

ECO-BRANDING AND SUSTAINABLE PLASTIC WASTE MANAGEMENT FOR LOCAL ECONOMIC DEVELOPMENT: EMPOWERING PKK COMMUNITIES IN KELURAHAN GUMURUH, BANDUNG, INDONESIA

Andriano Simarmata^{1*}, Friska Amalia², Iftika Suliastuti³, and Imanda Dea Sabiella⁴

^{1,2}Interior Design Department, School of Design,

³Visual Communication Design, School of Design,

⁴Entrepreneurship, Binus Business School,

BINUS University,

Bandung, Indonesia

andriano.simarmata@binus.ac.id

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ABSTRACT

Plastic waste has become one of the most urgent environmental challenges, particularly at the household level where waste management practices remain limited and underutilized. This community service project was carried out to empower PKK as Family Welfare Empowerment community groups from Kelurahan Gumuruh, Bandung, Indonesia, by integrating eco-branding strategies into sustainable plastic waste management. The main objective was to transform household plastic waste into value-added products that could strengthen community-based economic independence. The method applied was participatory action through design workshops in which 40 PKK participants were actively involved. They were guided by design lecturers and supported by students in generating ideas, developing concepts, and producing product prototypes. A total of 30 prototypes were successfully produced and curated, reflecting both functional and aesthetic qualities, as well as the principles of eco-branding. These products are planned to be exhibited and marketed through local bazaars, providing visibility and potential economic opportunities for the community. The results demonstrated that collaboration between PKK communities and academic facilitators significantly improved participants' knowledge, creativity, and confidence in plastic waste management. In conclusion, this program highlighted the importance of community and academic partnerships in addressing environmental issues while simultaneously fostering local economic development.

Keywords: Plastic Waste Management, Eco-Branding, Community Empowerment, Local Economic Development, Participatory Design

A. INTRODUCTION

Plastic waste has become one of the most critical global environmental challenges, and Indonesia is currently ranked as the second-largest contributor of marine plastic waste (Jambeck et al., 2015). According to the Indonesian Ministry of Environment and Forestry, the country generates more than 6.8 million tons of plastic waste annually, of which only around 10–15% is recycled, while the rest pollutes the environment or ends up in landfills (KLHK, 2022). At the local level, household-scale waste management practices are still limited and remain a pressing concern. In Kelurahan Gumuruh, Bandung City, the problem of plastic waste is evident in densely populated neighborhoods, where household waste segregation and recycling practices are minimal. The area has approximately 1,200 households, with more than 60% of families still relying on conventional waste disposal systems without sustainable management approaches (Kelurahan Gumuruh Data, 2023). This condition creates significant environmental risks while also representing untapped opportunities for community-driven initiatives. The partner community involved in this service program is the PKK (Family Welfare Empowerment) group, a women-led community organization operating at the neighborhood level across Indonesia.



Figure 1. PKK Community of Kelurahan Gumuruh, Bandung

PKK in Kelurahan Gumuruh (figure 1) consists of around 40 active members representing households in the community. Despite their strong social capital, PKK members face challenges in

translating their potential into sustainable waste management practices and productive economic activities. Limited knowledge of product design, branding, and business development are the main barriers preventing them from turning household plastic waste into value-added goods.

The objective of this community empowerment activity was to enhance the capacity of PKK members in plastic waste management by integrating eco-branding strategies into product development. Through this initiative, PKK members were expected not only to adopt sustainable practices in waste reduction but also to generate economic independence by producing marketable goods from recycled plastic materials. The priority problems identified were the lack of awareness in household waste management, the absence of creative product development skills, and insufficient knowledge of eco-branding as a tool to differentiate sustainable products in local markets.

To address these challenges, the solutions offered included participatory design workshops conducted in collaboration with academic facilitators. Design lecturers and students from Bina Nusantara University guided the PKK members through idea generation, concept development, and prototyping of products made from household plastic waste. The participatory approach emphasized co-creation, ensuring that PKK members were actively engaged in both decision-making and execution processes. As a result, 30 product prototypes were developed and curated to meet functional, aesthetic, and eco-branding standards. These prototypes are planned to be exhibited and marketed through local bazaars, connecting the community with wider consumer networks and reinforcing the sustainability narrative.

From a theoretical perspective, eco-branding has been recognized as an effective strategy for aligning environmental responsibility with consumer values (Parguel et al., 2015; White et al., 2019). Empirical studies show that eco-branded products can enhance consumer trust and willingness to pay, thereby providing opportunities for local communities to create niche markets (Rahbar & Wahid, 2011). In terms of community empowerment, previous studies highlight the importance of

participatory approaches that involve communities in design and decision-making processes to achieve sustainable behavioral change (Sanders & Stappers, 2008; Hussain et al., 2012). This service program aligns with those findings by combining environmental education, product innovation, and branding strategies in a community-based context.

The output of this activity is twofold: (1) tangible products in the form of eco-branded plastic waste prototypes ready for exhibition and commercialization, and (2) intangible outcomes in the form of enhanced knowledge, creativity, and entrepreneurial capacity among PKK members. This program demonstrates how collaborative engagement between communities and academia can address pressing environmental issues while simultaneously fostering local economic development.

B. IMPLEMENTATION AND METHODS

The community service activities were carried out in Bandung, West Java, with PKK members from Kelurahan Gumuruh as the primary partners, collaborating with design lecturers and practitioners. The program was structured in several stages, integrating educational, creative, and participatory approaches to empower the community in applying eco-branding strategies while developing upcycled product designs. The methodology was anchored in the principles of Participatory Action Research (PAR), wherein the community acts as the central agent of social change and academics serve as facilitators (Hussain, Sanders, & Steinert, 2012; Sanders & Stappers, 2008). Through PAR, the intervention moved beyond mere knowledge transfer to mobilize collective capacity for sustainable local innovation. This aligns with Dillard (2020), who posits that PAR transforms community members from passive recipients into active stakeholders in problem-solving processes.

The implementation comprised two main stages (figure 2). The first stage featured an educational seminar on waste management and eco-branding, involving Newhun Recycle professionals and BINUS Bandung lecturers who delivered materials under the topic "Branding for Eco-friendly Products and Strategies to Build Sustainable Brands." This session provided conceptual

knowledge and practical insights regarding sustainable branding and environmentally friendly product strategies, ensuring that the participants were exposed to both technical waste management knowledge



Figure 2. (a) Seminar : Branding for Eco-friendly Products by Newhun
(b) Workshop : Plastic Waste Sorting

and eco-branding concepts. To make the activities more engaging, a practical workshop on plastic sorting emphasizing classification by type and identification by color was conducted.

The second stage was a creative workshop (figure 3) that emphasized collaborative exploration. In this session, a total of 60 participants, comprising 40 PKK members as the primary subjects and 20 academics (including lecturers from Product Design, Visual Communication Design, Creative Entrepreneurship, and university students) as facilitators were divided into five working groups. Each group was tasked with producing six product design ideas, culminating in a total of 30 generated prototypes. The design process encompassed brainstorming, sketching, and prototyping using the provided recycled materials and tools. Crucially, alongside the physical product development, each group was also required to formulate a visual identity concept and a compelling tagline for their products to embed eco-branding principles effectively (Kotler & Keller, 2016). This stage was strategically designed to encourage active participation, mutual learning, and the integration of

multidisciplinary expertise, thereby strengthening the participants' sense of agency in waste-based product innovation.



Figure 3. Creative Workshop and Prototyping Process

The measurement of success was conducted primarily through a qualitative and descriptive framework. Evaluation indicators included shifts in the participants' knowledge, technical skills, and attitudes toward waste management and eco-branding. As formal written pre- and post-tests were not administered, the assessment relied on retrospective self-evaluations, in-depth group discussions, feedback forms, and facilitator observation rubrics. Consequently, the quantifiable estimates reported in the outcomes were derived from the systematic thematic analysis of these qualitative feedback mechanisms and facilitator consensus. Furthermore, the tangible output of the workshop, namely the 30 curated design prototypes and their formulated eco-branding identities, served as direct evidence of the participants' acquired competencies. The achievement level was also evaluated based on the socio-cultural engagement reflected in the collaborative dynamics between the PKK members and academics, as well as the economic potential of the generated product ideas. This multidimensional qualitative evaluation ensured that the service outcomes were assessed not only on immediate

deliverables but also on their potential to drive long-term behavioral and entrepreneurial transitions in the partner community.

C. RESULTS AND DISCUSSION

Implementation of service activities

The program was implemented through a series of participatory workshops, training sessions, and mentoring activities. The service applied a co-design methodology that ensured the active involvement of PKK members across all phases ranging from initial waste collection and segregation to the physical creation of upcycled products and the strategic formulation of eco-branding (Sanders & Stappers, 2008). The training modules were comprehensively designed (figure 4) to address four critical domains: (1) sustainable plastic waste management practices; (2) technical product design utilizing recycled plastics; (3) foundational eco-branding principles; and (4) digital marketing strategies for broader market engagement (Kotler & Keller, 2016).

By integrating practical demonstrations with experiential learning, the program ensured that participants acquired tangible, hands-on competencies. This phase successfully culminated in the prototyping of various marketable accessories, which currently serve as baseline models requiring further aesthetic and functional refinement.



Figure 4. Design Presentation

The collective nature of these activities, coupled with intensive facilitation by field experts, fostered a high degree of participant enthusiasm. This expert guided collaborative environment significantly cultivated the participants' confidence and psychological empowerment in navigating the product development process (Hussain et al., 2012). The initiative provided more than just immediate technical skills; it instilled a renewed sense of agency, equipping the community with realistic pathways and the necessary optimism to independently advance and scale their product lines in the foreseeable future (Dillard, 2020).

Indicators of achievement and program outputs

The achievement of program objectives was measured using several indicators, including knowledge, skill, eco-branding adoption, and potential economic outcomes. A summary of the comparison between the conditions before and after the program is presented in Table 1.

Table 1. Indicators of achievement and program outputs

Indicator	Before Program	After Program
Knowledge of waste management	Low awareness of plastic waste sorting; no understanding of recycling for products	Increased knowledge of waste management by 70% (based on post-seminar and post-workshop)
Product development skills	Limited skills; only basic crafts without market orientation	30 prototypes developed: 50% participants able to generate creative and marketable products.
Eco-branding awareness	No knowledge of eco-branding	Able to prompt an ecobranding concept and tagline for their product
Economic outcomes	Household income unaffected by waste-related activities	Highly potential, community member actively participated in design production

The intervention yielded substantial empirical improvements across key socio-economic and environmental indicators, validating the efficacy of Participatory Action Research (PAR) in empowering grassroots communities as active agents of change (Dillard, 2020). Prior to the program, baseline assessments indicated a pronounced deficit in environmental literacy, particularly concerning plastic waste segregation and recycling, reflecting broader systemic waste management challenges (Kementerian Lingkungan Hidup dan Kehutanan, 2021; World Bank, 2018). Post-intervention, participants demonstrated a 70% increase in waste management knowledge. This cognitive shift is

fundamental for transitioning communities from a linear waste disposal mindset to a "waste-to-wealth" paradigm (Kurniawan et al., 2021), a critical step in mitigating the localized impacts of plastic pollution (Jambeck et al., 2015). Furthermore, the initiative significantly elevated the community's technical design competencies. Initially constrained to rudimentary, non-market-oriented crafts, the collaborative workshops utilized co-creation strategies (Sanders & Stappers, 2008) and participatory design methodologies (Hussain et al., 2012) to drive innovation. This approach successfully facilitated the development of 30 distinct product prototypes, empowering 50% of the participants to produce aesthetically marketable items. To ensure commercial viability, this product development was strategically integrated with eco-branding education. Overcoming a baseline absence of brand awareness, participants successfully formulated explicit eco-branding concepts and taglines, effectively embedding ecological value into their product identities to achieve competitive differentiation (Kotler & Keller, 2016). These activity integrated capacity-building efforts and catalyzed new economic trajectories; transforming a community where household incomes were previously isolated from waste activities into a collective actively engaged in sustainable production, thereby laying the groundwork for local circular economic resilience.

Advantages and limitations of the program

The main advantage of the program was its ability to successfully integrate environmental education with economic empowerment, resulting in high levels of active community participation (Dillard, 2020). The implementation of the co-design method effectively encouraged creativity and strengthened the sense of ownership among PKK members during the product development process (Sanders & Stappers, 2008). Furthermore, the eco-branding initiative provided a strategic advantage, helping the community to distinguish and position their products in competitive markets (Kotler & Keller, 2016). However, several practical limitations were observed. Some participants faced difficulties in maintaining consistent product quality, primarily due to limited access to proper

manufacturing tools. In addition, the marketing reach remained geographically localized, highlighting the need for stronger digital engagement to expand commercial visibility. Another significant challenge was time availability; as many PKK members had concurrent household responsibilities, their capacity to participate in continuous training sessions was constrained.

Community participation and long-term impact

Community participation remained highly active and sustained throughout the intervention, particularly during the critical phases of product co-design and branding decision making (Hussain et al., 2012). This collective involvement not only strengthened social cohesion among the participants but also successfully promoted tangible behavioral changes in daily waste management practices at the household level (Dillard, 2020). Looking toward the long term, these foundational efforts are expected to establish a resilient, community-based model that integrates sustainable waste management with the creative economy. This framework provides a viable and scalable approach that can be replicated to address similar socio-environmental challenges in other urban neighborhoods.

Opportunities for future development

The outcomes of this intervention unveil several strategic opportunities for future development and programmatic scaling. Specifically, future efforts should prioritize: (1) the expansion of current product lines through the adoption of diversified recycling techniques to maximize resource recovery and value addition (Kurniawan et al., 2021); (2) the cultivation of strategic collaborations with local community and digital platforms to facilitate wider market penetration; and (3) integration with local government policies on circular economy and sustainable urban development. Furthermore, to sustain commercial viability, subsequent capacity building programs must emphasize advanced eco-branding training. This entails equipping the community with essential skills in digital storytelling and e-commerce optimization to effectively communicate their sustainable value proposition to a broader consumer demographic (Kotler & Keller, 2016).

D. CONCLUSION

The community empowerment initiative implemented in Kelurahan Gumuruh successfully demonstrated the academic and practical value of integrating eco-branding strategies into community-based plastic waste management. Utilizing a Participatory Action Research (PAR) framework, this study contributes to the existing literature on sustainable local economic development and community-based circular economy. It provides an empirical model of how academic-community partnerships can effectively transform household waste management from a mere environmental burden into a catalyst for community-based economic independence. By directly involving participants in knowledge sharing and collaborative product development, the research bridges the gap between theoretical sustainable frameworks and grassroots application, positioning PKK members as active agents of change rather than passive recipients.

The effectiveness of this program can be clearly delineated through its specific outputs, outcomes, and long-term impacts. The direct, tangible results (outputs) of the design workshops included the successful creation and curation of 30 product prototypes by 40 actively involved PKK participants. These prototypes successfully embedded functional and aesthetic qualities alongside eco-branding principles. Additionally, a shared community eco-label was established as a strategic branding intervention. As an immediate result (outcomes) of the program, participants experienced a measurable transfer of design knowledge. This led to significant improvements in their practical skills, creativity, and confidence in transforming plastic waste into marketable products. Furthermore, their awareness regarding sustainable waste management and eco-branding was profoundly enhanced. At a broader level, the program generated long-term impacts by fostering sustainable, environmentally responsible behaviors within the community. By preparing these value-added products for local bazaars, the initiative created potential economic opportunities, thereby

strengthening community-based economic resilience and serving as a viable model for sustainable local development.

Based on these findings, it is recommended that future community empowerment initiatives prioritize continuous assistance and long-term mentoring to ensure the sustainability of the workshop results. Expanding networking opportunities with industry players and policymakers, as well as integrating digital marketing strategies, will further enhance market penetration. Addressing these sustainability challenges will not only consolidate the gains achieved but also enable broader replication of empowerment models that synergize eco-branding with circular economy principles.

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Contributorship Statement

Andriano Simarmata, S.Ds., M.Ds. (Lecturer, Interior Design, BINUS Bandung) served as the corresponding author and was responsible for the conceptualization of the study, data curation, development of the methodology, manuscript drafting, as well as review and editing of the final manuscript. Friska Amalia (Lecturer, Interior Design) and Iftika Suliastuti (Lecturer, Visual Communication Design) contributed to the investigation, co-design workshop facilitation, community mentoring in recycled product prototyping, visual identity concept development, and review of the manuscript. Imanda Dea Sabiella (Lecturer, Entrepreneurship) was responsible for guiding the eco-branding strategy, mentoring the participants in creating product taglines, and contributing to the drafting of the branding related.

Data Availability Statement

This study employed qualitative research methods through a combination of literature review and observational approaches within an internal research-based design framework. The datasets generated during the study are qualitative in nature and may contain sensitive participant information. Therefore, the data used is not publicly available due to privacy and ethical considerations. However, anonymized excerpts may be made available by the corresponding author upon reasonable request.

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