MIPA 4 students after learning activities using ethnoscience-based physics e-modules using kvisoft flipbook makers. The usage aspect obtained a score of 310, so the percentage was obtained at 86.1% with an excellent category. The content aspect is 316, so the rate is obtained by 87.7% with the superb type. The language aspect scored 215, so the percentage was obtained at 89.6% with the excellent category. The design aspect received a score of 330, so the rate was obtained by 91.6% in the outstanding variety. Based on the analysis of student responses using ethnoscience-based physics e-modules using kvisoft flipbook makers to improve students' overall science literacy skills, the average score obtained was 292.75, so the percentage obtained was 88.75% in the excellent category.

1.3 Student Activities

Based on student activity data, its activities have excellent categories. We observe students when carrying out learning activities. The results of observations of students during learning activities can be seen in Table 11.

Table 11. Results of Observation of Student Activities

Assessed aspects	Score		Average Score	Percentage
	Observers 1	Observers 2		
Listening and Paying Attention	4	4	4	100%
File, Answer, and	3	4	3,5	87,5%

Respond				
Work together	3	4	3,5	87,5%
Understand	4	4	4	100%
Completing science literacy test questions	4			100%
Conclude	3	3	3	75%
Respect	4	4	4	100%
Relevant Behavior	4	4	4	100%
Total Actual Score	**25**	**27**	**26**	**93,75%**

Table 11 shows that the results of observing student activities are in the form of scores made by two observers, then transformed into a scale of four. The observations, such as listening and paying attention, resulted in an average score of 4 percentages of 100% with excellent categories. Aspects of delivery, responses, and answers obtained an average of 3.5, with a rate of 87.5% in the outstanding category. Working together scored an average of 3.5 percentage 87.5% in the excellent category. The comprehension aspect scores an average of 4 percentage 100% in the outstanding category. The element of answering science literacy test questions scored an average of 4 percentage 100% in the excellent category. The concluding aspect scores an average of 3 percentages of 75% in the outstanding category. The respect aspect gets an average score of 4 percentage 100% in the excellent category. The relevant parts of behavior scored an average of 4, with a percentage of 100% in the outstanding category. Then the average overall score of 3.75 to obtain a rate of 93.75% with an excellent category.

Based on the analysis of the study results and its description in the above results, it is clear that the resulting product falls under valid, practical, and effective criteria. Can be seen from expert validation of the products developed in this research activity. Practicality can be seen from the implementation of learning using media that has been designed. As for effectiveness, it can be seen from the increase in science literacy ability tests, student response questionnaires, and student activities. The results showed that the products developed can be used for physics learning anywhere and anytime because they are flexible and students are more interested in learning activities.

CONCLUSION

Based on the research results of the Ethnoscience-Based Physics E-Module, Using the Kvisoft Flipbook Maker is valid, practical, and effective. Thus, enabling students to improve their science literacy skills through the e-module. The conclusion is based on several things as follows. 1. Ethnoscience-Based Physics E-Module Using Kvisoft Flipbook Maker is valid. 2. Based on the implementation of learning, ethnoscience-based physics e-modules using kvisoft flipbook makers developed practically achieve a very high level of reliability with a percentage of 95.3%. 3. E-Module Physics Based on Ethnoscience Using Kvisoft Flipbook Maker is effective for (a) improving students' science literacy skills, as evidenced by the acquisition of normalized gain of 0.65 on pre-test and post-test included in the category of moderate improvement, (b) learners respond well during the learning process, with a percentage of 88.75% belonging to the excellent category, and (c) learners who perform activities well during the learning process get a percentage of 88.75% with the excellent category.

The author suggests that the ethnoscience-based physics e-module using the developed kvisoft flipbook maker is recommended to be implemented in other X classes at SMA Negeri 1 Majenang and other schools and is expected to be further developed with different materials.

REFERENCES

[1] Fakultas Teknik Universitas Negeri Padang. Jln. Hamka Air Tawar Padang, 25131 and U. Usmeldi, "Pengembangan Modul Pembelajaran Fisika Berbasis Riset dengan Pendekatan

Scientific untuk Meningkatkan Literasi Sains Peserta Didik," *J. Penelit. Pengemb. Pendidik. Fis.*, vol. 2, no. 1, pp. 1–8, Jun. 2016, doi: 10.21009/1.02101.

[2] Y. Andrian and R. Rusman, "Implementasi pembelajaran abad 21 dalam kurikulum 2013," *J. Penelit. Ilmu Pendidik.*, vol. 12, no. 1, pp. 14–23, Apr. 2019, doi: 10.21831/jpipfip.v12i1.20116.

[3] D. Susanti and S. Waskito, "PENYUSUNAN INSTRUMEN TES DIAGNOSTIK MISKONSEPSI FISIKA SMA KELAS XI PADA MATERI USAHA DAN ENERGI," p. 4.

[4] E. Zuriyani, "LITERASI SAINS DAN PENDIDIKAN," p. 13.

[5] M. Arohman and D. Priyandoko, "Kemampuan Literasi Sains Siswa pada Pembelajaran Ekosistem," p. 4.

[6] R. I. Sari, J. Jufrida, W. Kurniawan, and F. Basuki, "PENGEMBANGAN E-MODUL MATERI SUHU DAN KALOR SMA KELAS XI BERBASIS ETHNOPHYSICS," *Phys. Sci. Educ. J. PSEJ*, p. 46, Apr. 2021, doi: 10.30631/psej.v1i1.697.

[7] G. Pratiwi, R. W. Akhdinirwanto, and N. Nurhidayati, "Pengembangan E-UKBM Dengan Aplikasi Kvisoft Flipbook Maker dalam Pembelajaran Fisika untuk Meningkatkan Kemampuan Problem Solving Peserta Didik," *JIPFRI J. Inov. Pendidik. Fis. Dan Ris. Ilm.*, vol. 4, no. 2, pp. 46–55, Nov. 2020, doi: 10.30599/jipfri.v4i2.697.

[8] W. E. Rahayu, "PENGEMBANGAN MODUL IPA TERPADU BERBASIS ETNOSAINS TEMA ENERGI DALAM KEHIDUPAN UNTUK MENANAMKAN JIWA KONSERVASI SISWA," p. 8, 2015.

[9] D. Arlianovita, B. Setiawan, and E. Sudibyo, "Pendekatan Etnosains dalam Proses Pembuatan Tempe terhadap Kemampuan Literasi Sains," p. 7, 2015.

[10] T. D. Kurniawati, R. W. Akhdinirwanto, and S. D. Fatmaryanti, "Pengembangan E-Modul Menggunakan Aplikasi 3D PageFlip Professional Untuk Meningkatkan Kemampuan Literasi Sains Peserta Didik," *J. Inov. Pendidik. Sains JIPS*, vol. 2, no. 1, pp. 32–41, May 2021, doi: 10.37729/jips.v2i1.685.