

ECOPRINT BATIK TRAINING FOR BIOLOGY AND CRAFT TEACHERS USING LOCAL MATERIALS FROM TERNATE ISLAND

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Abstrak: Ecoprinting merupakan salah satu keterampilan alternatif yang ingin dikuasai dan dimintai oleh guru-guru di Kota Ternate. Hal ini karena teknik ini sangat menarik untuk diajarkan pada siswa di sekolah sehingga penting untuk mengajarkan ecoprinting pada guru-guru terlebih dahulu. Kegiatan pelatihan pembuatan batik ecoprint diselenggarakan tim pengabdian universitas Khairun bersama MGMP Biologi SMA/MA Kota Ternate dan dihadiri 28 guru dari 11 SMA se-Kota Ternate. Tujuannya ialah mengajarkan keterampilan membuat batik ecoprint. Kegiatan dilakukan menggunakan metode sosialisasi, demonstrasi, pelatihan dan pendampingan. Alat dan bahan pembuatan diperoleh dari lingkungan sekitar sebagai potensi lokal daerah Ternate. Hasil evaluasi melalui pre test dan angket menunjukkan bahwa awalnya sebanyak 67% peserta tidak mengetahui tentang ecoprinting. Saat pelatihan, peserta cenderung menggunakan daun yang berwarna yakni daun bayam merah sebanyak 64% peserta. Hasil evaluasi, peserta merespon positif terhadap pelatihan baik terhadap isi materi, pemateri, dan metode pelaksanaan kegiatan. Secara keseluruhan penilaian peserta adalah baik sekali terhadap isi materi dan instruktur dengan rata-rata skor masing-masing 91, sedangkan untuk penilaian terhadap metode rata-rata ialah 89. Pelatihan berhasil mengajarkan ecoprinting kepada semua peserta dan tim merekomendasikan untuk mengajarkan pada siswa SMA di Kota Ternate.

Kata Kunci: batik ecoprint, bayam merah, Musyawarah Guru Mata Pelajaran (MGMP) Biologi

Abstract: Ecoprinting is one of the alternative skills that teachers in Ternate City want to master and demand. This is because this technique is very interesting to teach to students at school, so it is important to teach ecoprinting to teachers first. The ecoprint batik training activity was held by the Khairun University service team together with MGMP Biology SMA/MA Ternate City and attended by 28 teachers from 11 high schools throughout Ternate City. The aim is to teach skills in making ecoprint batik. Activities are carried out using methods of socialization, coercion, training and mentoring. Tools and manufacturing materials were obtained from the surrounding environment as a local potential of the Ternate area. The evaluation results through pre-tests and questionnaires showed that initially 67% of participants did not know about ecoprinting. During training, participants tended to use colored leaves, namely red spinach leaves, as many as 64% of participants. As a result of the evaluation, participants gave a positive response to the training regarding the content of the material, presenters, and methods of implementing activities. Overall, the participants' assessment was very good regarding the content of the material and the instructor with an average score of 91 each, while for the assessment of the method, the average was 89. The training was successful in teaching ecoprinting to all participants and the team recommended teaching it to high school students in the city Ternate.

Keywords: batik ecoprint, red spinach, MGMP Biology

Introduction

Biology teachers of Ternate City High School as partners of the community service program represented by MGMP Biology stated problems in discussions with the community service program team. The problem is the need for alternative skills for Biology and Crafts teachers, especially psychomotor skills that will be transferred to the student. The team then made observations at SMA/MA in Ternate City. We discovered many local potentials in Ternate

that relate to Biology subjects, Crafts, and its curriculum. The aim of learning Biology, Crafts and Arts with direct practice is to equip students with the affective, cognitive and psychomotor skills needed to know and love the natural, social, cultural and spiritual environment in their region, as well as preserving and developing the advantages and useful local wisdom of the region. This skill is good for students and the environment in order to support national development. Especially in the context of science learning, the focus is given to providing direct experience to develop competence, so that students can scientifically explore, understand and love the surrounding environment (Restanti et al., 2013).

In line with the attachment to Law (UU) Number 23 of 2014 concerning Regional Government, it is stated that determining subjects at the SMA/MA level in the curriculum is the authority of the provincial government. The Ministry of Education and Culture also encourages regional governments to design curricula that suit the needs and potential of their respective regions. The use of a local content curriculum has the potential to provide knowledge, skills, and shape students' attitudes and behavior, with a focus on understanding environmental conditions and the demands of the surrounding community (Alfi & Bakar, 2021).

In *sekolah penggerak* or schools implementing the *kurikulum merdeka belajar*, providing direct practice and guidance for teachers in ecoprint batik making is an excellent alternative to be applied. The hope is that teachers will be more capable of developing their skills and innovating by utilizing local potentials related to plants in the surrounding environment as the basic material for ecoprint batik making, thereby enhancing the creative economy of the community (Saptutyningsih & Kamiel, 2021).

The skill of creating ecoprint batik is highly relevant to be applied in learning, especially in subjects such as Biology or Crafts and Arts. The implementation of ecoprint media can enhance creativity, communication, collaboration, and critical thinking (Widiantoro, 2020). Teachers can provide hands-on practice to their students in creating ecoprint batik to make learning more meaningful and enjoyable, thereby enhancing understanding of the taught material (Fatmala & Hartati, 2020). Similarly, the materials to be used can be sourced from all local potentials available in the city of Ternate, such as plant resources and the tools to be used. One of the local potentials in Ternate is the clove plant, and this plant even serves as a symbol for the city of Ternate (Suparman et al., 2020).

The creation of ecoprint batik involves the technique of applying patterns to fabric or material using natural elements such as leaves found in the surrounding environment for natural dyeing purposes (Sifaunajah et al., 2020). The trend of creating batik using the ecoprint method has been consistently increasing since 2017 (Nurohim et al., 2020). In the school environment, the use of the ecoprint method in the learning process can serve as a cross-disciplinary educational model that integrates art instruction and environmental knowledge (Setyaningrum & Purwanti, 2020).

The results of problem identification and observation among biology and craft teachers in Ternate City indicate that many teachers are not familiar with eco printing. Many teachers have also never tried the process of ecoprint batik on fabric, thus they have not taught or practiced it in class. Especially for biology and craft teachers, it is advisable to provide training on ecoprint

making using local plants available in Ternate. The objective of the training is to impart ecoprint skills to biology and craft teachers in high schools in Ternate City

Method

The method of this community partnership activity consists of three stages: Introduction and Socialization, Training, Assistance, and Evaluation. The flow is illustrated in Figure 1, and the details are as follows.

Introduction and Socialization.

This activity is to provide understanding to Biology or Crafts and Arts MGMP teachers in Ternate City about the creation of ecoprint batik using materials readily available from the surrounding environment

Training

This activity is carried out to train Biology or Crafts and Arts MGMP teachers in Ternate City on creating ecoprint batik using plant-based materials as the local potential of Ternate Island. The batik technique utilized during the training activity is the pounding technique. The training comprises both demonstration and hands-on practice. Demonstration, this activity aims to provide visualization of the process of creating ecoprint batik using materials sourced from the surrounding environment. The batik technique employed in the demonstration activity is the pounding technique

Assistance and Evaluation

This activity is carried out to support teacher groups in creating ecoprint batik and to conduct evaluations. This activity is conducted at the participants' homes on a scheduled basis. If there are any obstacles encountered during the partnership activities, they can be promptly identified and solutions can be sought through the assistance provided in this phase. The batik technique used in mentoring activities is the steaming technique. Evaluation of activities is carried out jointly with the service team and partners. Participants will complete an evaluation questionnaire covering feedback on the content, methods, and facilitators in [Table 1](#), [Table 2](#), and [Table 3](#). The activity is considered successful if participants' feedback falls at least in the "good" category, as indicated in [Table 4](#).



Figure 1. The flow of community service activities

Table 1. Participants Responses to the speaker

Content	Feedback				
	VD	D	H	S	VS
The training content is in accordance with work needs					
The training content is in accordance with training objectives					
The training content is interesting and thoroughly discussed					
The training content is beneficial					
The training content provides new skills					

Table 2. Participants Responses to the Implementation

Implementation	Feedback				
	VD	D	H	S	VS
The method is in line with the discussed topic					
The schedule is appropriate and on time					
The committee worked well					

Table 3. Participants Responses to the Instructor

Instructor/Trainer	Feedback				
	VD	D	H	S	VS
The instructor can interact with the participants					
The instructor provides the opportunity for discussion					
The instructor master the lesson					
The instructor can motivate participants to be active					
The instructor employs easily comprehensible language					

The conversion of values in the evaluation indicators are as follows:

VD	: Very Dissatisfied	: 1
D	: Dissatisfied	: 2
H	: Hesitant	: 3
S	: Satisfied	: 4
VS	: Very Satisfied	: 5

Table 4. Assessment Scores and Categories

Skor	Kategori
81-100	Excellent
61-80	Good
41-60	Sufficient
21-40	Not Good
0-20	Poor

Results and Discussion

The training activity was attended by 28 participants from 11 public and private high schools (SMA/MA) within the city of Ternate, as shown in [Figure 2](#). A total of 21.43% of the participants were biology teachers who also teach Crafts and Arts, while the rest were pure biology teachers. The results of the activity are presented according to the implementation stages.



Figure 2. Group photo of some participants and ecoprinting service team

Socialization

This activity begins with a pre-test to assess participants' understanding before the socialization. The pre-test results from 28 participants show that 67% were unaware of ecoprint batik, and all participants had never attempted to create ecoprint batik. Some participants were already familiar with and had heard information about ecoprint. Details of the teachers' perceptions obtained from the pre-test are illustrated in the pie chart in [Figure 3](#).

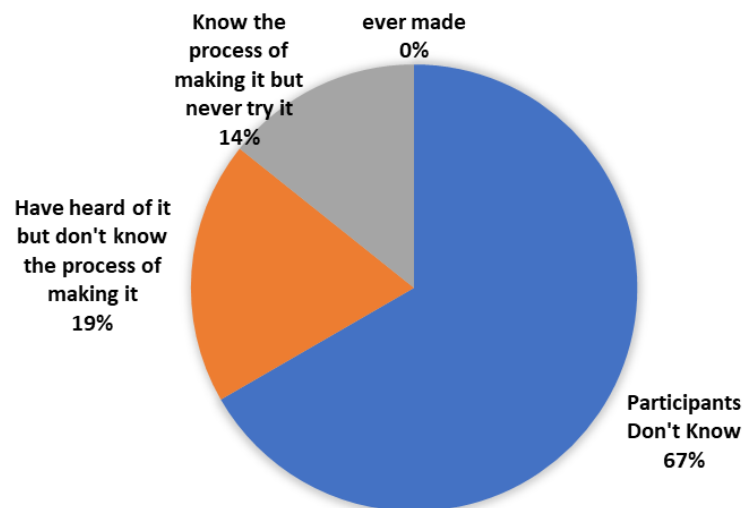


Figure 3. Participants perceptions of ecoprint training

Demonstration

Lecturers from the Faculty of Teacher Training and Education (FKIP) at Khairun University conducted a practical session on creating ecoprint batik using the pounding technique, which involves a method of printing by hitting (Octariza & Mutmainah, 2021; Zarkasi & Suwasono, 2022). Pounding is a fundamental technique with the simplest steps in the process. Leaves are placed on plain fabric and then pounded to transfer the pattern onto the fabric underneath. The pounding technique involves the direct printing of motifs from the leaves. Participants were provided with a visualization by directly observing the ecoprint batik-making technique using materials and tools available in the school's location. The demonstration utilized various fabric colors and various types of plants as the batik prints. Participants were enthusiastic because the tools and materials were readily available, and if they had to purchase them in the market, the cost would be very affordable.

Practice

Participants engaged in hands-on practice of the pounding technique immediately following the demonstration. The teachers selected fabric and sought plants for printing materials, with leaves being the chosen print material. Leaf options included castor, cosmos, and papaya leaves (Saraswati et al., 2019; Purwani, 2022). In this activity, all participants actively created ecoprint batik using various fabric colors (white, pink fanta, pitch), fabric types (mori, cotton), and plant types for coloring and as blueprints for ecoprint batik (taro leaves, gofasa wood leaves, fern leaves, red spinach leaves, starfruit leaves, rubber flower leaves, bougainvillea flower leaves, and others). Participants were grouped according to their school and practiced creating ecoprint batik based on the techniques demonstrated earlier. They were free to choose the blueprints for their fabric and the types of plants used in creating ecoprint batik.

The ecoprint batik paintings from three participant groups clearly display the chosen leaf shapes and colors. Meanwhile, one SMAN 8 Kota Ternate group created batik with the inscription "SMAN 8 OK." Figure 4 illustrates the process of creating ecoprint batik during the training activity. Figures 4 and Figures 5 depict participants working in groups, pounding plants on stretched fabric covered with plastic. The pounding was done using stones gathered from the environment/garden of SMAN 1 Kota Ternate. In this activity, participants were enthusiastic, with each group member pounding their chosen plants, creating a lively but enjoyable atmosphere. One crucial aspect to note in the pounding technique is that the chosen plants should be highly sensitive to high temperatures, as this plays a crucial role in the extraction of color pigments (Purwani, 2022).

Mentoring

The mentoring program is the next step of the practice but is conducted at the participants' homes according to the schedule provided by the MGMP because it requires more time with more advanced techniques. The batik technique used is steaming, which involves using various kitchen utensils for the steaming process (Sholikhah et al., 2021). The activity is carried out with each participant group from the same school. In the assistance activity using

the steaming technique, it is observed that the resulting ecoprint batik is of higher quality – the colors are brighter and clearer, and it is less prone to fading due to the mordanting technique using alum, steaming, and fixation also using alum in its process. In the mentoring session, participants have used a variety of leaves. The data in [Figure 6](#) shows the percentage of participants' choices regarding the types of plants that can be used for ecoprinting.



Figure 4. The process of pounding plants in the making of ecoprint batik.



Figure 5. The process of pounding plants in the making of ecoprint batik by participants from SMA 8

Tendency of participants' choice of plant for ecoprints

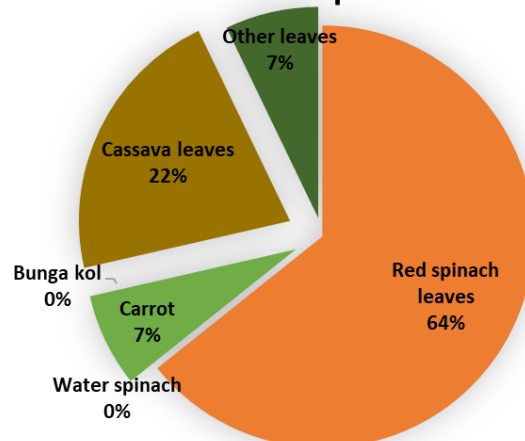


Figure 6. Percentage of participants' chosen plant types for ecoprinting

Evaluation

In this stage, an evaluation is conducted through written feedback from participants regarding the training. Participants are provided a checklist for assessing the training content, methods and implementation, and the facilitator. The results of participant responses are presented in [Figure 7](#).

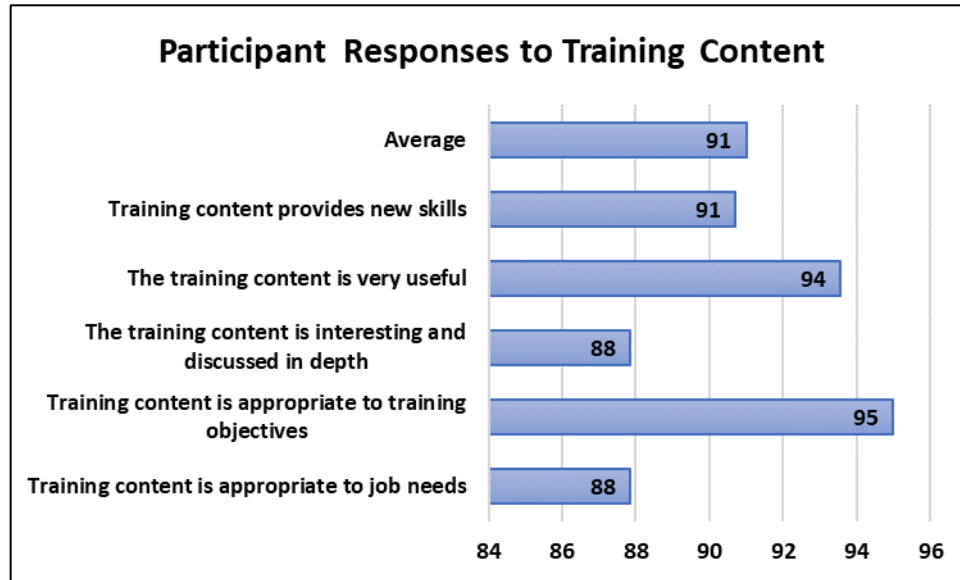


Figure 7. Participant evaluation in the form of participants' responses to training content

The participants' average response to the training content is excellent, scoring 91. The highest response is given to the participant's feedback on the relationship between the training material and the training objectives, which is 95. The smallest score, still in the excellent category, is for the feedback on the relevance of the material to the depth and suitability for teachers' work needs, each scoring 88.

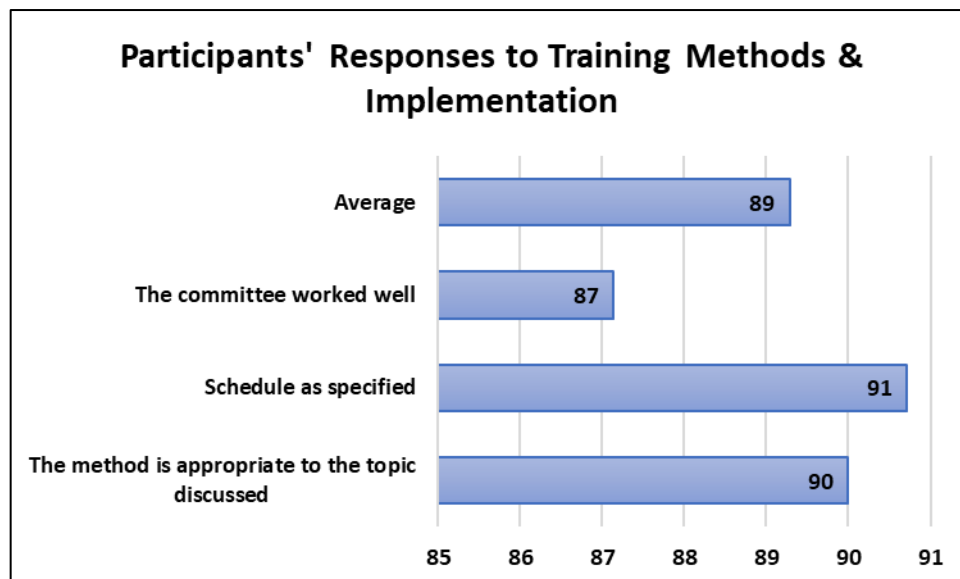


Figure 8. Participant feedback on methods & implementation

In evaluating the methods and implementation of the activities as shown in [Figure 8](#),

participants provided an average rating of 89, classified as excellent. The participants' highest feedback on the activity schedule is 91, and the lowest is for the committee's work, 87, but both are still categorized as excellent. The training methods used received an above-average score of 90.

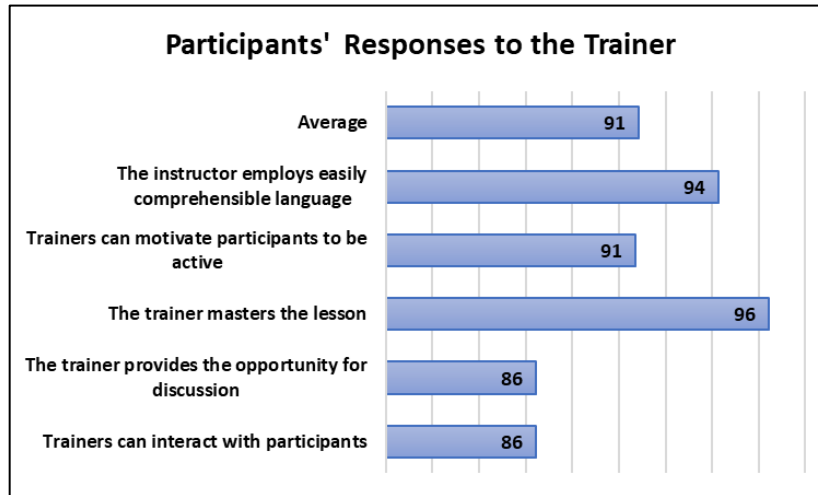


Figure 9. Participants' responses to the instructor/trainer

The instructor delivered the content excellently, as indicated by the participants' assessment score of 91 in [Figure 9](#). The instructor is considered highly knowledgeable about the material, uses appropriate language, and can motivate participants; all of which received scores above 90. The instructor's interaction with participants is also excellent, providing opportunities for questions. The evaluation results from interviews conducted by the service team with participants, coordinators, and the management of the Biology MGMP after participating in the training and mentoring revealed that 100% of participants understood and were skilled in creating ecoprint batik. Participants are also committed to implementing ecoprint batik in their schools' biology or crafts and arts education.

Information from the pretest indicates that the majority of teachers are not familiar with the ecoprint process, but they are eager to understand and apply ecoprint in arts and crafts as well as biology classes. During the practical session using the pounding technique, participants used stone pounding tools taken from Sulamadaha Beach in Ternate. Participants pounded selected leaves stretched on fabric. After completing this activity, participant groups held an exhibition of their works, observed by other groups. The plant type commonly chosen in this practical training session is the leaves of sweet potatoes or cassava. These types of leaves are frequently used in ecoprinting (Wirawan & Alvin, [2019](#); Iftitah et al., [2023](#)). Participants also used fern leaves as prints

During the mentoring session with the steaming method, when participants were presented with a choice of leaves for the ecoprint process, they tended to choose sources with red or vibrant colors. Red spinach leaves were chosen by 67% of the 28 participants. Other plant types favored by participants were sweet potato leaves (22%) and orange carrot leaves (7%). Participants did not choose cabbage flowers and water spinach leaves (0%). A small percentage (7%) of participants were still unsure about selecting the plant type to be used as

a blueprint for their ecoprint batik and planned to explore other leaf options.

In general, participants' responses to the content, methods, and facilitators were excellent. The average scores for each aspect were excellent, above 81, and even for the feedback on the content and instructor, it was 91. This also illustrates the teachers' response to the activity, feeling that it was beneficial for their work and that they gained new skills. This is consistent with numerous publications indicating that training or learning in ecoprinting plays a role in enhancing participants' skills and independence (Fitri et al., 2021), improving science learning outcomes (Nawang Sari & Suryanti, 2021), and supporting the creative economy (Kartiko et al., 2023).

The batik training activity with ecoprinting is excellent and can support the learning process of high school Biology and Arts and Crafts. This is also highly aligned with the Kurikulum Merdeka, which is related to local wisdom and sustainable living. Through this activity, the activities of the High School/Madrasah Aliyah Biology Teachers Working Group (MGMP Biologi SMA/MA) in Ternate can be enhanced. Other partnership activities are expected to continue to collaborate with the High School Biology Teachers Working Group to achieve mutual progress for the Ternate region and, more broadly, for North Maluku.

Conclusion

The ecoprint batik-making training has been successfully conducted, imparting skills related to ecoprinting from locally available materials on Ternate Island to biology and craft teachers. This success is evident from the participants' responses to the program, which were overwhelmingly positive. Specifically, the participant feedback averaged above 81, falling into the category of excellent, particularly in relation to the material, instructor, and activity methods.

In detail, the participants demonstrated a high level of satisfaction, indicating a comprehensive understanding and appreciation of the training. The success of the training is attributed to the participants' positive responses and engagement throughout the sessions. Based on the outcomes, the service team recommends that teachers apply ecoprinting techniques to students in the classroom, utilizing locally available resources from Ternate Island. This approach aligns with the goal of integrating ecoprinting into the curriculum, promoting sustainability, and fostering a connection with the local environment.

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References

- Alfi, D. Z., & Bakar, M. Y. A. (2021). Studi Kebijakan Tentang Kurikulum Pengembangan Muatan Lokal. *Rabbani: Jurnal Pendidikan Agama Islam*, 2(1), 1–14. <https://doi.org/10.19105/rjpai.v2i1.4140>
- Wirawan B., & Alvin, M. (2019). Teknik Pewarnaan Alam Eco Print Daun Ubi Dengan Penggunaan Fiksator Kapur, Tawas Dan Tunjung. *Jurnal Litbang Kota Pekalongan*, 17, 1–5. <https://doi.org/10.54911/litbang.v17i0.101>
- Fatmala, Y., & Hartati, S. (2020). Pengaruh Membatik Ecoprint terhadap Perkembangan Kreativitas Seni Anak di Taman Kanak-Kanak. *Jurnal Pendidikan Tambusai*, 4(2), 1143–1155.
- Fitri, R., Sudarmiatin, Zonna Lia, D. A., & Murniati, A. (2021). Konsep Design Thinking Melalui Ecoprint Sebagai Upaya Meningkatkan Keterampilan dan Kemandirian Santri. *Jurnal Karinov*, 4(1), 64–69.
- Iftitah, N., Sutrisno, W., Maskuri, A., & Prabaswari, A. D. (2023). Pelatihan Pemanfaatan Daun Singkong Menjadi Bahan Ecoprint. *Journal of Appropriate Technology for Community Services*, 4(1), 19–25. <https://doi.org/10.20885/jattec.vol4.iss1.art3>
- Kartiko, C., Adhe, K. R., Shinta, H., & Puspita, C. (2023). Pelatihan Batik Ecoprint pada Kelompok Ibu-Ibu PKK di Kelurahan Warugunung Surabaya untuk Menunjang Pertumbuhan Ekonomi Kreatif Batik Ecoprint Training for PKK Mothers ' Group in Warugunung Sub-district, Surabaya, to Support Creative Economic Growth den. *Lambung Inovasi*, 8(2), 359–367.
- Nawangsari, D. A., & Suryanti. (2021). Pengaruh Model Pembelajaran Berbasis Proyek Pembuatan Ecoprint Terhadap Hasil Belajar IPA Materi BAGian, Bentuk, dan Fungsi Daun Siswa Kelas 4 SDN 1 Ngetal. *Jurnal Penelitian Pendidikan Guru Sekolah Dasar*, 09(10), 3529–3541. <https://ejournal.unesa.ac.id/index.php/jurnal-penelitian-pgsd/article/view/44075>
- Nurohim, Zazuli, A. I., & Hidayah, F. F. (2020). Membangun Desa Ekonomi Mandiri Melalui Batik Ecoprint di Rejosari Kabupaten Kudus. *Prosiding Seminar Nasional Unimus*, 3, 68–76.
- Octariza, S., & Mutmainah, S. (2021). Penerapan Ecoprint Menggunakan Teknik Pounding Pada Anak Sanggar Alang-Alang, Surabaya. *Jurnal Seni Rupa*, 9(2), 308–317. <http://ejournal.unesa.ac.id/index.php/va>
- Purwani, S. (2022). Pelatihan Ecoprint Teknik Punding dengan Daun Pepaya di LKP Kumalasari. *Abdimas Akademika*, 3(02), 184–191.
- Restanti, R., Sarwanto, & Sudarisman, S. (2013). Pembelajaran Biologi Dengan Pendekatan CTL (Contextual Teaching And Learning) melalui Model Formal dan Informal Hands on Activities Ditinjau dari Kreativitas Siswa dan Sikap Peduli Lingkungan. *Bioedukasi*, 6(1), 76–94. <https://media.neliti.com/media/publications/59685-ID-pembelajaran-biologi-dengan-pendekatan-c.pdf>
- Saptutyningsih, E., & Kamiel, B. P. (2021). Mendorong Ekonomi Kreatif Melalui Produk Ecoprint Melalui Pemanfaatan Potensi Alam di Dukuh Glugo Bantul. *Warta LPM*, 24(1), 145–158. <https://doi.org/10.23917/warta.v24i1.11081>
- Saraswati, R., Susilowati, M. H. D., Restuti, R. C., & Pamungkas, F. D. (2019). Buku Pemanfaatan Daun untuk Ecoprint dalam Menunjang Pariwisata M . H . Dewi Susilowati Ratri Candra Restuti Fajar Dwi Pamungkas Departemen Geografi Fakultas Matematika dan Ilmu Pengetahuan Alam di Indonesia Universitas. In *Universitas Indonesia* (Issue October).
- Setyaningrum, F., & Purwanti, S. (2020). Pelatihan Pembuatan Batik Ecoprint Sebagai Media Pembelajaran IPA bagi Guru SD di PCM Berbah. *Seminar Nasional Pengabdian Kepada Masyarakat*, 1(2), 79–88. <https://ojs.unm.ac.id/semnaslpm/article/view/18284>
- Sholikhah, R., Widowati, W., Pendidikan, S. N., Keluarga, K., Kunci, K., Pelatihan, :, & Gunungpati, K. (2021). Pelatihan Pembuatan Ecoprint Pada Ibu-Ibu PKK Di Kelurahan Gunungpati Kota Semarang. *Fashion and Fashion Education Journal*, 10(2), 81–85. <https://journal.unnes.ac.id/sju/index.php/ffe>
- Sifaunajah, A., Tulusiawati, C., & Af'idah, L. (2020). Pengembangan Kerajinan Batik dengan Teknik Ecoprint bersama Organisasi Karang Taruna dan IPNU-IPPNU Desa Barongsawahan. *Jurnal Pengabdian Masyarakat Bidang Keagamaan*, 1(1), 16–20. http://ejournal.unwaha.ac.id/index.php/abdimas_agama/article/view/1061
- Suparman, S., Nurhasanah, N., Bahtiar, B., & DAS, S. (2020). Studi Literasi Taksonomi dan Penelusuran Spesimen Lektotipe Cengkih (*Syzygium aromaticum* (L.) Merr. & Perry). *Techno:*

- Jurnal Penelitian*, 9(1), 363. <https://doi.org/10.33387/tjp.v9i1.1753>
- Widiantoro, S. (2020). Pengembangan Model Pembelajaran Ecoprint untuk Meningkatkan Keterampilan Abad 21 di Sekolah Dasar. *Jurnal Didaktika Pendidikan Dasar*, 4(3), 759–778. <https://doi.org/10.26811/didaktika.v4i3.142>
- Zarkasi, M. S., & Suwasono, B. T. (2022). Teknik Pounding Pada Ecoprint Sebagai Sumber Inspirasi Dalam Penciptaan Karya Seni Grafis Abstraksi Wayang. *Acintya : Jurnal Penelitian Seni Budaya*, 14(1), 53–65. <https://doi.org/10.33153/acy.v14i1.4327>