THE DEVELOPMENT OF E-WORKSHEET BASED ON SETS (SCIENCE, ENVIRONMENT, TECHNOLOGY, SOCIETY) FOR WASTE PROCESSING SUB-TOPIC TO IMPROVE STUDENT'S SCIENTIFIC LITERACY SKILLS

Pengembangan Elektronik-Lembar Kegiatan Peserta Didik (E-LKPD) Berbasis SETS (Science, Environment, Technology, Society) Pada Sub-Materi Pengolahan Limbah Untuk Meningkatkan Keterampilan Literasi Sains Peserta Didik

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Abstract

The development of the 21st century learning demands scientific literacy competence. One of the things that can be used to train scientific literacy is with learning materials that integrate Science, Environment, Technology, Society (SETS). SETS-based learning is learning model that connects and links the science concepts studied with other fields, namely technology, environment and society. The aims of this study was to develop E-LKPD based on SETS for waste processing sub-materials to improve students scientific literacy which is theoretically and empirically feasible for learning process. The theoretical feasibility of E-LKPD is reviewed from the validation results assessed by material expert lecturers, education expert lecturers and biology teachers. The empirical feasibility can be seen from students response. This research is a development research using the 4D method (define, design, develop, disseminate) without doing the disseminate stage. The data analysis technique used quantitative description method. The results showed that the E-LKPD is declared theoretically feasible with a validation percentage of 97% with a very valid category. E-LKPD was also declared empirically feasible by getting a positive response from students with a practicality percentage of 97% with a very practical category. Hence, it can be concluded that the E-LKPD based on SETS for waste processing topic to improve students' scientific literacy is declared theoretically and empirically feasible for learning process. The implication of this research is to help improve the scientific literacy of Indonesian students, which is still considered low. Through the development of this E-LKPD is one of the efforts to improve Indonesian students in scientific literacy.

Keywords: E-worksheet, SETS, Scientific Literacy

Abstract

Perkembangan pembelajaran di abad 21 menuntut adanya kompetensi literasi sains. Salah satu hal yang dapat digunakan untuk meningkatkan literasi sains yaitu dengan bahan ajar yang mengintegrasikan Science, Environment, Technology, Society (SETS). Pembelajaran berbasis SETS merupakan pembelajaran yang menghubungkan dan mengaitkan antara konsep sains yang dipelajari dengan bidang lainnya yaitu teknologi, lingkungan dan masyarakat. Tujuan penelitian ini adalah mengembangkan E-LKPD biologi berbasis SETS pada sub materi pengolahan limbah untuk meningkatkan literasi sains peserta didik yang layak secara teoritis dan empiris untuk pembelajaran. Kelayakan teoritis E-LKPD ditinjau dari hasil validasi oleh dosen ahli materi, dosen ahli pendidikan dan guru biologi. Kelayakan empiris ditinjau dari pemaparan kepraktisan dari hasil respon siswa. Penelitian ini merupakan penelitian pengembangan dengan menggunakan metode 4D (define, design, develop, disseminate) tanpa melakukan tahap disseminate. Teknik analisis data menggunakan metode deskripsi kuantitatif. Hasil dari penelitian ini menunjukkan bahwa E-LKPD dinyatakan layak secara teoritis dengan persentase validitas 97 % dalam kategori sangat valid. E-LKPD juga dinyatakan layak secara empiris dengan mendapatkan respon positif siswa dengan persentase kepraktisan 97 % dalam kategori sangat praktis. Dengan demikian LKPD elektronik berbasis SETS pada sub materi pengolahan limbah untuk meningkatkan literasi sains siswa dinyatakan layak secara teoritis dan empiris untuk proses pembelajaran. Implikasi dari penelitian ini adalah membantu perbaikan literasi sains siswa Indonesia yang selama ini diteliti masih rendah. Melalui pengembangan E-LKPD ini, menjadi salah satu upaya meningkatkan literasi sains siswa Indonesia.

Kata Kunci: E-LKPD, SETS, Literasi sains

INTRODUCTION

The development of 21st century learning demands scientific literacy skills because it can improve students to be responsive and expected to be able to solve problems in the environment. Scientific literacy has several skills that should be improved, including identifying issues/natural phenomena scientifically, explaining phenomena scientifically and interpreting or using scientific data or facts. According to Sothayapetch in Susanti and Rachmadiarti (2018) scientific literacy competence is used to understand scientific knowledge (scientific content) through events that occur in life.

Scientific's concept, which is known as scientific literacy, is very important for every individual to master in order to live successfully in the 21st century. Therefore, scientific literacy is the main goal of science learning today. Data released by PISA shows the average science score of OECD countries is 489, while Indonesia has only reached a score of 396 and is ranked 69th out of 71 participating countries (OECD, 2019). These results imply that Indonesia is a country with low scientific literacy skills. This fact shows that we need for serious efforts to increase the learning of biology in schools gradually and sustainably. One of the learning strategies that can be applied to improve scientific literacy is the integration of science, technology, environment, and society or SETS. This is in line with Zoller's opinion in Susanti and Rachmadiarti (2018) which states that learning with integrates SETS is related to multidimensional knowledge that can help students practice scientific literacy skills.

According to Khasanah (2015) the SETS approach is a form of learning activity that directly links the elements of science, environment, technology, and society. Through the SETS approach, it will be able to provide assistance to teachers in linking the material being taught with the real life situation of students and inspire students to make connections among the knowledge they have and its application in real life. For example, in waste processing sub-materials, students are expected to understand the relations and integration of science, environment, technology and society (SETS) as a unit and its implications in their lives and apply it in the learning process. The relationshhip between SETS elements is shown in Figure 1.
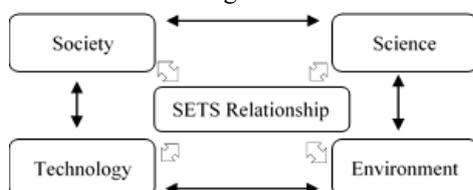
Fig. 1. *Relationship between SETS elements (modified from Binadja, 2005)*

In order to biology concept about pollution environment, especially in waste processing materials can be carried out effectively, systematically, and integratedly, teachers must be able to prepare learning activities to improve students' skills and support students to find scientific knowledge concepts which are expected from this knowledge to improve students' scientific literacy skills. One thing that can be done is to facilitate students with guidance in the form of student worksheets (LKPD) or called LKS in the 2006 National Curriculum. This LKPD is used as a guide for teachers and a guide for students in conducting observations, experiments, and demonstrations to facilitate investigation or solve a problem in learning (Trianto, 2011).

The development of the 21st century learning demands the existence of teaching materials that are in accordance with technology so that LKPD is not only in the form of sheets but also in digital form in the form of Electronic Student Work-Sheets (E-LKPD) (Rasiman, 2014). The SETS vision was chosen for the development of the E-LKPD because until now there are still few available teachers use the SETS vision in E-LKPD guideline, specifically for biology subjects in the waste processing sub-material. On watse processing sub-material there is a very close relationship between science, technology, the environment, and society because the material for environmental change is closely related to everyday life. There is integration sub material SETS-based waste processing, it is expected that students can have the ability to solve environmental pollution problems and waste processing using scientific concepts, technology products and maintaining them, and also reducing the impact on the environment and society.

According research from Khasanah (2015) SETS is a modern science learning approach. Susanti et. al (2018) stated that SETS-based learning is one strategy to improve students' scientific literacy. So this research intended to develop teaching materials in the form of E-LKPD based on SETS to improve students' scientific literacy. SETS learning model is able to give students an understanding of the role of the environment in science, technology, and society so that students can take advantage of the knowledge they learn and apply it in real life expecially in waste processing sub-materials.

Based on the background, this research aims is to develop E-LKPD based on SETS for waste processing sub-material to improve students' scientific literacy which is theoretically and empirically feasible for learning process.

METHOD

The research method used is Research and Development. This study aimed to develop and produce an Electronic Student Work Sheet (E-LKPD) based on SETS (Science, Environment, Technology, Society) in the Waste Processing Sub Material to Improve Scientific Literacy of Students, the E-LKPD which was developed using a research design 4-D is define (definition), design (planning), develop (development), and disseminate (dissemination). However, at the disseminate not implemented.

The subject of this research is the student worksheet based on SETS for waste processing topic. The theoretical feasibility of E-LKPD is reviewed from the validation results assessed by material expert lecturers, education expert lecturers and biology teachers of SMA LabSchool Unesa. Then empirical feasibility is reviewed from practicality test to 10 students of class 1st Science SMA Labschool Unesa Lidah Wetan Surabaya with questionnaires response.

Research design

The Define stage (D) explains the learning needs. The goal at this stage is to define the terms of learning. At this stage, it is necessary to analyze the objectives and limitations of the E-LKPD based on SETS to improve Science Literacy. This stage consists of: curriculum analysis, student analysis, task analysis, concept analysis.

The Design (D) stage has the aim of designing learning tools in the form of E-LKPD based on SETS to improve scientific literacy, at this stage it has several stages including: media selection, format selection, initial design of E-LKPD in the form of draft I then will be consulted regularly to the lecturer .

The Develop (D) stage aims to produce a draft II that is ready to be tested. The Electronic Student Work Sheet (E-LKPD) has been revised based on input from experts. At this stage, feedback is needed through 2 steps, namely review and validation from material expert, education expert and high school biology teachers. Then an analysis is carried out to determine whether the student work sheet can be declared valid or not, if it is valid then a small revision will be carried out, namely Draft II and then to the practicality test stage of the E-LKPD using a student response questionnaire. Meanwhile, if the E-LKPD is declared invalid, a major revision will be carried out to produce the Draft II and will be reviewed and validated again. The results of the E-LKPD based on SETS development for waste processing sub-materials to improve scientific literacy were re-analyzed to see if the E-LKPD development process met the valid requirements. If it has fulfilled it will produce a Final Draft. Meanwhile, if it does not good, a small revision of the validation will be carried out again.

Variable operational definition

The feasibility of the E-LKPD is reviewed from the theoretical feasibility and empirical feasibility.

The theoretical feasibility of E-LKPD is reviewed from the validation results assessed by material expert lecturers, education expert lecturers and biology teachers. The validity of the E-LKPD is said to be valid if the interpretation of the percentage of the validity assessment results from validators > 61% with a valid category.

The empirical feasibility is reviewed from the results of student responses. E-LKPD is declared empirically feasible if it obtains the percentage of students' practicality responses > 71% with a practical category.

Data collection method

The data collection methods in this study were validation and questionnaire methods. The E-LKPD validation method is a way of obtaining data on the t theoretical feasibility level of the ELKPD before being tested. This validation method is carried out by providing the developed E-LKPD along with validation sheets to material expert lecturers, education experts and biology teachers. The questionnaire method is aimed at students to assess the empirical feasibility of the E-LKPD which was developed by distributing response questionnaires to 10 students. Students are asked to answer "Yes" or "No" from each response questionnaire that has been given.

Data analysis method

The data analysis technique used includes validation of the development of the E-LKPD. The developed student worksheets will be validated by writing scores of 1-4 on each aspect that assessed. The percentage of the questionnaire data was obtained based on the Likert scale calculation.

From the validation results, the feasibility level is calculated using the following formula:

$$\text{P Validation score (\%)} = \frac{\Sigma Score}{Maximal\ score} \times 100$$

The results of the analysis of the validation sheet of experts and biology teachers were used to determine the theoretical feasibility of the E-LKPD based on SETS for waste processing submaterials to improve scientific literacy by using the interpretation of modified assessment criteria from Riduwan (2016) :

Table 1. Validation Criteria of E-Worksheet

Validation score Percentage (%)	Category
0-20	Invalid
21-40	Less Valid
41-60	Valid Enough
61-80	Valid

81-100	Very valid

(Riduwan, 2016)

E-LKPD also measured its empirical feasibility from the responses of students. This measurement was carried out through a response questionnaire filled out by 10 students. The student response questionnaire used the Guttman scale: 1 (yes answer) and 0 (no answer). The average percentage can be calculated using the formula:

P Response score (%) = x 100 $\frac{\sum Score}{Maximal\ score}$

Then the data is analyzed and the results will be analyzed according to Riduwan (2013) with the interpretation criteria in Table 2.

Table 2. Interpretation Criteria

E-LKPD Practicality Percentage (%)	Criteria
<25-40	Not practical
41-55	Less practical
56-70	Practical enough
71-85	Practical
86-100	Very practical

(Riduwan, 2013)

E-LKPD is state to be practical based on student responses if students answer "yes" reaching > 71% with the category of students also being carried out by describing student responses contained in the response questionnaire sheet. The results of the student response analysis are used to reflect and describe the practicality of the E-LKPD and then used to determine the empirical feasibility.

RESULTS AND DISCUSSION

This research output is to produces an electronic worksheet based on SETS which is theoretically and empirically feasible for learning process. This research resulted in 2 E-LKPD. The E-LKPD produced by the researcher consists of E-LKPD 1 with topic 1 "Mengapa Lingkunganku Berubah?" which contains material on pollution and solid waste management. Meanwhile, E-LKPD 2 with topic 2 "Selamatkan Lingkunganku" which contains material about water pollution and wastewater processing from detergent wastewater using simple phytoremediation techniques with water hyacinthgoiter plant.

E-LKPD Profile

The display of the results of the LKPD that has been developed can be seen in Figure 1. The profile display of the E-LKPD development can be seen in some figure below.

Fig. 2. *Main cover of E-LKPD*

The main cover of E-LKPD is the forefront of E-LKPD and is the main face of E-LKPD before entering E-LKPD 1 and E-LKPD 2.

(a)   *(b)*
Fig. 3. *(a) E-LKPD 1 cover (b) E-LKPD 2 cover*

E- E-LKPD 1 cover and E-LKPD 2 cover are the initial part of each E-LKPD. The cover is a barrier for each topic of discussion.
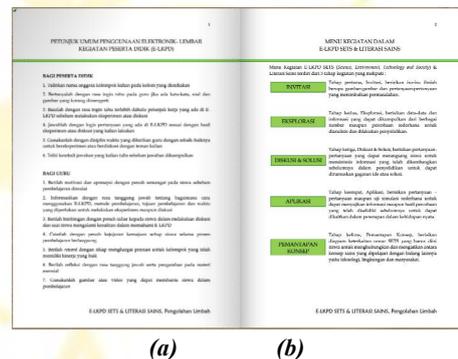
(a)   *(b)*
Fig. 4. *(a) E-LKPD instruction (b) Activiry Menu's*

E-LKPD instruction is instructions for using E-LKPD which consists of instructions for teachers and instructions for students. Activity Menu's is an explanation related to the stages of activities that will be carried out in the E-LKPD. The stages of activities in the E-LKPD based on SETS include the stages of invitation, exploration, discussion & solution, application and establishment of concept.

(a)   *(b)*

Fig. 5. *(a) E-LKPD identity (b) Topic summary*

E-LKPD identity consists of group identity, topic, time allocation, basic competence, indicators and learning objectives. "Ringkasan materi" is a summary of material that serves to help students answer discussions. E-LKPD SETS has a learning syntax consisting of 5 stages, namely invitation, exploration, solution, application and concept estabishment. The following is a table of activity menu and descriptions contained in the E-LKPD.

Table 3. Description of the Activity Menu in E-LKPD

No	Activity Menu in E-LKPD	description
1.		The Invitation activity contains problem issues in each E- LKPD topic, namely pollution and waste management. This activity is intended to provide apperception to students.
2.		This activity contains data and information that can be collected from article sources and simple experiments to be analyzed and investigated by students.
3.		This activity contains questions that can stimulate students to synthesize information that has been developed previously in the investigation so that ideas or solutions can be formulated.
4.		This activity contains questions and simple simulation tests to be able to present information and experimental results that have been investigated previously so that they can be linked in real life application.
5.		This activity contains a diagram of the relationship between SETS elements that students must fill out to connect and link the science concepts being studied with other fields, namely technology, environment and society.

Based on table 3, LKPD has five main activities. This activity is a form of effort in forming the concept of material for students. In addition, students can connect and link the concepts of science being studied with other fields, namely technology, environment and society. This is in line with Yunitasari's research (2013: 2) the role of student worksheets based on SETS as a learning tool to increase students' sensitivity to current scientific problems so that they have an effort to solve environmental and society problems and more open up with technological insights. In addition, the menu of activities on the SETS E-LKPD is also integrated to improve students' scientific literacy skills.

The first scientific literacy indicator is identifies scientific issues or phenomena with the SETS approach in the invitation stage syntax, namely at the ivitation stage students are assigned to identify problems where students are given an issue or problems that actual and exist in the society that can be observed by students, then students identify the problem scientifically what causes the pollution of the environment.

The second indicator is to explain scientific phenomena in which the syntax of the SETS approach supports the second indicator of scientific literacy, namely the activity menu of the discussion and solution stages. At that stage student will build or construct own knowledge through discussion to find or explain problems and consequences about waste pollution. In addition, students can also synthesize information that

they have developed previously in the investigation about environmental pollution and waste processing.

The third indicator is use scientific evidence and scientific data. These skills are improved at the application stage, when the students are expected to analyze the issues or problems that have been stated at the beginning where students look for simple solutions to reduce problems in waste pollution and detergent waste water that are available in the E-LKPD. Therefore, E-LKPD SETS & Science Literacy can improve students to develop scientific literacy through the activitiy menu in the E-LKPD.

Another unique side of the SETS & Scientific Literacy E-LKPD is that it is easily accessible. The SETS & scientific literacy electronic worksheets are designed usingn Flip PDF Professional software application which has the benefit of inserting video and images on electronic worksheets so that they become attractive electronic worksheets and look three dimensional (3D). Displays of the E-LKPD like real worksheets and easy for readers to use. This e-worksheet can be accessed using a computer/laptop and smartphone equipped with an internet connection. Following the new normal conditions after the COVID-19 pandemic, hybrid learning that collaborates limited face-to-face meetings and online meetings requires teaching materials that are adaptive, innovative and not boring. Details of the profile and contents of the E-LKPD can be viewed online at the following link:https://online.flipbuilder.com/cxtud/xyvo/. This is in line with what was stated by the Ministry of Education and Culture in Rohma and Puspitawati (2021) that teachers must be able to create learning innovations and an enjoyable learning condition at home online or in limited face-to-face meetings at school.

Theoretical feasibility

The theoretical feasibility of E-LKPD is reviewed from the validation results. The electronic worksheets were validated by three validators, namely material expert lecturers, education experts lecturers and biology teacher based on the components of content, language, and presentation. The result of the recapitulation of electronic worksheet validation were show in Tabel 4.

Table 4. The Result of E-LKPD Validation

No	Criteria	V1	V2	V3	Average (%)
1.	**Presentation**				
	The suitability of the LKS title with the topic	4	4	4	100
	Images relevant to the topic	4	4	4	100
	The combination of font and sizes is appropriate	4	4	3	92
	Color combination between images is suitable	4	4	4	100
	Include complete identity	4	4	4	100
	The learning objectives relevant with the KD	4	3	4	92
	The layout is attractive and appropriate.	4	4	3	92
	Font size can be read clearly and appropriately.	4	4	4	100
	The image display is clear and attracts the student's attention	4	4	4	100
	The color display is clear and attracts the student's attention	4	4	4	100
	Included steps of the SETS approach model.	4	4	4	100
	Included aspects of scientific literacy skills.	4	3	4	92
	The activities/instructions in E-LKPD are explained clearly (not confusing the students).	4	4	4	100
	The order of the questions is according to the material and student level.	4	4	4	92
	Questions stimulate students to be curious about environmental issues, especially waste processing.	4	3	4	92
	Questions increase students' understanding and	4	3	4	92

knowledge about waste processing.				
Having an identity, referring to sources that are appropriate to the student's reading level and clear learning goals	4	3	4	100
Average Criteria	**97 % / Very valid**			
2. **Content :**				
Material conten				
The suitability of indicators with Basic Competencies (KD)	4	3	4	92
The suitability of learning objectives with indicators	4	4	4	100
The suitability of the material with the learning objectives	4	4	4	100
The suitability of the material with the concept	4	4	4	100
Not contain wrong concept	4	3	4	92
The concept presented does not have a double meaning	4	4	4	100
Coherent and clear material	4	4	3	92
The material relevant to the ability level of the students	4	4	3	92
Average / Criteria	**96 % / Very valid**			
SETS Aspect				
a. Invitations	4	4	4	100
b. Exploration	4	3	4	92
c. Solution	4	4	4	100
d. Application	4	4	4	100
e. Establishment of concept	4	4	4	100
Average / Criteria	**98 % / Very valid**			
Scientific Literacy Aspect				
a. Identify scientific issues	4	4	4	100

b. Explain scientific phenomena	4	4	4	100
c.Using scientific evidence	4	3	4	92
Average / Criteria	**97 % / Very valid**			
3. **Language**				
Language according to PUEBI	4	3	4	92
Understanable and relevant to the maturity level of students	4	4	4	100
Use short and clear language	4	4	4	100
Average / Criteria	**97 % / Very valid**			
All Aspect Validation	**97%**			
Criteria	**Very valid**			

Based on the results of E-LKPD validation in table 4, the percentage of the overall score is 97% with a very valid category which means the E-LKPD that have been evolved are appropriate for use in the studying process.

The presentation aspect of two E-LKPD were rated with a percentage score of 97%. This indicate the presentation of the E-LKPD is suitable. This concerns how the E-LKPD looks in terms of appearance, layout, typeface, and attractiveness. The percentage obtained in this aspect falls into the very valid category. The cover design and title writing in the E-LKPD are considered to be in accordance with the material and content and get very valid scores. The combination of letters, the appropriate size of the font, as well as a clear appearance and attractive colors with a very valid category. The image elements in the E-LKPD are considered interesting and in accordance with the material concept. This is in line with the statement of Toharudin (2011), learning media must attract interest and motivate students to study further, so that they can develop their skills. In addition, the learning process requires an interest in something in order to learn optimally (Plass et al., 2010).

The systematic presentation in the E-LKPD such as learning objectives that are in accordance with the material concept, the steps of activities on the E-LKPD are very clearly, and the activities/instructions for each question on the E-LKPD are clearly explained. However, the validator provides notes to readjust the time allocation in experiments of E-LKPD. Widjajanti (2008) suggests that the development of a good E-LKPD is adapted to the situation and conditions of the learning

model activities that will be applied. In this E-LKPD, the time location is considered less suitable for the activities that must be carried out. Then the E-LKPD needs to be revised again during learning.

The content aspects of the two E-LKPDs were rated with an average percentage score of 97%. These results indicated that the content aspect of the E-LKPD is in accordance with the concept of the selected material. The depth of the material used follows the concept. The compatibilty of the concept with aspects of SETS and scientific literacy indicators stated very valid. Indicators of scientific literacy skills can be seen at the E-LKPD stage, the fisrt at the invitation stage students are presented with problem such as the problem of garbage accumulation that is produced by people every day in the invitation section in E-LKPD 1 and then the problem of detergent waste water produced by humans which is presented in the invitation section of E-LKPD 2. At that stage students can identify scientific issues and phenomena through the pictures and problems presented. Dewi et. al (2021) states that scientific literacy prioritizes the importance of scientific thinking in identifying issues. Second, at the discussion and solution stage students are given questions that stimulate students to be able to explain phenomena scientifically. In the discussion and solution section in E-LKPD 1 students were given discussions and questions about the causes and solutions to the waste problem and then in E-LKPD 2 students were given a discussion about the results of the detergent wastewater phytoremediation experiment using water hyacinth plants. From that students are asked to be able to explain the results of the experiment scientifically. The use of science environment technology and society in teaching materials explicitly gives students the opportunity to investigate and explain issues that exist in real life (Akcay et. al., 2010). Third, at the application stage students are presented with stimulus questions and simple simulation tests. At the application stage in E-LKPD 1 students were given a stimulus for waste processing technology using PLTSa technology then students discussed the application of this technology and also gave ideas about other technologies, while in E-LKPD 2 students were given simulations about the application of the results from phytoremediation experiments of detergent waste water that tested on the respiratory rate of fish. Then from of all that the students are expected to be able to use scientific evidence from experimental results that have been investigated previously to be linked in real life application. This is in line with the research of Avikasari et. al. (2018) that students feel happy with teaching materials related to

surrounding phenomena and can be applied in everyday life.

Therefore, this electronic worksheet is declared valid because it contains activities that are in accordance with the indicators and learning objectives in obtaining and seeking information about environmental problems that occur with the help of technology. The questions in the E-LKPD guide students in analyzing problems and understanding the concept of environmental change and waste processing material based on literacy, discussion, and problem solving activities. By being able to solve environmental problems, students can create ideas to solve problems that exist in the environment so that ideas are beneficial to society. In addition, in solving problems, students can use society ideas and hope to involve the society. These results shows that there is a good correlation between the steps in the E-LKPD activity and the SETS-based learning model. This is in line with the opinion of Poedjiadi (2010) that the purpose of SETS learning is to help students understand science, the development of science and technology and their impact on the environment and society so that the students have more scientific and technological literacy.

The feasibility of the language in the E-LKPD becomes the third component of the assessment by the validator. Aspects that must be assessed in terms of the use of language and terms in the E-LKPD. The result of the linguistic aspect obtained average percentage score of 97% with a very valid category. these results indicate that the E-LKPD uses clear sentences and easy-to-understand sentences according to the maturity level of students. In addition, the language used is short, clear and most importantly in accordance with PUEBI rules. This result is in accordance with the theory that the construction requirements of a good E-LKPD are use standard language according to PUEBI and sentences that are easy to understand and clear (Amalini, 2022).

The validation process has been completed and there are some recommendation or suggestions from the validator at the E-LKPD that has been evolved. Suggested records from validators are summarized in table 5.

Table 5. Suggestions Validator

No.	Suggestions Validator
1.	Electronic worksheets are provided with information regarding menus/features in the E-LKPD
2.	"Exploration" based on hand on activity can be improved
3.	Addition of time allocation and test parameters to the phytoremediation practicum

4. Adding a stimulus for waste processing technology of questions in the "Application" section of E-LKPD 1

5. Related to some spelling errors

Based on the data in table 5, there are several recommendations from the 3 validators. Then, revisions had been made in line with the recommendations. The first recommendations has been added with an explanation of the description of the activity menus on the SETS E-LKPD & Science Literacy on the first page before entering the E-LKPD activity. The second proposal has been added with the addition of hand on activity based activities such as exploring links and videos on E-LKPD 1 and conducting phytoremediation experiments water hyacinth goiter on E-LKPD 2. The third suggestion has been to add an appropriate time allocation and the Total Suspended Solid (TSS) parameter to the results of the phytoremediation practicum experiment water hyacinthgoiter. The fourth suggestion is a added stimulus for waste processing technology using PLTSa technology has been added to the questions in the "Application" section of E-LKPD 1. Then the typing error has been corrected based on the suggestions given by the validator. The suggestions for improvement are carried out in order to obtain good results of E-LKPD products. A good LKPD must meet didactic, construction, and technical requirements (Saifuddin & Kuntjoro, 2021).

Empirical feasibility

The empirical feasibility of E-LKD based on SETS for waste processing sub-materials is reviewed from recapitulation of the results of student responses. This value is received from the results of the response questionnaire sheets filled out by ten students on aspects of readability, language, appearance, content, SETS aspects and scientific literacy aspects. The results of the questionnaire response were show in Table 6.

Table 6. The Result of Student Response

No.	Criteria	Positive respons	Percentage (%)
1.	**Readability**		
	The font size and type can be read clearly	10	100
	There is content that explain the instructions for students	10	100
	The instructions in the E-LKPD are clear	10	100
	Average (%) / Criteria	**100 / Very Practical**	
2.	**Language**		
	Words and terms are easy	10	100
	to understand		
	Informative and easy to understand	10	100
	Average (%) / Criteria	**100 / Very Practical**	
3.	**Presentation**		
	Interesting E-LKPD display.	10	100
	The flip E-LKPD display is attractive.	10	100
	The color combination does not interfere with the content of the material.	10	100
	The image presented is clear	10	100
	Layout arrangement makes it easier to understand E-LKPD.	10	100
	hyperlinks can work well when accessed online	10	100
	videos can work well when accessed online	10	100
	Average (%) / Criteria	**100 / Very Practical**	
4.	**Content :**		
	Material concept		
	The videos and pictures on the E-LKPD can help in understanding waste processing sub-materials	9	90
	The material presented can be help in understanding the concepts in waste processing sub-materials	10	100
	E-LKPD can make them more motivated in studying waste processing sub-materials.	9	90
	Average (%) / Criteria	**100 / Very Practical**	
	SETS Aspect		
	Invitation stage stimulates students' curiosity about waste processing sub-materials.	9	90
	The exploration stage encourages students to investigate scientific issues.	9	90
	The discussion stage encourages students to synthesize data and find ideas.	9	90
	The application stage	9	90

encourages students to apply scientific findings/evidence.		
The Concept Consolidation Stage encourages students to understand and relate the elements of SETS	10	100
Average (%) / Criteria	**100 / Very Practical**	
Scientific Literacy Aspect		
The questions presented can practice students' scientific literacy skills.	9	90
E-LKPD encourages to practice students skills in identifying scientific issues.	10	100
E-LKPD encourages students to practice skills in explaining scientific phenomena.	10	100
E-LKPD encourages you to practice skills using scientific evidence.	10	100
The whole E-LKPD SETS & Science Literacy is considered good.	10	100
Average (%) / Criteria	**100 / Very Practical**	
All Aspect Practicality	**97%**	
Criteria	**Very Practical**	

Based on table 6, the results of the practicality of E-LKPD are obtained from the results of 10 students responses. The results of these responses indicate that the average percentage score is 97% with a very practical category. This means that the worksheets that have been developed are interesting and practical to use in the learning process. Teaching materials that are presented in a practical and correct manner can make it easier for students to be interested and enjoy with the learning process (Rohma and Puspitawati, 2021).

The empirical feasibility could be seen from practicality of several aspects from readability aspect, language, and the presentation that obtained a persentase score of 100% in the very practical category. This shows that the readability and language used in the E-LKPD are very clear and easy to understand according to the students' reading level. Then the way of presenting the E-LKPD is interesting and follows the layout of electronic learning materials. E-LKPD looks like actual books and experience three dimension. This makes students no

longer bored quickly because they see interesting learning materials. Nurhairunnisah's assertion (2018) states that the greater interactive the learning materials used, will give the more the studying motivation embedded in students. The practicality of learning materials is considered from the layout. E-LKPD have used an electronic layout that makes use of the PDF flip professional which offers get admission to hyperlinks for students so that students without difficulty access it from everywhere. Especially within new normal conditions after the COVID-19 pandemic, which requires hybrid learning, it will make it easier for students to learn from home or from school so that this electronic LKPD is very practical to use.

The content aspect obtained an average percentage of practicality scores from student questionnaires of 98% with a very practical category. The content aspects include the concept of the material, the suitability of the SETS aspect and the aspect of scientific literacy skills. The material concept aspect received a positive response from students with an average percentage score of 93% which indicates that the material presented in the E-LKPD can motivate and assist students in understanding the material. This is accordance with Dewi et. al. (2021) statement that the positive responses given by students indicate that most students have high interest and attention in learning activities. Learning activities and learning components that get high student attention are very important for achieving learning objectives.

On the other hand, the suitability of the E-LKPD with the SETS aspect and the scientific literacy aspect received a positive response from students, each of whom received an average score of 92% and 98%. This shows that the SETS & Science Literacy E-LKPD contains some learning activity that refer to the SETS learning model syntax with activities in it that can encourage and improve students' scientific literacy skills on waste processing materials. This is in line with Binadja's opinion (in Yunitasari, 2013: 19-20) which states that the implications of this SETS approach are so that students' thinking applies science concepts to forms of technology that are beneficial to society without having to damage the environment, linking the scientific concepts learned by implying the concepts of science and technology. The science in other SETS elements, familiarizes students with using everyday information as one of the departures for the learning process.

According to Koderi et al., (2020) teaching materials that can be used in teaching and learning activities are teaching materials that have been declared valid on didactic, construction, and language requirements. In accordance with the results of this research, the E-LKPD

SETS that had been developed was declared theoretically feasible with valid in terms of content, presentation, and language. In addition, the E-LKPD is also stated to be empirically feasible from the results of students' practicallity responses. This indicates that the expert validation test with a student response shows a positive correlation. Therefore, E-LKPD based on SETS to improve scientific literacy skills can be used as appropriate teaching materials in the learning process.

CLOSING
Conclusion

The main characteristic of this E-LKPD is that it packs waste processing sub-materials with simple phytoremediation that is suitable for high school learning in the form of E-LKPD based on SETS. The results of developing E-LKPD based on SETS to improve students' scientific literacy is declared theoretically feasible with a validation percentage of 97% with a very valid category. E-LKPD was also declared empirically feasible by getting a positive response from students with a practicality percentage of 97% with a very practical category.. Therefore, it can be concluded that the E-LKPD based on SETS for waste processing topic to improve students' scientific literacy is declared theoretically and empirically feasible to be used in the biological learning process for high school students.

Suggestion

The results of this study still need to be followed up by applying learning tools in the classroom. This is expected to be able to re-examine the feasibility of this learning device. In addition, to test how the material developed in this device.

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