

THE DEVELOPMENT OF ELECTRONIC-WORKSHEETS (E-WORKSHEETS) WITH SUB-MATERIALS OF WASTE RECYCLING BASED ON ECOPRENEURSHIP TO TRAIN ENTREPRENEURSHIP INTEREST OF STUDENTS

Pengembangan Elektronik-Lembar Kegiatan Peserta Didik (E-LKPD) Sub Materi Daur Ulang Limbah Berbasis Ecopreneurship untuk Melatihkan Minat Kewirausahaan Peserta Didik

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Abstract

The 2013 curriculum requires students with productive, innovative, and creative traits that have a positive contribution to social life, for instance by creating graduates who have an entrepreneurial interest to be an ecopreneur. To be able to fulfill these demands, school life-learning is needed, which is supported by decent and appropriate teaching materials in order to increase the entrepreneurial interest of students. The research aims to produce teaching materials in the form of Electronic-Worksheets (E-Worksheets) waste recycling ecopreneurship to instruct students' entrepreneurial interest which is theoretically and empirically feasible in accordance with the requirements of the 2013 curriculum and 21st century learning using the 4D method. (define, design, develop, disseminate) without doing the disseminate stage. Theoretical feasibility is obtained from the validation results, while empirical feasibility is obtained from the results of the teacher response questionnaire. E-worksheets ecopreneurship waste recycling is declared very feasible theoretically with an average value of 3.66 and empirical with an average value of 98%.

Keywords: E-worksheets, Entrepreneurship, Ecopreneurship, Entrepreneurial Interests, Waste recycling

Abstrak

Kurikulum 2013 menuntut peserta didik dengan sifat yang produktif, inovatif, dan kreatif yang memiliki kontribusi positif dalam kehidupan bermasyarakat, contohnya dengan terciptanya lulusan yang memiliki minat kewirausahaan untuk menjadi seorang ecopreneur. Untuk dapat memenuhi tuntutan tersebut diperlukan pembelajaran pada kehidupan persekolahan yang didukung bahan ajar yang baik dan tepat guna meningkatkan minat kewirausahaan peserta didik. Penelitian ini memiliki tujuan untuk menghasilkan bahan ajar berupa Elektronik-Lembar Kegiatan Peserta Didik (E-LKPD) ecopreneurship daur ulang limbah untuk melatih minat kewirausahaan peserta didik yang layak secara teoritis dan empiris sesuai dengan tuntutan kurikulum 2013 dan pembelajaran abad-21 dengan menggunakan metode 4D (define, design, develop, disseminate) tanpa melakukan tahap disseminate. Kelayakan secara teoritis didapatkan dari hasil validasi sedangkan kelayakan secara empiris didapatkan dari hasil angket respons guru. E-LKPD ecopreneurship daur ulang limbah dinyatakan sangat layak secara teoritis dengan rata-rata nilai 3.66 dan empiris dengan rata-rata nilai 98%.

Kata Kunci: E-LKPD, Ecopreneurship, Minat Kewirausahaan

INTRODUCTION

The 2013 curriculum requires teachers as facilitators and catalysts for students in Indonesian education, Government Regulation number 64 of 2008 which becomes Government Regulation number 19 of 2017 was

changed to create Indonesia generation to be a generation with positive character and abilities under the claims of the 21st-century, namely to focus on knowledge and skills for learners (Kemendikbud, 2017).

Indonesian education is one of the important factors which have contributed to the progress of the nation,

especially in the number of post-school unemployment. The Central Statistics Agency (BPS) 2020 stated that post-school unemployment in February 2020 was 137.91 million people which had an increase of 1.73 million people from February 2019. The Center for Population Research (P2K-LIPI) 2020 stated that the lockdown generation is unemployment which consists of fresh graduates, namely high school graduates to university graduates who have an age range of 15 to 24 years. Lockdown generation will experience difficult conditions where after the pandemic ends, there will be conditions for competition to get eminent jobs that are not balanced with existing jobs (ILO, 2020).

Wahyuningrum (2019) states that one of the best ways to solve labor problems in Indonesia is to open new employments through entrepreneurship. The Ministry of Industry (Kemenperin) 2018 stated that currently the ratio of the number of entrepreneurs in the State of Indonesia is still at 3.1% of the total population so it is necessary to increase 4 million new entrepreneurs to support the strengthening of the Indonesian economic sector. One of the ways to increase the number of entrepreneurs can be done by instructing entrepreneurial interest in senior secondary or high school education, with entrepreneurship education or entrepreneurship in school education it can be one of the lessons included in contextual learning. Entrepreneurship is one of the important aspects possessed by individuals that must be instilled through learning in schools as a qualification for students to become individuals with positive characters in society (Amenan, 2016).

Basic competence (KD) in biology material, namely KD 3.11 is to analyze data on environmental changes, causes and impacts on life and KD 4.11 is to formulate ideas in solving problems of environmental changes that occur in the surrounding environment. In KD, students are required to be active, innovative, and creative to be able to solve environmental problems around them in the form of waste recycling which can produce a product from goods that did not have selling value and are no longer used. Entrepreneurship-based biology learning can train students' interest in entrepreneurial interest which has been supported in several studies such as research by Afannudin (2019) which developed worksheets to train students' entrepreneurial interest using the 4D method on waste recycling sub-material which has very valid results and research from Wulandari (2019) who has tested the effectiveness of worksheets in making virgin coconut oil to instruct students' biopreneurship, which results in the 95.16% achievement percentation of the biopreneurship indicator.

Riyadi (2018) conducted research by using e-worksheets in learning can make the activities more practical than using the conventional worksheets, this statement is supported by research conducted by Apriyanto (2019) which states that students respond well to the use of e-worksheets as teaching materials compared to the conventional worksheets. There have not been many electronic-based student activity sheets developed and the requirements of 21st century learning which need electronic-based learning and the large number of unemployed is based on the lack of entrepreneurship with the Project Based Learning (PjBL) approach that instruct students to make projects by paying attention to environmental problems. Based on the description, the researcher is encouraged to carry out enhancement research to overcome existing problems with the title "The Development of Electronic-Worksheets (E-Worksheets) with Sub-Materials of Waste Recycling Based on Ecopreneurship to Instruct Entrepreneurship of Students".

METHODS

This study aims to develop and produce biology teaching materials in the form of e-worksheets on waste recycling materials using ecopreneurship basis to instruct students' entrepreneurial interest using the Project-Based Learning (PjBL) learning method which is declared feasible by proficient validators. The enhancement stage of e-worksheets teaching materials was carried out at the State University of Surabaya in October 2020. The development of e-worksheets in this study used the 4D method which has the following stages: define, design, develop, and disseminate. This research was conducted up to the develop stage and the dissemination stage was not carried out in this research.

Define stage uses several analysis such as curriculum, student, task, concept, and learning objectives analysis. This step uses data is important to make the basis of whether this research needs to be done or not. From the analysis is focus on the ecology topic and identifying the task that student need especially in waste recycling topic within curriculum need.

The design stage is consist of compiling test criteria, selecting media who are relevant with e-worksheets concept, selecting format of e-worksheets, and design the product.

The development stage is consist of produce the product e-worksheets ecopreneurship with sub materials waste recycling. The validity of e-worksheets can be get from validation result by education expert.

The expedience of e-worksheets is seen from the theoretical and empirical feasibility which includes

aspects of e-worksheets such as e-worksheets identity, technical requirements, construction requirements, e-worksheets content, ecopreneurship-based activities, and entrepreneurial characteristics.

The theoretical feasibility was obtained from the value of the validation results by one proficient lecturer on learning resources and one skilled ecology lecturer at the Biology Department of UNESA and a biology high school teacher. The instrument in the validation process uses a validation sheet that assesses aspects of e-worksheets such as e-worksheets identity, technical requirements, construction requirements, e-worksheets content, ecopreneurship-based activities, and entrepreneurial characteristics which analyzed quantitatively descriptive. The validation assessment is calculated with formula $\frac{\sum Score}{Maximal score} = final score$ and based on the three validator scoring mode which is analyzed with calculations that refer to the Likert scale with the assessment criteria of 3.26-4.00 (very feasible), 2.51-3.25 (feasible), 1.76-2.50 (adequate), 1.00-1.75 (less feasible) obtained from the scoring in Table 1.

Table 1 Likert Scale Assessment Criteria

Score	Interpretation Criteria
4	Very Valid
3	Valid
2	Less Valid
1	Invalid

The empirical feasibility was obtained based on a teacher response questionnaire consisting of aspects of readability, presentation and content of the waste recycling ecopreneurship e-worksheets which was analyzed descriptively quantitatively. The responses were given by seven biology teachers. Assessment based on the Guttman scale: 1 (yes response) and 0 (no response). The results obtained are calculated (%) using formula $\frac{\sum score}{maximal score} \times 100\% = final score$ then as the percentage of positive responses with interpretation based on Riduwan (2016), namely $81\% \leq P \leq 100\%$ (very feasible), $61\% \leq P \leq 80\%$ (feasible), $41\% \leq P \leq 60\%$ (quite feasible), $21\% \leq P \leq 40\%$ (less feasible), and $0\% \leq P \leq 20\%$ (not feasible) (Adapted from Riduwan, 2016).

RESULTS AND DISCUSSION



1. E-worksheets Ecopreneurship Profile of Waste Recycling as a Learning Resources



The waste recycling ecopreneurship e-worksheets was enhanced using the Kvisoft Flipbook Maker Pro, which has the advantage of inserting pictures and videos on the e-worksheets. The user interface is also simple and easy to

use by readers. e-worksheets can be accessed by using a computer / laptop which must be supported by the Flash Player application. This e-worksheets concieves material content on environmental change, especially in recycling waste based on ecopreneurship with project based learning thourgh entrepreneurial activities for students to do projects in the *Jadi Ecopreneur Yuk!* (Let's be Ecopreneur!) feature.

The e-worksheets ecopreneurship profile of waste recycling consists of two topics. The first topic is the planning of waste recycling products and the second topic is the marketing of the products. The e-worksheets waste recycling ecopreneurship has several supporting features such as: *baca yuk!* (Let's read!), *kerjakan yuk!* (Let's do it!), *Nonton yuk!* (Let's watch!), *Tahukah kamu?* (Did you know?), *jadi ecopreneur yuk!* (Let's be ecopreneur!) The features of the e-worksheets ecopreneurship waste recycling can be seen in Table 2.

Table 2. Features of the E-worksheets Ecopreneurship Waste Recycling

No.	Feature	Description
1.	<i>Baca Yuk!</i> (Let's read!)	Include waste recycled reading materials which used to introduce some insights and strengthen students' understanding in the material.
		
2.	<i>Kerjakan Yuk!</i> (Let's do it!)	Involve questions which will become exercises for students to understand material of waste recycling .
		
3.	<i>Tonton Yuk!</i> (Let's watch!),	Include videos that are adding insight and understanding the waste recycling material to the students

No.	Feature	Description
		
4.	<i>Tahukah Kamu? (Did you know?)</i>	Contains interesting information which is useful for students in understanding about waste recycling and environment material.
		
5.	<i>Jadi Ecopreneur Yuk! (Let's be Ecopreneur!)</i>	Contains information and activities which will instruct students to become true ecopreneur with easy and fun activities in a project.

2. Theoretical Feasibility of E-worksheets Ecopreneurship Waste Recycling

The theoretical feasibility of the e-worksheets ecopreneurship waste recycling was obtained based on a recapitulation of the assessment conducted by three validators. The validators assessed aspects of e-worksheets such as e-worksheets identity, technical requirements, construction requirements, the e-worksheets contents, ecopreneurship-based activities, and entrepreneurial characteristics. The validation results can be seen in Table 3.

Table 3. Validation Recapitulation of E-worksheets Ecopreneurship Waste Recycling.

No.	Assessment Aspects	Score			Average value
		V1	V2	V3	
E-worksheets Identity					
1.	The e-worksheets title suitability with the teaching material	4	3.5	4	3.83
2.	Include the learning objectives on the e-worksheets	4	3	4	3.66
3.	Time allocation suitability in the e-worksheets	4	4	3	3.66
4.	Include the e-worksheets working instructions	4	3	3	3.33
5.	Group identification on e-worksheets	4	3	4	3.66
6.	The suitability of the	3	4	4	3.66

No.	Assessment Aspects	Score			Average value
		V1	V2	V3	
	questions formulated in the e-worksheets with learning objectives				
7.	List of references	4	3	4	3.66
Average value		3.63			
Interpretation		Very Valid			
Technical requirements					
8.	Suitability of the writing and letters in the e-worksheets	4	3	3	3.33
9.	Suitability of the cover page with the e-worksheets title	4	3	4	3.66
10.	The suitability of the e-worksheets layout and the contents	4	3	4	3.66
11.	The appearance of e-worksheets attracts the attention of students	3	4	3	3.33
Average value		3.49			
Interpretation		Very Valid			
Construction Requirements (Language)					
12.	Sentences used in e-worksheets clear and not cause a double meaning	3	3	4	3.33
13.	The language used in e-worksheets can be understood by students	4	4	3	3.66
Average value		3.49			
Interpretation		Very Valid			
E-worksheets Contents					
14	The article suitability with learning objectives	4	4	4	4
15	E-worksheets suitability with the ditactic requirements	4	3.5	4	3.83
Average value		3.91			
Interpretation		Very Valid			
Ecopreneurship Based Activities					
16	Determining the product concept	3	4	4	3.66
17	Organizing students in groups	4	3	4	3.66

No.	Assessment Aspects	Score			Average value
		V1	V2	V3	
	Average value				3.66
	Interpretation				Very Valid
Entrepreneurial Characteristics					
18	Analysis of situations leading to the idea of entrepreneurship	4	4	3	3.66
19	Instructing entrepreneurial interest	4	4	4	4
	Average value				3.83
	Interpretation				Very Valid
	Overall Aspects Average Value				3.66
	Interpretation				Very Valid

Description: V1 and V2 (Learning resources expert)
V3 (Content expert)

3. Empirical Feasibility of E-worksheets Ecopreneurship Waste Recycling

The empirical feasibility of waste recycling ecopreneurship e-worksheets could be seen by looking at the results of the recapitulation of the response questionnaire that was filled by seven teachers. The teachers assessed aspects of e-worksheets such as e-worksheets identity, technical requirements, construction requirements, e-worksheets contents, ecopreneurship-based activities, and entrepreneurial characteristics. The results of the recapitulation of teacher responses can be seen in Table 4.

Table 4. Recapitulation of Teacher Responses to E-worksheets waste recycling ecopreneurship

No.	Assessment Aspects	(%)	
		Yes	No
E-worksheets Identity			
1.	The e-worksheets title suitability with the teaching material	100	0
2.	Include the learning objectives on the e-worksheets	100	0
3.	Time allocation suitability in the e-worksheets	100	0
4.	Include the e-worksheets working instructions	100	0

No.	Assessment Aspects	(%)	
		Yes	No
5.	Group identification on e-worksheets	100	0
6.	The suitability of the questions formulated in the e-worksheets with learning objectives	100	0
7.	List of references	100	0
Technical Requirements			
8.	The font used on the e-worksheets interesting	100	0
9.	The cover page with the title e-worksheets is suitable and attractive	100	0
10.	The proportions in the e-worksheets are suitable	100	0
11.	The appearance of e-worksheets attracts the attention of students	86	14
Construction Requirements (Language)			
12.	Sentences used in e-worksheets clear and not cause a double meaning	86	14
13.	The language used in e-worksheets can be understood by students	100	0
E-worksheets Contents			
14.	The article which contains the learning objective is suitable and interesting	100	0
15.	E-worksheets suitability with the didactic requirements	100	0
Ecopreneurship Based Activities			
16.	Product conceptual activity is easy and attractive	100	0
17.	There are activities to organize students in groups	100	0
Entrepreneurial Characteristics			
18.	Analysis of situations that can lead to entrepreneurial ideas	100	0
19.	Instructing	100	0

No.	Assessment Aspects	(%)	
		Yes	No
	entrepreneurial interest		
	Average value	98	
	Interpretation	Very Feasible	

Based on the data that has been obtained from the responses of 7 teachers, it is showing the results of 98% positive response which means that the interpretation is very feasible. Overall, the aspects of the e-worksheets received a 100% response except for the aspects of technical requirements and construction requirements. 86% obtained on the point of e-worksheets appearance attracted the attention of students, which fall into the aspect of technical requirement. Another 86% obtained from the point of the sentence used in e-worksheets were clear and did not cause double meanings, on the aspect of the construction requirements. The e-worksheets is packed in a form of flipbooks so students are able to open it virtually, the packaging of e-worksheets in flipbooks also accommodate the teaching materials to be interesting which capable of making the learning activities enjoyable (Chandra, 2016).

E-worksheets ecopreneurship is very feasible based on the validation results obtained by an average of 3.63 on the aspect of e-worksheets identity. E-worksheets identity contains the e-worksheets framework which includes the title, objectives, time allocation, work instructions, and bibliography of these components which are important in worksheets which aims to facilitate the use and maximize the objectives of worksheets (Rusli, 2017). This e-worksheets contain some features that can guide the students to understand waste recycling material and activities to develop their entrepreneurship interest. E-worksheets is important to meet the demands of the 21st-century in technology, innovation, and develop skills in education aspect (Wijaya *et al.*, 2016).

The technical requirements aspect of the ecopreneurship e-worksheets obtained an average result of 3.49 which is considered very feasible. The technical requirements include the aspects of the layout of the components in the e-worksheets. A good and attractive layout of teaching materials will help students in the learning process and attract students' interest in using e-worksheets teaching materials (Gumelar, 2017). The attractive appearance of e-worksheets could prevent the students from feeling boredom so that they will feel not easy to be bored with learning (Syarifah, 2017). Motivational words on the layout and back cover of e-worksheets will also help motivate students to carry out ecopreneurship activities in e-worksheets, this is

supported by Kemala (2017) that entrepreneurial interest can be enhanced by providing motivation that will positively affect students' psychology. *Kerjakan Yuk!* feature is consist the questions who train student to more understand about waste recycling concept why answering high order thinking questions.

The language aspect is one of the important aspects in e-worksheets teaching materials, according to the National Standard Agency for National Education (2020), the language components in teaching materials include interactive communication on teaching materials, accuracy in sentence structure, standardization of the terms used, accuracy of spelling according to the rules of the Indonesian language, as well as the consistency of writing on scientific / foreign names. The language requirements of the e-worksheets ecopreneurship waste recycling obtain an average value of 3.49 with a very valid interpretation. The validators gave suggestions to fix typo and shorten the material in the e-worksheets, after revised typo in the e-worksheets already fixed and the material already shorten to improve e-worksheet in this aspect.

The contents of e-worksheets include articles and components in e-worksheets which refer to the ditactic requirements. Wiyoko (2016) explains that the material in teaching materials must be in accordance with the teaching material and be specific, clear, and up-to-date material. The content aspect of the e-worksheets ecopreneurship waste recycling obtained an average value of 3.91 with a very valid interpretation. The validators gave suggestions to make the article more variation in whole biology content not only in plastic recycling but also in other recylcing, after revised articles on e-worksheets already add by organic recycling in the *Baca Yuk!* feature in this e-worksheets. Articles in this e-worksheets is important to give student some idea in waste recycling and in business information. The waste recycling material is picked because in the material have many environment problems that can be source of ideas to make business plan in the entrepreneurial activities and project to complete the project in this e-worksheets. *Tahukah kamu?* feature is contain up to date information who can stimulated the student to be more concerned with the environment problems. There is an *Nonton Yuk!* feature that provides video to increase student understanding of the waste recycling material, this state is supported by past reseach Kamba (2019) that video have positively effect to increase knowledge of student.

Adequate entrepreneurial activities in the worksheets consist of entrepreneurial activities that encourage students to conceptualize business products by carrying

out opportunity analysis activities and planning product concepts that are attractive and have selling value (Utami, 2018). Ecopreneurship based activities on the e-worksheets ecopreneurship waste recycling obtained an average score of 3.66 with very valid interpretations. Sutiyaniti (2018) through her research explains that worksheets for recycling waste gets a positive response from students when it is used in learning and can increase students' entrepreneurial interest. Ecopreneurship in this e-worksheets can challenge the student to solve the problem of environmental in their area, this activity not only can challenge themselves to solve the environmental problem but also motivated their ecopreneurship interest to increase (Yimamu, 2018). The ecopreneurship activities in this e-worksheets can get in the *Jadi Ecopreneur Yuk!* feature to challenging students make a business plan based on environmental problems with easy guide and run that business in their team to complete the project in this feature. Singh (2018) explains that ecopreneurship not only can offer a win-win solution both in business and environment but also enable young ecopreneurs to fulfill their goals. Research by Nowiński (2019) entrepreneurship education in the high school level is impact positively in Poland.

Teaching materials that have an entrepreneurial basis possess entrepreneurial activities to motivate students to analyze opportunities until designing business products that can trigger students' entrepreneurial interests (Dewi, 2016). In e-worksheets ecopreneurship waste recycling aspects of entrepreneurial characteristics get an average score of 3.83 with a very valid interpretation. Related research that supports entrepreneurial-based activities in teaching materials, especially worksheets, is also supported by research conducted by Sisnodo (2015) which states that worksheets on an entrepreneurial basis gets positive responses from students and can increase entrepreneurial interest in students, moreover, entrepreneurship-based worksheets also have the potential to foster new entrepreneurial candidates who pay attention to the environmental and local regional potential. E-worksheet is one of the best way to motivate entrepreneurship student during their education and this state is supported by research conducted by Stephan (2015) which states that motivation is one of important things that support person to increase their entrepreneurship, education is positively related to challenge student motivation in entrepreneurship. By using entrepreneurship worksheets is one of the best things to support the student to challenging and develop themselves in their education. In this e-worksheet

entrepreneur characteristics can be found in *Jadi Ecopreneur Yuk!* feature that make student to analysis the situation in their own area to produce business plan based on their idea and creativity to solve environment problem and develop their entrepreneurship interest. An ecopreneur is a entrepreneur who both making profits and going green at the same time (Santini, 2017). To make students more confident run their business plan there are feature called Nonton Yuk! that contain video who motivated student to become a successful entrepreneur.

The state that e-worksheets ecopreneurship can train entrepreneurship interest of the student is supported by behavioristic learning theory who state that someone can have certain behavior after doing activity and experience in past, behavior can form by a stimulus which can produce a reactive behavior relationship/response (Fahyuni, 2016). Project based learning is one of the best learning method to support the student doing experience and have a new experience to create new behavior in project task, the past research who use project based learning to create new behavior especially in entrepreneurship is the research by Affanudin (2019) who created worksheets project based learning in waste recycling material to train entrepreneurship and Thohiroh (2020) who created worksheets project based learning in biotechnology to train creative and innovative thinking through ecopreneurship project. By solve environmental problems can positively effects student to their attitudes and behavior concerning sustanaibility, this state is supported by past research Jeronen (2017) who research about teaching methods in biology education state that good choice learning method in biology can positively effect the student not only in knowledges but also in attitudes and skills. Entrepreneurship education is important to be include in curriculum especially ecopreneurship to train entrepreneurship interest and make more young entrepreneur who make both profits dan solving environmental problems, this state is support by study literature Du Toit (2018) that entrepreneurship education can potential to solve the highest young unpleyoment rate in South Africa youth.

CONCLUSION AND SUGGESTION

A. Conclusion

The result of e-worksheets ecopreneurship waste recycling is declared very feasible both theoretically and empirically. E-worksheets on waste recycling ecopreneurship is stated to be very feasible theoretically based on the validation results with a score 3.66 very valid interpretations. E-worksheets on waste recycling

ecopreneurship is stated to be very feasible empirically based on the positive response from the teachers with a score 98% a very proper interpretation.

B. Suggestion

Further research can be carried out by implementing the development of e-worksheets ecopreneurship waste recycling as a learning resource for students.

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