Empowerment Teachers of SMA Malang Raya Making Eco Enzyme and Biology Module for Teachers

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Abstract

In this 21st century, educators are required to be able to facilitate and inspire students to be critical and creative, involve students in exploring real-world issues and solving various problems. Learning caring for the environment needs to be associated with the application in the daily lives of students in the family, community, and environmental environment, so that learning is contextual, and students get meaningful learning. There are still quite a lot of teachers who have not been able to develop contextual learning and raise problems from the surrounding environment or daily activities. *Eco-enzymes* are one of the learning resources and media in the surrounding environment that can be raised in the learning process. This activity aims to hold eco-enzyme training and preparation of teaching modules for Biology Teachers of SMA Malang Raya. Training on making Eco-enzymes *was* conducted for one day starting with the theory of Eco-enzymes, independent curriculum, making teaching modules, and continued with direct practice of making *Eco-enzymes* from various kinds of fruit skins. All participants had the opportunity to make *Eco-enzymes*. *Eco-enzymes* that have been made are maintained for 3 months in individual homes and harvested after their time. This training was followed by group work for one month to create teaching modules related to *Eco-enzymes* so that teachers can apply them to students in schools. Based on the training, 6 teaching modules related to *Eco-enzymes* were produced. Based on this activity, Malang Raya High School teachers can develop learning sourced from the environment around students.
Keywords: Eco-enzyme; Teacher; Teaching Module

Abstrak

Pada abad 21 ini, pendidik dituntut untuk mampu memfasilitasi dan menginspirasi peserta didik untuk kritis dan kreatif, melibatkan peserta didik dalam menggali isu dunia nyata dan memecahkan berbagai permasalahan. Pembelajaran peduli lingkungan perlu dikaitkan dengan penerapan dalam kehidupan sehari-hari peserta didik di lingkungan keluarga, masyarakat, dan alam sekitar, sehingga pembelajaran bersifat kontekstual dan peserta didik mendapatkan pembelajaran yang bermakna. Masih cukup banyak guru yang belum dapat mengembangkan pembelajaran yang kontekstual dan mengangkat permasalahan dari lingkungan sekitar atau kegiatan sehari-hari. *Eco-enzym* merupakan salah satu sumber dan media pembelajaran di lingkungan sekitar yang dapat diangkat dalam proses pembelajaran. Kegiatan ini bertujuan untuk mengadakan pelatihan eco-enzym dan penyusunan modul ajar bagi Guru Biologi SMA

Malang Raya. Pelatihan pembuatan *Eco-enzym* dilakukan selama satu hari diawali dengan teori tentang *Eco-enzym*, kurikulum merdeka, pembuatan modul ajar, dan dilanjutkan praktik langsung pembuatan *Eco-enzym* dari berbagai macam kulit buah. Seluruh peserta mendapatkan kesempatan untuk membuat *Eco-enzym*. *Eco-enzym* yang telah dibuat dipelihara selama 3 bulan di rumah masing-masing dan dipanen setelah waktunya. Pelatihan ini dilanjutkan kerja kelompok selama satu bulan untuk membuat modul ajar terkait *Eco-enzym* agar guru dapat menerapkannya kepada peserta didik di sekolah. Berdasarkan Pelatihan tersebut, dihasilkan 6 modul ajar yang terkait dengan *Eco-enzym*. Berdasarkan kegiatan ini, guru-guru SMA Malang Raya dapat mengembangkan pembelajaran bersumber dari lingkungan sekitar peserta didik.

Kata Kunci: Eco-enzyme; Guru; Modul Ajar

INTRODUCTION

Learning activities designed by educators need to develop skills demanded in this 21st-century learning era, such as critical thinking and problem-solving skills, communication and collaboration skills, and creativity and innovation skills. The main goal of 21st-century learning is to build individual learning abilities and support their development into lifelong, active, independent learners, therefore teachers need to be learning trainers (Susriyati Mahanal, 2014). Learning an attitude of caring for the environment needs to be associated with application in students' daily lives in the family, community, and environmental environment so that learning becomes meaningful for students. *Eco-enzymes* are one of the learning resources and media in the surrounding environment that can be raised in the learning process. *Eco-enzyme* is a liquid extract produced from the fermentation of vegetable and fruit residues with a substrate of brown sugar or molasses. Household organic waste can be processed into *Eco-enzyme*. *Eco-enzyme* is a liquid resulting from the fermentation of organic household waste such as fruit and vegetable peels, with a sugar substrate (brown sugar, brown sugar or cane sugar), and water. Basically, *Eco-enzyme* accelerates biochemical reactions in nature to produce enzymes that are of widespread benefit by using fruit or vegetable waste. *Eco-enzyme* has many benefits can be a cleaning fluid at home, body care, it can also be as a natural fertilizer and an environmentally friendly pesticide. In this pandemic condition, *Eco-enzyme* can be used as a hand sanitizer (Agustina Monalisa Tangapo & Febby Kandou, 2022).

GENERAL DESCRIPTION OF THE COMMUNITY, PROBLEMS AND TARGET SOLUTIONS

General description

Malang Raya is a metropolitan area which is a combination of three regions such as Batu City, Malang City, and Malang Regency, East Java Province (Ghozali et al., 2017). According to the Dapodikdasmen of the Ministry of Education, Culture, Research, and Technology (Kemendikbudristek), Malang Raya has more than 100 high schools and 1,209 high school teachers. Malang has a distinctive feature with the nickname of the city of education because many educational institutions were established in Malang, ranging from elementary school to tertiary level. In 2020, the Central Bureau of Statistics of East Java Province noted, there were 3 state universities and 46 private universities in Malang City.

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Problem

A common problem experienced by teachers is that the development of learning tools in schools has not been carried out optimally because teachers are still confused and the task load is large, lack of references, and lack of training for teachers. The problem of education and teaching is a fairly complicated and complex problem, because many things affect it (Seidman, 2018). One of the factors that influence the teaching and learning process is the teacher. So far, a lot of criticism has been directed at teachers, especially on the way teachers teach who are considered to place too much emphasis on mastering a number of concepts alone without considering how to communicate a concept in a way that is more pleasant and easy for students to understand and like (Ferdinandus, 2018).

The task of the teacher is to convey the subject matter to students using certain methods or methods in the learning process that is carried out. The success of the teacher delivering the material to his learners largely depends on the method used. Whether or not the achievement of educational goals is successful depends on the learning process experienced by the student. Problems in everyday life can be related to materials that involve many disciplines in their studies, such as ecosystems, the environment, and biotechnology (Aasen & Sadownik, 2019). The activeness and independence of students in the learning process is the responsibility of the teacher, every material accompanied by practicum so that practicum activities can be carried out simple and easy to understand. These practicum activities will have a positive impact on the development of student process skills so as to train students in finding their own knowledge. The reality that often occurs is that practicum activities are not carried out due to various reasons, such as lack of time to do practicum, lack of laboratory/assistants, lack of supporting facilities and infrastructure, and so on (Junedi et al., 2020).

Target solution

Some of the solutions offered are eco-enzyme training and teaching module preparation training. Teaching modules can also be interpreted as learning tools or learning designs based on the curriculum that is applied with the aim of achieving predetermined competency standards (Nurdyansyah, 2018). *Eco-enzymes* are organic solutions made by utilizing vegetable and fruit waste in creating a clean and comfortable environment. *Eco-enzymes* are one of the sources and media of learning in the surrounding environment that can be raised in the learning process and become an example for several materials such as environmental changes and their impact on life, anaerobic metabolism, and biotechnology. This can be used as a breakthrough in compiling teaching modules as a learning medium with P5 (Andina, 2019).

METHOD

This activity uses an empowerment approach through eco-enzyme training and assistance in making Teaching Modules by raising eco-enzymes as teaching modules. The initial stage is carried out through the delivery of material by the community service team regarding the benefits of *eco-enzymes*, the relationship between *eco-enzymes* and microbes, the practice of making eco-enzymes, and P5. Furthermore, direct training on making eco-enzymes with partners involved the fathers and mothers of biology teachers at SMA Malang Raya. Before the training, a pretest is held and after the training, a pos, test is held. The next stage is assistance

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in making P5-based teaching modules online through WhatsApp groups periodically. This activity was carried out with assistance from the fathers and mothers of biology teachers at Malang Raya High School. The presence and active participation of partners is evaluated in the form of pretest and posttest results, then displayed in the average form, and then statistically analyzed.

RESULTS AND DISCUSSION

The training for making EE was carried out in the department of biology (B21) FMIPA UM, and online via google meet by involving the fathers and mothers of teachers in Malang City and Malang regency, a total of 18 who attended offline. Eco-enzyme training it was a success because the number of participants exceeded the desired target. The initial target stated in the pamphlet stated that the available quota was only 15 participants, but those who registered were many, exceeding 20 participants. Therefore, coordination is carried out again by considering certain things. In the end, workshops and training on making eco-enzymes are carried out offline and online.

The methods and strategies used by giving Pre-test and Post-test can help teachers to evaluate and improve teaching activities and methods as well giving Pre-tests and Post-tests can increase student motivation and interest in learning as well as readiness for learning activities so that learning outcomes can increase (Effendy, 2016). Based on the pretest and post-test data results, data processing is carried out using Microsoft Excel, by entering the average formula. The average formula is used in finding the average of each existing record. There is a difference from data nos. 1-18, where the highest average is 91.00 while the lowest average is 63.00. Pretest and post-test results are presented in Table 1.

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Table 1. Average Pretest and Posttest Results

No	Pretest	Posttest	Average
1	30	96	63,00
2	72	84	78,00
3	88	94	91,00
4	40	88	64,00
5	76	100	88,00
6	62	80	71,00
7	64	92	78,00
8	40	100	70,00
9	54	90	72,00
10	72	96	84,00
11	66	88	77,00
12	64	96	80,00
13	80	90	85,00
14	72	84	78,00
15	70	90	80,00
16	64	96	80,00
17	58	96	77,00
18	58	86	72,00

Based on the average results in the table above, a further test is needed in the form of paired t-test. The paired t-test was analyzed using Microsoft Excel 2010.

Table 3. Hasil Uji t-Test: Paired Two Sample for MeanS

	Pretest	*Posttest*
Mean	62,77777778	91,44444
Variance	215,5947712	32,8496732
Observations	18	18
Pearson Correlation	-0,134360012	
Hypothesized Mean Difference	0	
Df	17	
t Stat	-7,387230913	
P(T<=t) one-tail	0,0000005	
t Critical one-tail	1,7396067	
P(T<=t) two-tail	0,0000011	
t Critical two-tail	2,1098156	

Based on the table above, it can be seen that the two-tail $P(T<=t)$ is smaller than the alpha value of 0.05. Thus, it can be concluded that there is a significant difference between the pretest and posttest in eco-enzyme training for the development of teaching materials in the form of modules. Teaching modules have a major role to support teachers in designing learning. In the preparation of learning tools that play an important role in teachers, teachers are honed in the ability to think to be able to innovate in teaching modules (Nesri, 2020). The teaching module is closely related to the independent curriculum. The independent curriculum prioritizes character development through content on learning and Pancasila student profiles (Sungkono,

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2009). The character that is formed is the important point in Pancasila, noble character, devotion, independence, thinking, critical, and can work together, as well as be creative (Zubaidah, 2019).

CONCLUSIONS AND SUGGESTIONS

The Eco-enzyme Making Training was carried out offline in Building B21 of the Department of Biology and online through *Google Meet* with participants consisting of biology teachers from Malang districts and cities. *Eco-enzyme* training is fairly successful because it exceeds the desired target. Preparation of teaching modules (*Lesson Design*) based on the results of training on making *Eco-enzymes* on several basic competencies of students. The teaching module is in the form of (P5), where each participant is divided into 6 groups to make it easier to compile a teaching module (P5).

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