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TRAINING ON USED COOKING OIL SOAP AS SOCIOPRENEURSHIP

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Abstract

The revitalization of the SMK curriculum projects serves that students are not only ready to work but also be able to create jobs through entrepreneurship. SMK Students are provided additional hours of entrepreneurship coursework in order to foster creativity, innovation, and an entrepreneurial mindset among students. Furthermore, students are also required to possess a social entrepreneurial mindset, which encompasses a business development perspective that takes into account social, economic, environmental, and health factors. In this program, students are given training in making soap from used cooking oil. Used cooking oil is a waste that has promising business prospects. Appropriate processing of used cooking oil can yield valuable products that satisfy the needs of the community. As a result of this training, up to 97% of students have acquired a greater understanding of the hazards and advantages associated with using cooking oil. Students possess advanced skills in producing soap products using used cooking oil. Furthermore, students develop a greater awareness regarding health and the environment.

Keywords: *Used Cooking Oil Soap, Sociopreneurship, Training*

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1. INTRODUCTION

A Vocational High School (SMK) is a type of formal education at the secondary level that aims to prepare graduates for employment in certain industries based on their skills. Vocational education, as defined by Law Number 20 of 2003 Article 15, refers to secondary education specifically designed to equip students with the necessary skills and knowledge to pursue careers in specific industries or fields. Hence, the SMK curriculum focuses upon achieving competency in the knowledge, skills, attitudes, and values necessary to succeed in the professional sector (Sudira, 2009).

The reconstruction of vocational high schools is necessary for generating a workforce composed of innovative, skilled, and reputable graduates who can thrive in the current era of globalization. In accordance with Presidential Instruction (INPRES) Number 9 of 2016 regarding the revitalization of Vocational High Schools, efforts have been made to enhance and align the curriculum of Vocational High Schools. One of these alignments is the implementation of Teaching Factory, which aims to foster innovation and productivity. Students are now expected to not only acquire technical skills and abilities, but also grasp the principles of business development (Biwara, 2017).

The objective of increasing the allocation of hours dedicated to entrepreneurship subjects in the SMK curriculum is to provide SMK graduates with the skills necessary to generate employment opportunities, rather than solely seeking employment themselves (Sutanto et al., 2018). Students in all vocational high school disciplines must possess a creative and imaginative mindset, together with an entrepreneurial outlook, in order to develop marketable products. Hence, entrepreneurship education not only enhances business-related knowledge but also fosters the development of students' entrepreneurial character (Winarno, 2015). Furthermore, students must possess social awareness in order to establish a business that requires consideration variables like the environment, welfare, and public health (Dwianto, 2018).

One of the products that can be developed by considering environmental aspects is soap derived from used cooking oil. Used cooking oil refers to frying oil that has undergone degradation due to multiple instances of heating (Ardhany & Lamsiyah, 2018). Used cooking oil that is consumed continually can cause disorders such as elevated cholesterol levels, coronary heart disease, hypertension and cancer. The act of disposing used cooking oil into the environment results in the demise of soil microorganisms, rendering the soil infertile and leading to water pollution (Medhiatika, 2021). Aside from soap, used cooking oil can be further transformed into biodiesel products and aromatherapy candles. According to a news release from the Minister of Energy and Mineral Resources (ESDM), there is significant potential for entrepreneurship in the production of biodiesel products from used cooking oil.

The objective of these community service activities is to offer vocational students training on the production of soap merchandise using used cooking oil. Furthermore, vocational students were also educated about the dangers associated with the consumption of used cooking oil, both in terms of health risks and environmental impact. Vocational

students possess the capacity to become catalysts for transformation, capable of generating employment opportunities while demonstrating a keen awareness of social, economic, and environmental issues (Andayani et al., 2022).

2. METHOD

This activity was conducted at SMKS Nusantara BM Lubukpakam, with target participants are 30 students from grade X, XI and XII. This activity conducted in four stages: (1) preliminary analysis, (2) focus group discussion, (3) design and preparation and (4) implementation as shown in Fig.1.

(1) Preliminary analysis

This activity was started by observing and interviewing one of entrepreneurship teacher at SMKS Nusantara BM Lubukpakam.

(2) Focus group discussion

The second step was discussed and collaborated with the Headmaster of SMKS Nusantara BM Lubukpakam about the implementation of the service program.

(3) Design and preparation

The LPPM Unimed Team designed the service program and prepared some materials which is necessary for the program such as: guiding book, lecturing material, and the tools and materials for practicing activity.

(4) Implementation

The service program was implemented on September 22nd 2021 and started by the test about used cooking oil as an entrepreneurship product. Then followed by lecture about the utilization of used cooking oil as a promising product such as biodiesel, soap, candle, etc. In addition, students are also provided with a lesson on the hazards posed by used cooking oil to both human health and the environment, including water and land. After that the students were practiced to create soap from used cooking oil. Finally, the evaluation for this program was measured by final test.

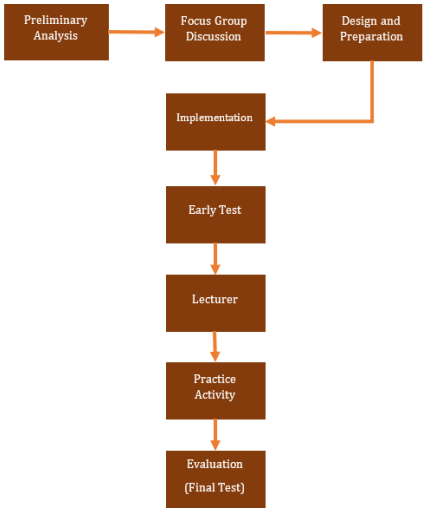

Fig. 1. Scheme of Activity Method

3. RESULTS AND DISCUSSION

The participant of this community service program are 30 students, with 33% boys and 67% girls. They are 30% grade X, 33% grade XI and 37% grade XII. Each grade represented area of expertise.

Table 1. List of pre-test and post-test questions

Code	Question
Q1	What is used cooking oil?
Q2	Who is the biggest producer of used cooking oil?
Q3	Is used cooking oil safe to consume?
Q4	Is used cooking oil safe if disposed in environment?
Q5	Did you know that used cooking oil can be turned into soap?
Q6	What addictive substances are added in making solid used cooking oil soap?
Q7	Can used cooking oil soap products be a promising entrepreneurship product?
Q8	Are you interested in selling used cooking oil soap products?
Q9	Consumption of used cooking oil can cause?
Q10	Disposing of used cooking oil into the environment can cause?

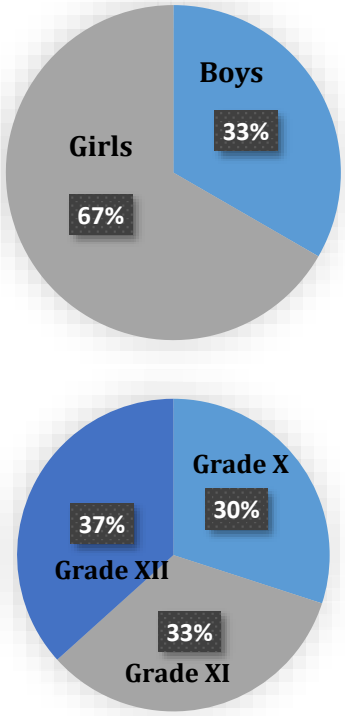

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Fig. 2. The participants of community service program

The activity started with assessing students' preliminary comprehension of used cooking oil and its hazards and usefulness in everyday life. Students were given 10 multiple choice questions via Google Form.

The students participated in this activity are SMK students who comprise of 3 areas of competence, which are (1) Komputer dan Teknik Jaringan (TKJ), (2) Otomatisasi Tata Kelola Perkantoran (OTKP), and (3) Akuntansi Keuangan dan Lembaga (AKL). The basis of competence is unrelated to scientific disciplines such as physics, chemistry, and biology. According to an interview with an entrepreneurship instructor, it was revealed that the students were not taught basic disciplines such as physics,

chemistry, and biology. Hence, this event was organized to assist students in developing entrepreneurial products using a scientific method.

The objective of this course is to enlighten students about the hazards and negative effects of used cooking oil on both human health and the environment. The repeated use of cooking oil can lead to the development of cancer and heart disease (Handayani et al., 2021). Furthermore, the act of disposing used cooking oil into sewers leads to environmental contamination. It has the potential to harm multiple terrestrial and aquatic ecosystems. Subsequently, it results in soil infertility.

The students received the material through a lecture that utilized power point presentation media. The implementation of strict health regulations required the splitting of students into two classes, with a maximum of fifteen students in each class. Each lesson was led by an instructor who helped the students gain a deeper understanding of used cooking oil, its impact, and the benefits as entrepreneurial products.

Fig.2. Lecturing Activities

The instruction proceeded with the experimental production of soap using used cooking oil. The aim is to offer students genuine practical experience. Students were categorized into 5 groups. Every group comprised 6 pupils. The students were provided with a manual that detailed the process of creating soap from used cooking oil, as depicted in Figure 3.

Fig. 3. Guiding Books

The equipment used in this experiment consisted of 2 measuring cups, 1 stirring rod, 6 molds, and an analytical balance. The main components were used cooking oil, sodium hydroxide, activated carbon, and water. Fragrance and pigment are essential to improve the quality of soap products created from used cooking oil. The initial phase involved refining the used cooking oil with activated carbon. Activated carbon is an adsorbent used to eliminate the black color and odor from used cooking oil (Prihanto & Irawan, 2018). Subsequently, 40 grams of NaOH were measured with a precision balance. The students were directed to wear gloves to prevent direct contact between NaOH and their skin (Handayani et al., 2021). A study by Eroglu et al. (2012) found that

exposing the skin to NaOH for 2-3 hours without gloves can cause skin burns. The first sign was a burning sensation, followed by redness and the development of blisters. Students are given knowledge on the characteristics of NaOH to reduce work-related accidents when producing used cooking oil soap.

Fig. 4. Practice Activities

In this experiment, the students combined 40 grams of NaOH with 150 mL of water and stirred until dissolved (Fig. 4). An exothermic reaction took place, causing the solution to take longer to cool down. The NaOH solution was mixed with 250 mL of used cooking oil and stirred until the solution became homogeneous. The process was termed saponification. When fat/triglyceride from used cooking oil reacts with NaOH, it produces soap and glycerol.

Each group had a distinct experimental competence. The soap products were influenced by the stirring time, as observed. Excessive stirring led to the solution clumping and reduced the quality of the soaps. The solution was molded and left to sit for 3-4 weeks before removing the alkaline NaOH. Next, the soaps made from used cooking oil are ready for use. Figure 5 displays the used cooking oil soap in various colors, including white, brown, and pink. The white color is the natural product without any added dye/pigment.

Fig. 5. Used Cooking Oil Soap Products

The training activity was evaluated using pretest and post-test assessments. Students' initial knowledge was assessed by a pretest. Then a post-test was conducted to determine the level of success of this community service.

From the pretest and post-test data (Fig.6), it was found that 29 out of 30 students were previously familiar with the concept of used cooking oil (Q1). The pretest data indicates that just 5 out of 30 students answered correctly to question 2, which inquired about the greatest producer of used cooking oil. The students' initial knowledge was clearly indicated to be low. After completing the training, there was a significant increase in the students' understanding, as evidenced by 97% of

students answering question Q2 correctly in the post-test session.

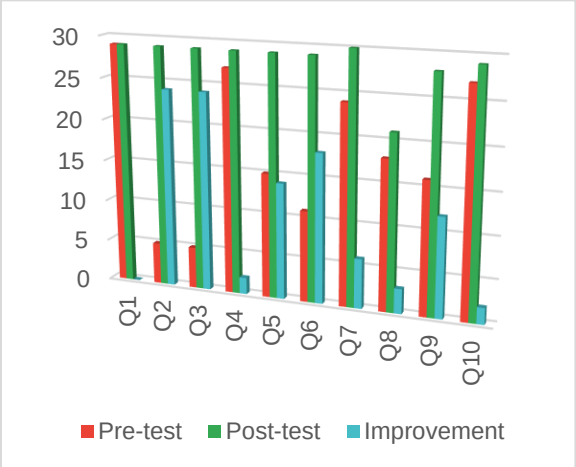

Fig.6. Data Analysis for Q1-Q10

Q3 refers to the hazards of ingesting used cooking oil. Figure 6 illustrates a notable disparity in the results for question 3 between the pretest and post-test. Initially, students were unaware of the hazards associated with ingesting used cooking oil waste. Then, they realize that ingesting used cooking oil can lead to cancer and heart conditions, 97% of students provided the correct answer for question 3 on the final test.

The environmental risk posed by used cooking oil is denoted by the Q4. About 90% of students comprehend that used cooking oil is detrimental to the environment, affecting both soil and water ecosystems. According to the statistics in Figure 6, no students answered Q4 incorrectly, however up to 3 students indicated that they did not know the answer.

Used cooking oil can be transformed into soap. According to the information in Figure 6 (Q5), it is evident that prior to the training, 50% of the students were already aware that soap could be produced from used cooking oil. The training included hands-on experience in producing soap from used cooking oil. The post-test data indicates that 97% of students comprehended and demonstrated proficiency in manufacturing soap from used cooking oil. According to the teacher team's observation, students successfully read and followed the instructions outlined in the guided book. Each group of students demonstrated creativity and innovation by producing soap in various colors. Figure 5 displays the soap products created by students using used cooking oil.

Sodium hydroxide (NaOH), often known as caustic soda, is a necessary ingredient in soap manufacturing. Caustic soda is readily available in the vicinity. It is commonly used as a cleaning agent. Due to its high corrosiveness, it is essential to handle it properly when utilizing it. In Fig. 6 (Q6), 16 out of 30 students, accounting for 53%, lack knowledge of the ingredients utilized in soap production. Solid soap is made by adding NaOH, while liquid soap is made by adding KOH. The saponification reaction occurs when a base reacts with oil. The post-test findings showed that 97% of students were aware of addictive chemicals used in soap making.

Used cooking oil is a waste that has a promising selling value after being processed into other products, especially biodiesel. In this training, students were not only given theoretical and practical knowledge related to used cooking oil soap products. However, students were also taught about more promising entrepreneurial prospects, namely biodiesel products made from used cooking oil. The aim is to attract

students' interest in collecting used cooking oil. Thus, indirectly students play an active role in overcoming used cooking oil waste that has been thrown away into the environment.

Used cooking oil soap is made with simple ingredients and a simple procedure. This caused 100% of students agreed that used cooking oil soap can be a promising entrepreneurial product (Fig.6. Q7). In addition, based on the data in Fig.6 (Q8) shows 21 out of 30 students were interested in selling used cooking oil soap products. Thus, students contributed to the environmental pollution issues, especially those caused by used cooking oil.

Students were also lectured about the health hazards of used cooking oil for the human body. Fig.6 (Q9) illustrates an increase in students' understanding, with 16 students showing enhanced knowledge following training. The instruction aims to increase students' awareness of the hazards associated with used cooking oil. Hence, students can educate their families or communities about the hazards of consuming used cooking oil. Therefore, they contributed to enhancing the health of the local community.

Students were educated about the hazards of used cooking oil for both human health and the environment. Individuals continue to dispose of used cooking oil in water or on the ground. Improperly discarded used cooking oil can be lethal to microbes and bacteria responsible for soil decomposition, leading to soil infertility. Used cooking oil released into water leads to the death of aquatic species. This knowledge is crucial for students. To raise students' awareness in order to protect the environment surrounding them. According to the information shown in Figure 6 (Q10). Approximately 90% of students are aware that improper disposal of used cooking oil can lead to environmental harm. This seminar aims to enhance students' awareness of social issues because the students were identified as agents of change.

4. CONCLUSION

Training in the production of soap from used cooking oil has an enormous impact on the knowledge and skills of students at SMK Nusantara BM Lubukpakam. Analysis of the pretest and post-test data revealed a discernible improvement in students' comprehension. A significant proportion of up to 97% of students are gaining a growing comprehension of the hazards, advantages, and methods involved in creating entrepreneurial products from used cooking oil. During this program, students acquire enhanced proficiency in producing soap items using used cooking oil. Furthermore, students develop a stronger concern regarding health and the environment.

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