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Eco Print Making Training as an Environmentally Friendly Product at Pipaya Foundation Bogor

Rita Yuni Mulyanti[1], Peggy Ratna Marlianingrum[2*], Ramayuli[3], Zaenudin[4], Asmi Rizaldi[5], Rendy Saputra[6]
Universitas Teknologi Muhammadiyah Jakarta
Corresponding Author: Peggy Ratna Marlianingrum peggy@utmj.ac.id

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A B S T R A C T

The Eco print training activity aims to address increasingly pressing environmental issues, namely the use of chemicals in the textile industry and dependence on unsustainable natural resources. The activity is to educate the public about making environmentally friendly products by utilizing natural materials that are easily found in the environment. This training was carried out by involving 30 mothers from the Pipaya Foundation. This program teaches Eco print techniques with two main methods: pounding and steaming, which allow participants to produce high-value artistic textile products from leaves and flowers. In addition to technical skills, this program also provides knowledge about the importance of sustainability in every aspect of life and the economic potential of Eco print-based products. Participants are given an understanding of how to use this technique to create environmentally friendly business opportunities that can increase family income.

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INTRODUCTION

Orphans often face significant challenges in terms of social and economic conditions. Losing a parent, especially the breadwinner, can lead to financial constraints and limited access to education. Many orphans struggle to access quality formal education, as school fees and other needs may not be met. As a result, they tend to lack the skills needed to enter the competitive job market. Losing a parent also impacts the emotional and psychological well-being of orphans. Without adequate guidance and support, they may feel less confident and struggle to build a bright future.

Mother Cares for Orphans Foundation (PIPAYA) is a social institution that focuses on empowering orphans through education and skills development. Based on existing data, many orphans in this foundation have great potential but are hampered by limited access to education and skills training that is relevant to the needs of the job market. On August 9, 2018, PIPAYA obtained legality as a foundation under the name Yayasan PIPAYA or Yayasan Paguyuban Mother Cares for Orphans Foundation through the Decree of the Minister of Law and Human Rights of the Republic of Indonesia Number AHU-0010587.AH.01.04. Year 2018 concerning the ratification of the establishment of the legal entity of the PIPAYA Bogor foundation. Currently, PIPAYA faces challenges in providing training that can equip orphans with useful skills for their future. Limited funds, trained human resources, and access to appropriate training materials are some of the main obstacles faced by the foundation. In addition, although there have been several efforts to provide formal education, there is still a lack of practical skills training that can be directly applied to generate income.

The training and Eco print making activities for orphans are related to MBKM, namely:

a) Integration of Learning and Practice: This training program supports the MBKM concept by integrating theoretical learning and direct entrepreneurial practice. Students can learn while practicing, understanding the business world from real experiences;
b) Off-Campus Learning: This activity allows students to learn outside the formal campus environment, providing valuable experience in the field, and broadening their horizons about entrepreneurship,
c) Soft Skills Development: Through this training, students can develop soft skills such as leadership, teamwork, and communication, which are very important in the world of work.

The training and Eco print making activities for orphans are related to the Main Performance Index (IKU), namely:

a. IKU 2: Students Gain Experience Outside Campus: This training allows students to gain real experience outside campus, which is one of the important indicators in assessing university performance.
b. IKU 5: Lecturers Engage in Activities Outside Campus: Training involving lecturers as facilitators or mentors will help universities meet IKU related to lecturer activities outside campus.
c. IKU 7: Collaboration with Business and Industrial Partners: This program can collaborate with various parties, including the creative and environmentally

friendly industries, strengthening the relationship between universities and the business world.

Focus of Community Service:

a) Economic Empowerment: Entrepreneurship and Eco print training can empower communities, especially orphans, to become more economically independent;
b) Environmental Sustainability: Teaching environmentally friendly and sustainable Eco print techniques, supporting the focus of community service in environmental conservation;
c) Improving Quality of Life: With new skills, orphans can improve their quality of life through better business opportunities;
d) Collaboration with Local Communities: This program can involve local communities, increase synergy between universities and the community, and ensure that community service programs provide real positive impacts.

Some of the main problems faced by PIPAYA include:

1. Limited Access to Skills Training
   Many orphans at PIPAYA do not have access to relevant skills training that is in line with market developments. The existing training is still very limited and has not been able to meet the need for practical skills that can help them become economically independent.
2. Limited Resources
   The foundation also faces constraints in terms of resources, both in terms of competent teaching staff and equipment and materials needed for training. This results in the training provided being less than optimal and not sustainable.
3. Lack of Entrepreneurial Knowledge
   Orphans at PIPAYA generally have very minimal knowledge about entrepreneurship. They do not have sufficient understanding of how to start and manage a small business, which is an important skill for achieving economic independence.
4. Lack of Motivation and Self-Confidence
   Many orphans lose motivation and self-confidence due to their social and economic backgrounds. Without proper support and guidance, they find it difficult to develop their potential and take the initiative in developing new skills

IMPLEMENTATION AND METHODS

Eco print is a fabric dyeing technique that utilizes natural materials such as leaves, flowers, and tree bark to print patterns on fabric. This technique is rooted in the tradition of natural dyeing used in various cultures, including India and Japan, which have utilized plant dyes for thousands of years (Singh & Jain, 2016). The term eco print began to be popular thanks to American textile artist India Flint in the early 2000s. Flint introduced this method as sustainable textile art, using natural materials that minimize environmental impact (Flint, 2008). In recent decades, eco print has become increasingly popular throughout the world,

including Indonesia, as awareness of sustainability and environmental preservation increases (Soewandi et al., 2020).

Eco print Making Technique

Pounding Technique

Based on research by Priyanto & Ariyanti (2021), the tools needed consist of a hammer or wooden/metal pounding tool, a pounding base (such as a wooden board or work table), scissors or a knife (to tidy up the leaves/flowers), gloves, and rags (to protect the leaves when beaten).

The materials used are natural fabrics (cotton, linen, or silk); Leaves and flowers with natural pigments (such as teak leaves, mango leaves, or henna flowers); Mordant (such as alum, vinegar, or tunjung); Clean water for washing the fabric.

According to Flint (2008), important steps include:

1. Material Preparation: Prepare the fabric and plants to be used. Soak the fabric in the mordant solution.
2. Pattern Arrangement: Place the leaves or flowers on the fabric according to the desired pattern.
3. Beating: Place the fabric on the pounding base, then cover the leaves with rags, then beat gently until the pigment moves.
4. Drying and Fixing: Let the fabric dry naturally, then iron or steam to lock the color.

Steaming Technique

Tools and Materials:

Soewandi et al. (2020) stated that the tools used in the steaming technique consist of: large steamer pan, stove, tongs, wooden tube or plastic pipe (to roll the cloth), rope or rubber band, scissors, and gloves.

The materials used are: Natural fabrics (cotton, linen, or silk); Leaves and flowers with natural pigments; Mordant (such as alum, vinegar, or tunjung); Clean water for washing the cloth.

Steps:

1. Material Preparation and Mordanting: Wash the cloth and soak it in mordant solution for a few hours.
2. Pattern Arrangement: Arrange the leaves and flowers on the cloth according to the pattern. Roll the cloth on a wooden tube or pipe, then tie it with a rope.
3. Steaming: Place the cloth roll in a steamer pan. Steam for 1-2 hours on low heat (Singhal & Shah (2019)
4. Cooling and Opening: Cool the cloth roll before opening.
5. Washing and Drying: Wash the cloth with clean water to remove plant residue, then dry it.

Fermentation Technique

Tools and Materials

Tools: Fermentation container (such as a plastic bucket with a lid or a large glass jar), gloves, rope, and scissors.

Materials: Natural fabric. According to Ratna & Kurniawati (2022), the use of leaves and flowers with high tannin content (eg teak leaves, mango leaves, or bark); Mordant (such as alum or tunjung) and clean water.

Steps:

1. Material Preparation: Prepare washed cloth and leaves with high tannin content. Soak the cloth in the mordant solution.
2. Arrangement: Arrange the leaves on the cloth, roll the cloth tightly, then tie it with rope.
3. Fermentation: Put the rolled cloth into the fermentation container. Add a little water until the cloth is wet, then close it tightly. Store in the dark for 3-7 days referring to the guide by Flint (2008).
4. Rinsing and Drying: Wash the cloth with clean water to remove any remaining leaves and fermentation Odor, then dry in the sun.

Eco print as an environmentally friendly product

Eco print is recognized as an environmentally friendly product because it uses natural materials and reduces dependence on harmful synthetic dyes. According to research by Singh & Jain (2016), the eco print technique reduces environmental impact because it does not produce toxic chemical waste, supports recycling of organic waste and supports local economic sustainability by utilizing plant resources. Eco print also encourages consumer awareness of sustainability. This product is increasingly in demand in the global market as an alternative to conventional textiles that often use hazardous chemicals (Soewandi et al., 2020).

Description of the Technology Used

The technology used in making eco print refers to simple processes and tools that integrate the principles of ecology, art, and traditional techniques to print natural patterns on fabrics. This technology utilizes natural chemical reactions and manual techniques to produce unique and environmentally friendly results.

1. Natural Pigment Extraction Technology
   Natural pigment extraction utilizes processes such as pounding, steaming, and fermentation to extract pigments from plants such as leaves, flowers, bark, and roots. This technique allows plant pigments to transfer to fabrics without using synthetic chemicals, making it environmentally friendly (Flint, 2008; Soewandi et al., 2020).
2. Mordanting Technology (Color Fixation)
   The mordanting process, which uses natural materials such as alum (aluminum sulfate) or vinegar solution, helps bind pigments to fabric fibers to make them more durable. This process involves soaking the fabric in a mordant solution before printing to ensure the pigments adhere well. This technology is important to maintain the sustainability of the ecoprint process without using synthetic dyes that damage the environment (Singh & Jain, 2016; Priyanto & Ariyanti, 2021).

3. Heat Processing Technology (Steaming and Boiling)
   Heat processing, such as steaming using steam and boiling through boiling, helps accelerate the penetration of pigments into the fabric. This process is energy efficient and often utilizes simple household appliances such as a steamer or stove. Steaming, for example, is an important technique for creating sharper colors and patterns on fabrics (Flint, 2008; Singhal & Shah, 2019).
4. Natural Fiber-Based Textile Technology
   Natural fabrics such as cotton, linen, silk, or wool are used in eco printing because they absorb pigments more easily than synthetic fabrics. The use of natural fibres supports sustainability because these materials are biodegradable, so they do not leave waste that pollutes the environment (Ratna & Kurniawati, 2022).
5. Fermentation Technology
   Fermentation utilizes microorganisms to accelerate the natural dyeing process. In this technique, fabric that has been given leaves or flowers is rolled and left in a humid and dark environment. The natural chemical reaction between tannins, mordants, and fabric produces unique colours without the need for additional energy such as heating (Flint, 2008; Soewandi et al., 2020).
6. Drying and Fixation Technology
   Drying using sunlight or open air is a simple and energy-efficient way to complete the eco print process. In addition, the use of an iron or steamer can help lock the colour into the fabric. This technology ensures long-lasting colours without using additional chemicals (Priyanto & Ariyanti, 2021; Singh & Jain, 2016).

Implementation of IPTEKS applied

Implementation of IPTEKS in eco print not only produces environmentally friendly products but also creates economic opportunities based on simple technology. The combination of biology, chemistry, textiles, and environmental technology in this process ensures that eco print becomes a sustainable alternative in the fashion and textile industry.

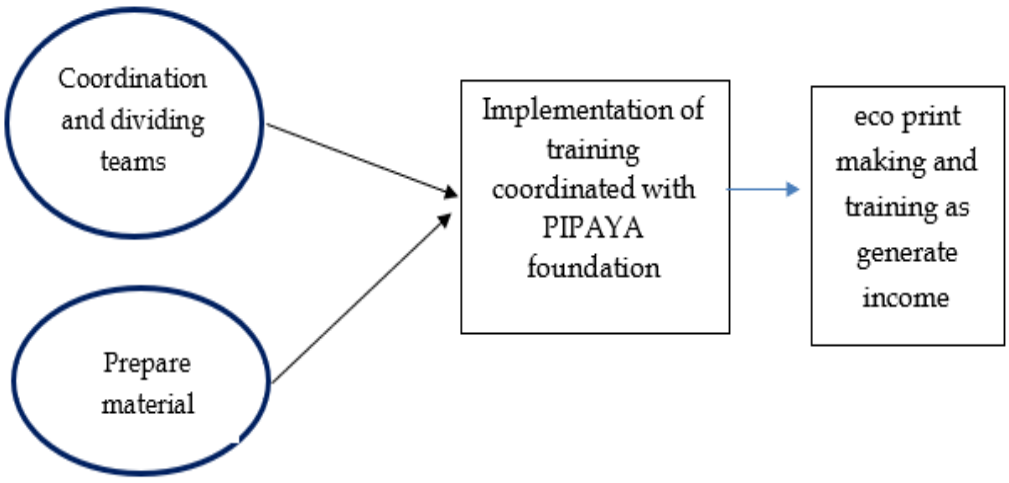

Figure 1. Conceptual Framework

RESULTS AND DISCUSSION

Description of activities carried out

Preparation for Training at the Minangkabau Campus of UTM Jakarta

Before the implementation of the community service activity, the team from Universitas Teknologi Muhammadiyah (UTM) Jakarta conducted a perception alignment session to ensure the success of the eco print workshop at the Pipaya Foundation. As part of the preparation, the community service team first conducted a joint exercise on campus. This activity aims to ensure that all team members understand the eco print making techniques that will be taught to participants, as well as identify challenges that may arise during the training process.

During the training session, the team practiced various basic eco print techniques, such as pounding and steaming, which are the main methods in making eco print products. This activity was also used to explore natural materials that can be used for the colouring process and printing patterns on fabric, as well as to align the way the material was delivered to suit the needs of participants from the Pipaya Foundation. This exercise not only aims to improve the team's technical skills, but also to strengthen understanding of the benefits and economic potential that can be generated from Eco print-based products.

The result of this perception alignment session was a mutual agreement on the training flow and adjustment of effective teaching methods, as well as readiness to actively involve participants in every stage of the workshop implementation. With this joint training, the UTM Jakarta team is ready to provide maximum training and provide a positive impact on the participants.

Figure 2. Training Preparation at UTM Jakarta Campus

Training at the Pipaya Foundation Bogor, December 22, 2024

The activity began with a warm and enthusiastic opening. The training participants, consisting of the mothers of the PIPAYA foundation, gathered in the prepared room. The Head of the PKM Team from UTM Jakarta, Dr. Rita Yuni Mulyanti, S.Pi., MM opened the event by giving a speech about the importance of ecoprint in supporting sustainability and preserving nature.

Figure 3. Initial Training Explanation

The socialization of the objectives and benefits of this training, namely to introduce eco print techniques and provide a practical understanding of how to make sustainable and nature-based textile products in full was delivered by Dr. Peggy Ratna Marlianingrum, S.Pi., M.Si. The speaker also emphasized that eco print is one way to bring art and technology closer to environmentally friendly principles, using natural materials to create unique patterns and colours on fabrics.

Figure 4. Starting Technical Training

In the socialization session, participants were given an explanation of the basic concept of Eco printing, history, and the Eco printing process. The speaker explained how this technique originated from traditional art that combines printing natural patterns from leaves, flowers, and other natural materials onto fabric using simple yet effective techniques. The speaker also provided an overview of how this technique is not only beneficial for the environment but can also produce textile artwork that has high aesthetic value.

Participants were then introduced to the various materials used in Eco printing, such as leaves, flowers, and natural fabrics. They were taught to recognize the types of plants that can produce good patterns and colours, as well as how to choose and prepare materials properly to achieve optimal results.

After the theory session was over, participants immediately jumped into practice. Starting with the pounding technique, which is one way to transfer natural pigments from plants to fabric. Each participant was given a previously prepared cotton cloth and various leaves, flowers, and other natural materials. In this activity, participants arranged the materials on the fabric and then hit them with a wooden hammer to extract the pigment and print the pattern on the fabric.

The team from UTM Jakarta provided instructions on the correct way to pound natural materials so that the pigments can adhere well without damaging the fabric fibres. Participants followed the steps enthusiastically, creating various interesting patterns and colours on their fabrics. This pounding technique gives a personal and unique impression to each work produced, because the printed pattern is very dependent on the natural materials used and the intensity of the pounding.

Figure 5. Participants Starting Practice

After the pounding technique, the activity continued with the steaming technique practice. At this stage, participants were given an explanation on how to steam fabrics that have been filled with natural materials using a steamer. The speaker explained how the steaming process works to mature the extracted pigments and strengthen the resulting colours and patterns**.**

Figure 6. Steaming technique practice

Participants then placed the fabric that had been given natural ingredients in the steamer and left it for a few minutes to ensure the pigments were fully absorbed into the fabric fibres. This process demonstrated how hot steam can

help fix the colour and create sharper and clearer patterns on the fabric. Participants were actively involved in setting the time and monitoring the steaming process to achieve optimal results. After all participants had successfully completed their Eco print work using the pounding and steaming techniques, the session was closed with a reflection of the work. Each participant was asked to show the Eco print results they had made and share their experiences about the challenges and excitement in the process of making it. The speaker gave appreciation to the participants who had participated enthusiastically and produced interesting works.

Figure 7. Shows Training Results

At the end of the activity, participants were given further information on how to care for Eco print products so that the colours and patterns are maintained, as well as how they can develop this technique further at home or in small creative businesses. As a closing, participants took a group photo as a souvenir of this training full of knowledge and creativity.

Figure 8. Group Photo with All Training Participants

Community Involvement and Sustainability

This Eco print training activity involved the mothers from the Pipaya Foundation, who have an important role in supporting economic empowerment based on local wisdom and environmental sustainability. As the foundation's administrators, they have a high concern for social and environmental issues, and are determined to provide a positive impact on society, especially in the areas of women's empowerment and the environment.

The mothers from the Pipaya Foundation have been actively involved since the beginning of the activity. They not only attended the socialization about Eco print, but also participated in every stage of the practice, from preparing materials, following the pounding technique, to applying the steaming technique. During the practical session, these mothers discussed with each other, shared experiences, and helped each other, creating a family atmosphere that supports the learning process.

Their involvement is very important because they not only learn to make environmentally friendly products, but also understand the business and creative economy potential of Eco print. As active foundation administrators, they can apply the knowledge they gain to empower the surrounding community, creating economic opportunities through Eco print-based products that have high artistic and selling value.

In addition, through this activity, the mothers of the Pipaya Foundation are also given the opportunity to expand their networks and collaborate with various parties who have a similar vision in advancing sustainability and economic empowerment based on local wisdom.

Sustainability in Eco print Training

Sustainability is the core of this training, in line with the goal of creating products that are not only economically valuable but also environmentally friendly. In this activity, participants are introduced to Eco print techniques that prioritize the use of natural materials and processes that have minimal environmental impact. All processes in making Eco prints, such as selecting natural materials, pounding techniques, and steaming, focus on the principle of sustainability that reduces the use of chemicals and high energy.

The use of natural materials such as leaves and flowers that are easily found in the participants' environment is a real form of wise utilization of existing natural resources. This reduces dependence on industrial raw materials that often have a negative impact on the environment. The techniques used in making Eco prints also reduce textile waste and hazardous chemicals that are commonly used in the conventional textile industry.

Moreover, by utilizing simple techniques such as steaming and pounding, participants are expected to be able to develop their creativity without the need for sophisticated equipment or high energy. This process is not only environmentally friendly, but also cost-effective and easy to practice at home or on a small business scale, providing opportunities for participants to develop businesses based on environmentally friendly products.

Through this training, the mothers of the Pipaya Foundation not only gain technical skills in making Eco prints, but also knowledge about the importance

of sustainability in every aspect of life. They are empowered to apply the principles of sustainability in their daily businesses or activities, so that they can create a wider impact in their communities. In addition, they can spread this knowledge to other members of the foundation and the surrounding community, increasing awareness of the importance of environmental sustainability and women's empowerment.

CONCLUSIONS AND RECOMMENDATIONS

The output of this ecoprint training activity is not only limited to the practical skills obtained by participants, but also produces various publications that will strengthen understanding, dissemination of information, and recognition of sustainability and creativity in making nature-based products. This activity can have a wider impact, both for the community, academics, and small business actors who want to develop ecoprint products as part of an environmentally friendly creative economy.

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