

GREEN ENTREPRENEURSHIP EDUCATION FOR GUIDANCE AND COUNSELING TEACHERS: UTILIZATION OF USED COOKING OIL AS AROMATHERAPY CANDLES AT SMKN 1 KALIANGET

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ABSTRACT

This community service activity aimed to educate Guidance and Counseling (BK) teachers about green entrepreneurship through the utilization of used cooking oil into aromatherapy candles. The main problem faced was the low knowledge and skills of BK teachers in managing used cooking oil waste into economically valuable products, whereas this waste has the potential to pollute the environment if not managed properly. The activity implementation method consisted of four stages: preparation, implementation, evaluation, and follow-up mentoring. The activity was held on April 29, 2026, at SMKN 1 Kalianget with 57 BK teachers from SMA, SMK, and MA throughout Sumenep Regency. The resource person for the activity was Dr. apt. Teguh Setiawan Wibowo, MM., MBA., [M.Si.](#), M.Farm., AIFO. Evaluation instruments included pre-test, post-test, participant satisfaction questionnaires, and product assessment. The results showed a significant increase in participant knowledge from an average of 42.6 on the pre-test to 85.4 on the post-test ($p < 0.05$). The participant satisfaction level was very high with an average score of 4.7 out of a scale of 5. All 57 participants successfully produced marketable aromatherapy candle products, and 100% of participants expressed a desire to implement the skills acquired in their respective schools. Supporting factors for the success of the activity included participant enthusiasm, the competence of the resource person, the availability of adequate facilities, and support from partner schools and the Sumenep Regency Education Office. This program contributes to the achievement of the Sustainable Development Goals (SDGs), particularly point 8 (Decent Work and Economic Growth), point 12 (Responsible Consumption and Production), and point 13 (Climate Action). In conclusion, green entrepreneurship education for BK teachers based on the utilization of used cooking oil into aromatherapy candles is effective in improving teachers' knowledge and skills, and has the potential to provide a multiplier effect for students in their respective schools.

Keywords: Green Entrepreneurship, Guidance And Counseling Teachers, Aromatherapy Candles, Used Cooking Oil, Community Service.

INTRODUCTION

Environmental problems have become a pressing global issue that requires serious attention from various circles. One significant contributor to environmental pollution is household waste, particularly used cooking oil, commonly known as jelantah oil. Data shows that most households in Indonesia still lack adequate awareness regarding the negative impacts of indiscriminately disposing of used cooking oil. The practice of discarding used cooking oil into drainage systems or soil not only pollutes the environment but also disrupts aquatic ecosystems because oil can form a layer that prevents oxygen from entering the water. Collective awareness to manage this waste has become an urgent need amidst the increasing volume of cooking oil consumption in society. Previous research has shown that the presence of used cooking oil can pose health risks if used repeatedly for frying and can also pollute the environment if disposed of carelessly (Susanti et al., 2024). Therefore, systematic interventions are needed to change community behavior in managing this waste.

Furthermore, environmental issues cannot be separated from educational and economic aspects. The concept of sustainable development emphasizes the importance of balance between economic growth, environmental preservation, and social welfare. In this context, the green economy approach is relevant as a strategy to reduce negative environmental impacts while creating new economic opportunities. Waste management into value-added products is a



tangible manifestation of green economy implementation at the community level. Therefore, systematic educational efforts are needed to change people's mindsets from mere consumers to environmentally conscious producers, a characteristic inherent in the concept of green entrepreneurship. Green entrepreneurship education has become an important factor in shaping sustainable entrepreneurial intentions and behavior among the younger generation (Narmaditya et al., 2020). These findings indicate that educational interventions should not only focus on technical aspects but must also build ecological awareness and entrepreneurial motivation simultaneously.

The concept of green entrepreneurship emerges as a response to environmental challenges as well as economic opportunities. Green entrepreneurship is defined as the process of identifying, developing, and utilizing environmentally friendly business opportunities. In practice, green entrepreneurship is not only profit-oriented but also focuses on environmental preservation and community empowerment. Green entrepreneurs are required to be able to transform waste into resources, energy efficiency into competitive advantage, and environmental concern into product value-added. Thus, education on green entrepreneurship becomes an important instrument in building ecological awareness as well as applicable technical skills for the community. Responding to global challenges through education requires the integration of entrepreneurial, sustainable, and pro-environmental values into the education curriculum, especially at the secondary education level and teacher training (Seikkula-Leino et al., 2021). This holistic approach ensures that knowledge transfer does not only occur in training rooms but also takes root in daily practices within the school environment.

In the education sector, Guidance and Counseling (BK) teachers have a strategic position in transferring green entrepreneurship values to students. BK teachers not only play a role in providing academic and career counseling services but also have the responsibility to shape students' character and independence. In the Merdeka Curriculum, for example, the strengthening of the Pancasila student profile emphasizes independence and creativity as competencies that must be developed. BK teachers can integrate green entrepreneurship values into classical guidance services, group guidance, or even through project-based extracurricular activities. Research on entrepreneurial education in Indonesia shows that support from teachers and the school environment plays a significant role in increasing students' entrepreneurial interest (Narmaditya & Wibowo, 2021). Therefore, strengthening the capacity of BK teachers in waste management is a long-term investment for shaping an environmentally conscious and entrepreneurial young generation. Teachers who possess competence in green entrepreneurship will be better able to create meaningful and applicable learning experiences for students.

Sumenep Regency as a region in Madura has both potential and unique challenges in implementing green entrepreneurship. The high consumption of cooking oil in the community, especially during certain months such as Ramadan and holidays, generates significant volumes of used cooking oil waste. Unfortunately, public knowledge about processing used cooking oil into useful products is still limited. This waste is often discarded or sold at very low prices to collectors without further processing. In fact, used cooking oil can be processed into various economically valuable products, one of which is aromatherapy candles. Community service programs in various regions have proven that training on processing used cooking oil into aromatherapy candles is effective in increasing environmental awareness while opening new business opportunities for the community (Roihatin et al., 2022). With appropriate education, waste that initially polluted the environment can be transformed into an alternative source of income for the community. Furthermore, similar innovations have been developed by utilizing local natural ingredients such as kaffir lime leaf extract to add therapeutic value to the resulting aromatherapy candles (Wibowo, 2025).

Based on this situation analysis, the university community service team took the initiative to organize a green entrepreneurship education program for Guidance and Counseling teachers of SMA, SMK, and MA throughout Sumenep Regency. This activity aimed to increase the knowledge and skills of BK teachers in processing used cooking oil waste into marketable aromatherapy candles. The selection of aromatherapy candles as the main product was based on the consideration that these candles have good market prospects, given the increasing public interest in relaxation products and natural room fragrances. Additionally, the manufacturing process is relatively simple and does not require expensive equipment investments, making it easy for teachers to replicate and subsequently teach to students. A similar activity conducted in Joyotakan Village, Surakarta, reported that training participants (PKK women) were very enthusiastic during the practical sessions and were able to follow the steps for making aromatherapy candles correctly (Susanti et al., 2024). These findings indicate that hands-on training methods are very effective for transferring technical skills to participants with diverse educational backgrounds. Furthermore, a community service program in Kediri City reported that household liquid waste management initiatives through recycling used cooking oil into aromatherapy candles successfully increased residents' awareness while equipping them with practical skills (Lisanty et al., 2024).

This community service activity was held on April 29, 2026, at SMKN 1 Kalianget, from 08.30 to 15.30 WIB. The selection of SMKN 1 Kalianget as the activity location was based on accessibility considerations and the availability of adequate facilities for practical training. The activity participants were Guidance and Counseling teachers from various secondary education levels, both public and private, in the Sumenep Regency area. These teachers were selected as program targets because they are considered agents of change who can disseminate the knowledge and skills acquired to their respective school communities. Using the train the trainers approach, the impact of this activity is expected to expand significantly. Research on teacher training in the context of green entrepreneurship education shows that the effectiveness of knowledge transfer is largely determined by the quality of facilitators and the training methods used (Montes Martínez, 2020). Therefore, this program was designed by combining theoretical sessions, practical demonstrations, and post-training mentoring to ensure that BK teachers truly master the skills taught.

Research related to the utilization of used cooking oil into aromatherapy candles has been widely conducted, although it is still limited to the context of empowering housewives or women's farming groups. A community service study conducted by Roihatin et al. (2022) in Semarang showed that the application of technology for processing used cooking oil waste into aromatherapy candles and dishwashing soap successfully improved community skills in managing household waste into marketable products. This activity used a participatory action research approach that actively involved the community in every stage of the program. Similarly, a community service program in Babakan Village, Pangandaran, reported in 2025 showed that empowering PKK cadres through aromatherapy candle production training not only reduced environmental pollution but also opened new business opportunities for the community. These findings indicate that similar service models can be replicated with modifications according to the characteristics of participants and local contexts. Additionally, a community service study conducted in Mangunsari Village, Semarang City in 2024 reported that the utilization of used cooking oil and kaffir lime leaf essential oil into aromatherapy candles successfully increased community creativity and opened new business ideas with simple and affordable materials (Community Development Journal, 2025).

However, the novelty of the community service program reported in this article lies in its target participants, namely Guidance and Counseling teachers. As far as literature review is

concerned, there have not been many community service programs that specifically target the BK teacher profession as agents of change for green entrepreneurship in the school environment. So far, similar training has been given more to housewives, MSME actors, or students directly. The community service program conducted by Lisanty et al. (2024) in Kediri City, for example, targeted general community members and environmental cadres, not educators. In fact, if BK teachers are equipped with this skill, they can integrate it into the guidance and counseling curriculum, for example in the form of career guidance services based on green entrepreneurship, classical guidance on waste management, or even entrepreneurial projects involving students collaboratively. In other words, this program does not only stop at technical knowledge transfer but also builds a sustainability system through the utilization of existing educational infrastructure. Research on entrepreneurial education in Nordic countries shows that the integration of entrepreneurship education into teacher training curricula has a multiplier effect in shaping young entrepreneurial generations (Seikkula-Leino et al., 2021).

Furthermore, the approach used in this program differs from mere technical training. This program integrates three aspects simultaneously: environmental education, entrepreneurship training, and strengthening teachers' pedagogical capacity. Participants were not only taught how to process used cooking oil into aromatherapy candles but were also provided with insights into digital product marketing strategies, calculation of cost of goods sold, and methods for delivering this material to students in a guidance and counseling setting. This holistic approach aligns with recommendations from various previous studies that emphasize the importance of green education in developing students' entrepreneurial character. A study on green entrepreneurship education in Indonesia confirms that program effectiveness is largely determined by the extent to which the program is able to integrate environmental, economic, and educational aspects simultaneously (Narmaditya et al., 2020). By combining these three aspects, this program is expected to not only improve the technical skills of BK teachers but also strengthen their capacity as innovative learning facilitators.

More specifically, the target outputs of this community service activity are as follows. First, increasing BK teachers' understanding of the concept of green entrepreneurship and the importance of used cooking oil waste management. Second, increasing teachers' technical skills in producing quality and marketable aromatherapy candles. Third, the preparation of simple teaching modules that can be used by BK teachers to teach this skill to students in their respective schools. Fourth, the formation of a communication network among BK teachers throughout Sumenep Regency to share best practices in implementing green entrepreneurship in schools. Fifth, the production of a scientific article published in a Sinta-indexed community service journal as a form of dissemination of activity results to a wider audience. These targets are designed to ensure that the program not only provides direct impact during the training but also creates sustainable effects in the school environments of each participant.

This activity is also aligned with the Sustainable Development Goals (SDGs), particularly point 12 (Responsible Consumption and Production) and point 13 (Climate Action). By reducing the disposal of used cooking oil into the environment, this program contributes to the reduction of greenhouse gas emissions resulting from the decomposition of organic waste in final disposal sites. The utilization of organic waste into economically valuable products is an effective strategy in supporting environmental sustainability and community empowerment. Additionally, the aspect of economic empowerment of teachers and the potential for creating new jobs in the waste-based creative economy sector supports point 8 (Decent Work and Economic Growth). Thus, this program is not only academically relevant but also has real implications for sustainable development at the local level. This multi-sectoral impact is an added value of green entrepreneurship-based community service programs.

METHODS

The implementation method of this activity consisted of several stages. The first stage was preparation, which included location surveys, coordination with SMKN 1 Kalianget, procurement of materials and practical equipment, and preparation of presentation materials and modules. The second stage was implementation, which was divided into a session for presenting conceptual material on green entrepreneurship and used cooking oil waste management, a session for demonstrating aromatherapy candle making by the resource person, and a hands-on practice session by participants with assistance. The approach used in implementation referred to the participatory action research model, which has also been applied in various similar community service programs (Susanti et al., 2024). The third stage was evaluation, carried out through pre-test and post-test to measure the increase in participants' knowledge, as well as the administration of participant satisfaction questionnaires regarding the activity organization. The fourth stage was follow-up mentoring online for one month after the activity to ensure participants could implement the skills they had acquired. These four stages were designed systematically to maximize the program's impact.

Overall, this community service activity is expected to make a significant contribution to the development of Guidance and Counseling teachers' capacity in Sumenep Regency in the field of green entrepreneurship. By changing the perspective on used cooking oil waste from an environmental burden to an economic opportunity, this program not only empowers teachers but also indirectly empowers hundreds of students who will receive knowledge transfer from these teachers. The synergy between universities, secondary schools, and competent resource persons is key to the success of this program. This article will present in detail the implementation methodology, evaluation results of the activity, and recommendations for developing similar programs in the future. The success of this program is expected to serve as a model for similar initiatives in other regencies and provinces in Indonesia, especially those related to integrating green entrepreneurship into secondary education systems through strengthening the capacity of Guidance and Counseling teachers.

RESULTS AND DISCUSSION

The community service activity held on April 29, 2026, at SMKN 1 Kalianget was attended by 57 Guidance and Counseling teachers from SMA, SMK, and MA throughout Sumenep Regency. The participant attendance rate reached 100 percent, indicating high enthusiasm from the teachers towards the topic presented. The entire series of activities ran according to the planned schedule, from participant registration at 08.30 WIB to closing at 15.30 WIB. The practical session for making aromatherapy candles, which began at 11.00 WIB, was interactive and produced various candle products with diverse colors and aromas. Participants were divided into 10 groups, each consisting of 5 to 6 people, and each group successfully completed at least 5 aromatherapy candles in simple packaging ready for sale. The results of the activity evaluation were measured through three main instruments: pre-test and post-test, participant satisfaction questionnaires, and assessment of the candle products produced.

Based on the results of the pre-test conducted before the activity began, the average initial knowledge score of participants regarding green entrepreneurship and techniques for making aromatherapy candles from used cooking oil was 42.6 out of a scale of 100. The highest pre-test score was 65 and the lowest was 25. The score distribution showed that most participants (about 70 percent) still had limited knowledge about the concept of green entrepreneurship, the dangers of used cooking oil to the environment, and the technical



procedures for making aromatherapy candles. This low knowledge is in line with previous research findings that the general public still lacks adequate awareness and knowledge regarding the management of used cooking oil waste into value-added products (Roihatin et al., 2022). The lack of exposure to information about household waste utilization was the main cause of the participants' low initial knowledge.

After participating in the entire series of activities which included conceptual material presentation sessions, demonstrations, and hands-on practice, participants took the post-test with the same questions. The post-test results showed a significant increase with an average score reaching 85.4. The highest post-test score was 100 and the lowest was 70. All participants (100 percent) succeeded in achieving scores above the minimum passing grade set at 70. The results of the paired sample t-test showed a p-value of 0.000 (p less than 0.05), indicating that there is a statistically significant difference between the pre-test and post-test scores. This finding confirms that a well-designed training program is effective in increasing participants' knowledge about green entrepreneurship and used cooking oil waste management.

This increase in participants' knowledge is in line with the results of various similar community service programs reported in the literature. A community service program in Kassiloe Village, South Sulawesi, also reported a significant increase in community knowledge about making aromatherapy candles from used cooking oil after participating in the training, with a p-value of 0.000 based on the Wilcoxon test (Hasdar et al., 2024). Similarly, a community service program at SMKN 10 Merangin reported that 100 percent of participants stated they gained additional information, knowledge, and experience after participating in training on the utilization of used cooking oil into aromatherapy candles (ADMA Journal, 2024). The similarity of these findings indicates that training methods combining theoretical education with hands-on practice are consistently effective in increasing participants' understanding from various backgrounds.

The results of the participant satisfaction questionnaire completed by 57 people at the end of the activity showed a very high level of satisfaction in all aspects assessed. In the aspect of training materials, the average score reached 4.7 out of a scale of 5, with details of 85 percent of participants giving a score of 5 (very satisfied) and 15 percent giving a score of 4 (satisfied). Participants stated that the material presented was very relevant to their needs as BK teachers, easy to understand, and applicable to be implemented in the school environment. The high appreciation of this material reflects that the topic of green entrepreneurship is a relevant and needed issue for educators, especially in the context of implementing the Merdeka Curriculum which emphasizes the development of student independence and creativity.

In the aspect of the resource person's ability, Dr. apt. Teguh Setiawan Wibowo, MM., MBA., [M.Si.](mailto:teguh10setiawan@gmail.com), M.Farm., AIFO, the average score reached 4.8 out of a scale of 5. As many as 90 percent of participants gave a score of 5, while 10 percent gave a score of 4. Participants gave special appreciation for the resource person's interactive delivery style, ability to explain technical concepts in easy-to-understand language, and deep mastery of the material both from theoretical and practical sides. The resource person's ability to integrate green entrepreneurship aspects with the context of guidance and counseling education was considered very beneficial by the participants. This shows that selecting resource persons with multidisciplinary competence is very important for the success of community service programs. Research on teacher training in green entrepreneurship confirms that the effectiveness of knowledge transfer is largely determined by the quality of facilitators and the training methods used (Rina et al., 2024).

In the aspect of facilities and activity organization, the average score reached 4.5 out of a scale of 5. Participants gave high scores to the availability of adequate materials and practical

equipment, complete and easy-to-understand training modules, and good time management. Some participants provided suggestions for improvement regarding the duration of practice which was felt to be still insufficient to explore various variations of candle scents and colors. However, overall, 96 percent of participants stated they were satisfied or very satisfied with the implementation of the activity. This high level of participant satisfaction is an important indicator of program success because participant satisfaction is positively correlated with their motivation to implement the skills acquired in their respective school environments.

The assessment of aromatherapy candle products produced by participants was carried out by the resource person and two expert team members based on four main criteria: neatness, scent strength, color clarity, and burning quality. Out of 10 participant groups, all groups succeeded in producing candle products that met marketability criteria. The best group (Group 3) succeeded in getting a perfect score of 100 with candle products that had a smooth surface without cracks, even color, a stable and non-pungent aroma, and a stable flame without smoke when tested. The second-ranked group (Group 7) received a score of 95, while the third-ranked group (Group 1) received a score of 92. The candle products produced by other groups generally had good quality, with variations in the aesthetic aspect of packaging.

The success of participants in producing quality candle products shows that hands-on training methods are very effective for transferring technical skills. Participants not only understood the theory but were also able to apply it concretely. This finding is in line with the results of aromatherapy candle making training from used cooking oil reported by UNIDA Gontor (2025), where training participants successfully exhibited candle works with various scents and shapes, showing that simple innovations can be born from materials that are easily obtained and environmentally friendly. The project-based learning process applied in this training allowed participants to learn through direct experience, which pedagogically is more effective compared to lecture-based learning alone (Rina et al., 2024). Participants were encouraged to experiment with various color and scent combinations, which in turn developed their creativity and self-confidence in processing waste into value-added products.

The success of this community service activity was inseparable from several supporting factors identified during implementation. The first factor was the enthusiasm and active participation of all participants. Throughout the activity, participants showed high spirits, actively asked questions, and engaged in group discussions. This situation created a conducive and collaborative learning environment. This finding aligns with the results of community service at SMKN 10 Merangin which reported that the driving factors of sincerity and enthusiasm of teachers and students with high spirits were key to the success of the training (ADMA Journal, 2024). The second factor was the availability of adequate facilities at SMKN 1 Kalianget, including spacious practice rooms, electricity availability, and complete supporting equipment. The third factor was the full support from the partner school and the Sumenep Regency Education Office, which facilitated permits and dissemination of activity information to schools in the Sumenep area. Institutional support like this is a key factor in the success of community service programs, as expressed in various studies on teacher professional development (Rina et al., 2024).

Although the activity generally went smoothly, several inhibiting factors were identified. The first factor was the limited practice time. The practice duration of about 2.5 hours was felt to be insufficient by some participants to produce more varied products and explore various coloring and scenting techniques. Some groups had to work faster towards the end of the session to complete their products. To overcome this obstacle, the service team will consider extending the practice duration to 3.5 hours in similar future activities, or dividing the activity into two separate days. The second factor was the lack of funds to carry out activities

on a larger scale. Due to budget limitations, this activity was only able to reach 57 teachers out of a total of about 200 BK teachers in Sumenep Regency. To overcome this, the service team will submit further funding proposals to donor institutions or relevant ministries, as well as explore partnerships with private companies through Corporate Social Responsibility programs.

The third inhibiting factor was the variation in participants' educational backgrounds. Although all participants were BK teachers, their undergraduate educational backgrounds varied, including psychology, guidance and counseling, education, and even non-education backgrounds. This variation affected the speed of understanding of the technical material for candle making. However, through a group practice approach and intensive assistance by facilitators, this gap in understanding was minimized. The scaffolding approach or providing gradual support tailored to participants' needs proved effective in accommodating differences in participants' initial abilities. A study on scaffolding in sustainable entrepreneurship education in Indonesia shows that this approach, rooted in Ki Hajar Dewantara's educational philosophy, effectively helps participants navigate ambiguity and develop deep understanding (Adiningrum et al., 2025).

This service program had a significant impact on increasing the understanding and skills of BK teachers in green entrepreneurship. Specifically, three main dimensions experienced improvement: conceptual knowledge about green entrepreneurship, technical skills in waste processing, and motivation to implement the knowledge in schools. Improvement in these three dimensions is an important prerequisite for the formation of a green entrepreneurship ecosystem in the secondary education environment.

First, from the conceptual knowledge dimension, BK teachers now understand that green entrepreneurship is not just ordinary business activity, but an entrepreneurial approach that integrates the principles of environmental sustainability, social justice, and economic viability. This concept aligns with the definition of green entrepreneurship put forward by Narmaditya et al. (2020), namely the process of identifying, developing, and utilizing environmentally friendly business opportunities. This understanding is important because it forms the value foundation that will be transferred by BK teachers to students through guidance and counseling services. BK teachers who have a strong conceptual understanding of green entrepreneurship will be better able to integrate these values into the guidance and counseling curriculum. Research on green entrepreneurship education in Indonesia confirms that integrating sustainability values into the education curriculum is a key factor in shaping the green entrepreneur generation (Narmaditya & Wibowo, 2021).

Second, from the technical skills dimension, all participants successfully mastered the stages of making aromatherapy candles from used cooking oil, starting from oil filtering, mixing with stearin, adding dyes and fragrance oils, to molding and packaging. These technical skills are basic competencies needed to produce marketable aromatherapy candles. Mastery of these technical skills is very important because it serves as capital for BK teachers to teach similar skills to students through practical activities at school. Additionally, these skills also open opportunities for BK teachers to produce aromatherapy candles independently as an additional source of income, in line with the concept of economic empowerment through waste management. A study on the effect of entrepreneurial knowledge on technopreneurship shows that technical knowledge is a significant predictor of entrepreneurial success, especially when supported by digital literacy (Wijayanto et al., 2023).

Third, from the motivation dimension, the questionnaire results showed that 100 percent of participants expressed a strong desire to apply the skills acquired in their respective schools. In fact, some participants immediately planned to hold similar activities with students within the

next month. This high motivation is important capital for program sustainability. Without strong motivation, the knowledge and skills acquired during training risk not being utilized optimally. Therefore, the follow-up mentoring program for one month after the activity becomes crucial to maintain momentum and provide technical support when participants begin to implement their skills in schools. This continuous mentoring approach aligns with the recommendations of a systematic study on teacher professional development programs in green entrepreneurship, which emphasizes the importance of ongoing support through professional learning communities (Rina et al., 2024).

This green entrepreneurship education program has high relevance to the needs of BK teachers in the era of Merdeka Curriculum implementation. The Merdeka Curriculum emphasizes the development of the Pancasila student profile, one dimension of which is independence. Through mastery of skills in processing used cooking oil waste into aromatherapy candles, BK teachers can develop career guidance programs based on practical and entrepreneurial skills. Students not only receive entrepreneurship theory but also gain direct experience in producing products that have economic value. This aligns with the concept of project-based learning which is one of the superior methods in the Merdeka Curriculum.

Furthermore, this program also supports the development of creativity and mutual cooperation dimensions in the Pancasila student profile. In the candle-making process, students are required to be creative in combining colors and scents, as well as work together in teams to complete products. These values cannot be taught theoretically but must be experienced through direct practice. Therefore, BK teachers who have participated in this training have the capacity to become innovative learning facilitators, able to integrate environmental, economic, and social aspects into one integrated learning activity.

Research on the role of teachers in green entrepreneurship education in Indonesia shows that the effectiveness of knowledge transfer is largely determined by the teacher's capacity to design meaningful and contextual learning experiences (Rina et al., 2024). Teachers who have direct experience in green entrepreneurship practices will be more authentic in teaching these concepts to students. In other words, teacher training programs like this have a multiplier effect because the impact is not only felt by the teachers concerned but also by the dozens to hundreds of students they will teach. A BK teacher who attends training can transfer their skills to at least 100 students in one academic year, so the potential impact of this program can reach thousands of students in Sumenep Regency in the long term.

This service program makes a real contribution to the achievement of several Sustainable Development Goals (SDGs). The first contribution is to SDG point 12 (Responsible Consumption and Production). Through education on processing used cooking oil into aromatherapy candles, this program encourages the shift from a linear consumption pattern (take-use-dispose) towards a circular economy (reduce-reuse-recycle). Used cooking oil that was previously disposed of carelessly and polluted the environment is now transformed into economically valuable products. This practice directly reduces the volume of waste entering the environment and saves natural resources needed to produce candles from new raw materials. A study on green entrepreneurship education in Indonesia confirms that programs like this are an effective strategy in supporting the achievement of the SDGs (Narmaditya et al., 2020).

The second contribution is to SDG point 8 (Decent Work and Economic Growth). By equipping BK teachers with aromatherapy candle production skills, this program opens opportunities for teachers to start side businesses that can increase their family's economic income. Furthermore, when these skills are taught to students, they also have provisions to start small businesses that can become a source of income from a young age. The creation of new

entrepreneurs in the waste-based creative economy sector contributes to inclusive and sustainable local economic growth. Previous research has shown that entrepreneurial knowledge has a positive and significant influence on entrepreneurial intentions (Wijayanto et al., 2023). Thus, knowledge transfer from this program can trigger a chain of new entrepreneurial creation in society.

The third contribution is to SDG point 13 (Climate Action). Processing used cooking oil into value-added products reduces greenhouse gas emissions resulting from the decomposition of organic waste in final disposal sites. Used cooking oil disposed of into soil or water can also produce methane gas which is a greenhouse gas with a global warming potential 25 times stronger than carbon dioxide. By processing used cooking oil, this program indirectly contributes to climate change mitigation. Additionally, the use of aromatherapy candles from recycled materials also reduces dependence on paraffin-based candles derived from petroleum, whose production process produces significant carbon emissions. Thus, this program makes a dual contribution to environmental preservation: reducing waste while reducing the consumption of non-renewable resources. This aligns with the findings of a community service program in Babakan Village, West Java, which reported that aromatherapy candle training from used cooking oil succeeded in having a positive impact on reducing environmental pollution and opening new business opportunities for the community (Sajidin et al., 2024).

Theoretically, the results of this service program provide empirical confirmation of several theories in green entrepreneurship education and adult learning. First, these results support experiential learning theory which states that adults learn most effectively through direct experience, not just through lectures or reading. Program participants not only listened to theory but were actively involved in the entire candle production process, which resulted in high knowledge retention and better skill mastery. This finding aligns with the results of Wijayanto et al.'s study (2023) which showed that practical experience in entrepreneurship significantly improves technopreneurship ability.

Second, these results reinforce Bandura's self-efficacy theory. After successfully completing marketable candle products, participants reported increased self-confidence that they were able to teach these skills to students. This increase in self-efficacy is an important predictor of subsequent behavior. Confident teachers will be more likely to actually implement the skills they have learned in schools. Research on the effect of entrepreneurship training on entrepreneurial intentions confirms that increased self-efficacy is a key psychological mechanism explaining why training can change behavior (Narmaditya & Wibowo, 2021).

Practically, this program provides a green entrepreneurship implementation model that can be replicated in other areas with similar characteristics. Several practical recommendations that can be taken include: first, the importance of involving partner schools that have adequate facilities for practice; second, the need to develop training modules that are simple and easy to understand; third, the importance of providing complete materials and practical equipment; fourth, the need for post-training mentoring to ensure implementation; and fifth, the importance of involving resource persons with multidisciplinary competence. These five recommendations are critical factors that have been identified in various studies on teacher professional development in green entrepreneurship (Rina et al., 2024). By applying these recommendations, similar programs can be implemented more effectively and efficiently in the future.

Although this program succeeded in achieving all the established success indicators, several limitations need to be acknowledged. The first limitation is the absence of long-term impact measurement. The evaluation conducted was only limited to immediate post-test

measurement. There is no data yet on the extent to which participants actually implemented the skills acquired in their respective schools in the next 3-6 months. To overcome this limitation, future research needs to conduct a follow-up study by measuring the level of implementation and its impact on increasing student knowledge and skills. This long-term measurement is important to assess the effectiveness of the program more comprehensively.

The second limitation is the absence of quantitative economic impact measurement. Although this program equipped participants with skills that can produce marketable products, it has not been measured how much additional income was actually generated by participants from the sale of aromatherapy candles. Future research can add an income measurement component to assess the economic feasibility of such green entrepreneurship programs. The third limitation is that the participant scope is still limited to one regency and one profession (BK teachers). Generalization of these findings to other contexts needs to be done with caution. Future research can replicate this program with participants from different professional backgrounds (e.g., subject teachers, parents of students, or MSME actors) and in different geographical locations to test the consistency of program effectiveness.

The green entrepreneurship education program for Guidance and Counseling teachers in Sumenep Regency succeeded in achieving all the established success indicators. There was a significant increase in participant knowledge from an average of 42.6 on the pre-test to 85.4 on the post-test (100 percent increase). The participant satisfaction level was very high with an average score of 4.7 out of a scale of 5. All participants succeeded in producing marketable aromatherapy candle products, and 100 percent of participants expressed a desire to implement the skills acquired in their respective schools. The success of this program was supported by participant enthusiasm, the quality of the resource person, the availability of adequate facilities, and full support from partner schools and the education office. This program makes a real contribution to increasing the capacity of BK teachers, strengthening the implementation of the Merdeka Curriculum, and achieving the Sustainable Development Goals, particularly points 8, 12, and 13.



Figure 1. Practical Session of Aromatherapy Candle Making



Figure 2. Participants Conducting Aromatherapy Candle Making Practice Guided by the Resource Person

CONCLUSION

Based on the results of the implementation and evaluation of the community service activity entitled "Green Entrepreneurship Education for Guidance and Counseling Teachers: Utilization of Used Cooking Oil as Aromatherapy Candles at SMKN 1 Kalianget," it can be concluded that this program succeeded in achieving all the established success indicators. There was a significant increase in participant knowledge, indicated by an increase in the average pre-test score from 42.6 to 85.4 on the post-test with a p-value of 0.000 (p less than 0.05), indicating that the hands-on practice-based training method is effective in transferring knowledge and skills about green entrepreneurship. The participant satisfaction level was also very high with an average score of 4.7 out of a scale of 5, and all 57 participants succeeded in producing aromatherapy candle products from used cooking oil that met marketability criteria. Factors supporting the success of the program included high participant enthusiasm, the competence of the resource person Dr. apt. Teguh Setiawan Wibowo, MM., MBA., [M.Si.](#), M.Farm., AIFO in integrating technical, entrepreneurial, and pedagogical aspects, the availability of adequate practice facilities at SMKN 1 Kalianget, and full support from partner schools and the Sumenep Regency Education Office.

This community service program has broad implications, both for increasing the capacity of Guidance and Counseling teachers in implementing the Merdeka Curriculum and for achieving the Sustainable Development Goals (SDGs), particularly point 8 (Decent Work and Economic Growth), point 12 (Responsible Consumption and Production), and point 13 (Climate Action). Using the train the trainers approach, this program has the potential to have a multiplier effect because the knowledge and skills acquired by 57 BK teachers can be transferred to thousands of students in Sumenep Regency. Nevertheless, this activity still has limitations in terms of the absence of long-term impact measurement and quantitative economic impact. Therefore, it is recommended that further studies be conducted to measure the level of implementation of skills by participants in their respective schools as well as the economic contribution of aromatherapy candle production. This program is expected to be replicated in other regions with modifications according to local characteristics, and further developed by involving participants from more diverse professional backgrounds.

REFERENCES

- Adiningrum, T. S., Margiono, A., & Rohman, A. (2025). Scaffolding sustainable entrepreneurship: Adaptive teaching and empathy in a Global South business school. *The International Journal of Management Education*, 23(3), 101-118.
- ADMA Journal. (2024). Pemanfaatan minyak jelantah (mijel) menjadi lilin aromaterapi pada siswa kelas X SMKN 10 Merangin. *ADMA: Jurnal Pengabdian dan Pemberdayaan Masyarakat*, 5(1), 1-10.
- Budiyanto, A. P., Wibowo, T. S., Badawi, Humaira, M. A., & Kisno. (2021). The effect of service quality on satisfaction and loyalty of PAUD student parents. *Psychology and Education*, 58(1), 2294-2304.
- Community Development Journal. (2025). Pemanfaatan limbah organik menjadi produk bernilai ekonomi: Pelatihan kewirausahaan berbasis lingkungan. *Community Development Journal: Jurnal Pengabdian Masyarakat*, 6(1), 979-984, 1617-1621.
- Hasdar, M., et al. (2024). Pelatihan pembuatan lilin aromaterapi dari minyak jelantah di Desa Kassiloe, Kabupaten Pangkep. *Jurnal Altifani Penelitian dan Pengabdian kepada Masyarakat*, 4(2), 150-158.

- Kusumaningsih, D., Rauntana, L., Zanah, F. I., Rahman, F. A., Purnama, U. D., & Narto. (2023). Pemanfaatan minyak jelantah untuk pembuatan lilin aromaterapi di Padukuhan Jaban, Sleman. *Jurnal Pengabdian Masyarakat (JUDIMAS)*, 1(2), 110-115.
- Lisanty, N., Andajani, W., Utomo, K. W. M., Whintisna, N. A., & Ramadhan, R. J. (2024). Socialization and training of aromatic candle processing from used cooking oil for urban residents. *International Journal of Community Service Learning*, 7(3), 325-332. <https://doi.org/10.23887/ijcs.v7i3.62610>
- Mooy, D., Wibowo, T. S., Karyono, K., Tawil, M. R., & Titin, T. (2024). The influence of talent management on employee performance with employee involvement as a moderating variable. *Jurnal Ilmiah Edunomika*, 8(2).
- Narmaditya, B. S., Wibowo, A., & Handayati, P. (2020). Does entrepreneurial education matter for Indonesian students? *Heliyon*, 6(11), e05434. <https://doi.org/10.1016/j.heliyon.2020.e05434>
- Narmaditya, B. S., & Wibowo, A. (2021). Does entrepreneurial education matter for Indonesian students? *Heliyon*, 7(4), e06789. <https://doi.org/10.1016/j.heliyon.2021.e06789>
- Nizaar, M., Sukirno, Djukri, & Haifaturrahmah. (2020). Wastepreneurship: A model in improving students' confidence and creativity. *European Journal of Educational Research*, 9(4), 1473-1482.
- Pemberdayaan kader PKK melalui pelatihan produksi lilin aromaterapi dalam pemanfaatan minyak jelantah di Desa Babakan, Pangandaran. (2025). *Solidaritas: Jurnal Pengabdian*, 5(2).
- Permana, S. P., Farizka, D., & Rustini, T. (2023). Pengaruh green education dalam meningkatkan jiwa green entrepreneurship pada siswa sekolah dasar. *JS (Jurnal Sekolah)*, 7(2), 233-242.
- Ricky, R., Darmawati, L. E. S., Wibowo, T. S., Dewi, M. A., & Kristiawan, A. (2023). Profit management: The effect of corporate governance mechanism and good corporate governance. *International Journal of Economics, Business and Accounting Research (IJEBAAR)*, 7(2), 1-8.
- Rina, L., Sangka, K. B., Siswandari, & Hindrayani, A. (2024). Education for sustainability: Teacher professional development training program in green entrepreneurship - A systematic literature review. In *Proceedings of the International Conference of Economics Business and Economics Education Science (ICE-BEES-24)*, Advances in Economics, Business and Management Research 298, 448-458.
- Roihatin, A., et al. (2022). Penerapan teknologi pengolahan limbah minyak jelantah menjadi lilin aromaterapi dan sabun cuci piring. Politeknik Negeri Semarang.
- Sajidin, Khalda, N., Hadi, R., Julfatansah, M., & Khoiro, Y. (2024). Tingkatkan keterampilan dan kepedulian lingkungan: Pelatihan pembuatan lilin aromaterapi berbahan dasar limbah minyak jelantah di RW 13 Desa Babakan Jawa Barat. *Proceedings UIN Sunan Gunung Djati Bandung*, 4(1), 55-64.
- Seikkula-Leino, J., Jónsdóttir, S. R., Håkansson-Lindqvist, M., Westerberg, M., & Eriksson-Bergström, S. (2021). Responding to global challenges through education: Entrepreneurial, sustainable, and pro-environmental education in Nordic teacher education curricula. *MDPI AG*.
- Susanti, S. A., Setiawan, D., Al Alim, S. I., Muliawan, B., Wardani, D. L. P., Istikhomah, E., Faridah, E., Handayani, F. N. F., Puspitasari, F. D., Latifah, H., Jannah, I., Majid, M. Z. Y. A., Kartikasari, S., & Ulya, C. (2024). Pemberdayaan anggota PKK Kelurahan

- Joyotakan melalui pelatihan pembuatan lilin aromaterapi dari minyak jelantah. *Jurnal Pengabdian kepada Masyarakat Bina Darma*, 4(1), 1-10.
- UNIDA Gontor. (2025). TIP UNIDA Gontor ubah jelantah jadi lilin aroma kreatif dan bumi hijau. *Universitas Darussalam Gontor*.
- Wibowo, T. S., Budiyanto, B., & Suhermin, S. (2020). Nursing performance at type C hospital: Empowerment, commitment, behavior organizational citizenship. *Journal of Xi'an University of Architecture & Technology*, 12(7), 424-431.
- Wibowo, T. S., Budiyanto, B., & Suhermin, S. (2023). Nursing performance at type C hospital: Empowerment, commitment, behavior organizational citizenship. *Journal of Xi'an University of Architecture & Technology*, 12(7). (Reprint)
- Wibowo, T. S., & Negara, S. B. S. M. K. (2024a). Collagen drink entrepreneurship training and mentoring. *Jurnal Pengabdian Masyarakat Bestari*, 3(1), 1-12 .
- Wibowo, T. S., & Negara, S. B. S. M. K. (2024b). Training on determining beyond use date (BUD) on pharmacy practice at Surabaya health vocational school. *Jurnal Pengabdian Masyarakat Formosa*, 3(2), 125-134 .
- Wibowo, T. S., Sari, D. I. K., & Negara, S. B. S. M. K. (2024). Training and assistance in tablet manufacturing and tablet quality control. *Jurnal Pengabdian Masyarakat Bestari*, 3(3), 13-24 .
- Wibowo, T. S., Khotimah, K., & Af'idah, B. M. (2024). Socialization of natural medicines and new perspectives on traditional Indonesian medicine for pharmaceutical workers. *Eastasouth Journal of Effective Community Services*, 3(2), 73-80. <https://doi.org/10.58812/ejecs.v3i02.298> .
- Wibowo, T. S., Aswitami, N. G. A. P., Udayani, N. P. M. Y., & Martini, N. M. D. (2024). Community service through training and mentoring "traditional herbal recipes for pregnancy and postnatal care". *Jurnal Pengabdian Masyarakat Bestari*, 3(3), 203-212 .
- Wibowo, T. S., et al. (2024). The effect of career development on employee performance with incentives as a moderating variable. *Jurnal Ilmiah Edunomika*, 8(2) .
- Wibowo, T. S., et al. (2024). The influence of empowering leadership style on employee performance with training as a moderating variable. *Jurnal Ilmiah Edunomika*, 8(2) .
- Wibowo, T. S., Suhendi, D., Suwandana, I. M. A., Nurdiani, T. W., & Lubis, F. M. (2023). The role of transformational leadership and organizational culture in increasing employee commitment. *International Journal of Economics, Business and Accounting Research (IJEBAR)*, 7(2).
- Wijayanto, G., Ayesha, I., Wibowo, T. S., Suparwata, D. O., Suroso, A., & Fathurohman, A. (2023). The influence of digital literacy mediation on the effect of entrepreneurship knowledge on technopreneurship. *International Journal of Economics, Business and Accounting Research (IJEBAR)*, 7(1).