


Plastic waste micro-management towards innovative sustainable living in inspiring art practice



 **Muhammad Fauzan Abu Bakar**^{1*}

^{1,2,3,4,5}College of Creative Arts, Universiti Teknologi MARA, Carwangan Sarawak, Kota Samarahan 94300, Malaysia.

¹Email: mfauzan@uitm.edu.my

 **Mohd Razif Mohd Rathi**²

²Email: razif0329@uitm.edu.my


³Email: valeriemichael@uitm.edu.my

 **Valerie Michael**³


⁴Email: clementjmel@uitm.edu.my

 **Clement Jimel**⁴

⁵Email: zaidrwasli@uitm.edu.my

 **Zaidi Wasli**⁵

⁶College of Computing, Informatics and Media, Universiti Teknologi MARA, Carwangan Sarawak, Kota Samarahan 94300, Malaysia.

 **Azlina Bujang**⁶

⁶Email: azlina80@uitm.edu.my



(+ Corresponding author)

ABSTRACT

Article History

Received: 19 May 2023

Revised: 7 July 2023

Accepted: 21 July 2023

Published: 4 August 2023

Keywords

Art practice
Community engagement
Innovative sustainable living
Micro-managing waste
Participatory research
Plastic waste.

This study explores the integration routine of daily lifestyle towards practising and producing artworks by managing plastic waste. With the current option of managing plastic waste, pollution has increased on land and across the sea and air. Plastic waste management is not a new trend, implemented extensively through innovations and technological developments. Artists need to fully grasp the concept and understand their role in this sustainable era globally through the reviewed literature. Every individual must know their responsibility and what they can do to make a change. This study has performed participatory research in one of the villages in Malaysia to test the proposed conceptual framework of the study. The study found that artists and communities can collaborate to play a significant role in micro-managing plastic waste and implicating societal awareness by extracting the aesthetic value of plastic waste art. This study further discussed and concluded that the impact of integrating innovative sustainable living into modern art practice has its purpose in developing the human lifestyle. An advanced conceptual framework on art practice toward innovative sustainable living will be proposed in this study as an extension of the previously reviewed literature.

Contribution/ Originality: This study explores the extension of an art form that contributes to developing and increasing human lifestyle towards the sustainable goal and proposed a suitable framework for artists to develop artwork based on community engagements.

1. INTRODUCTION

Sustainability is not a new topic that has been recently discussed. The topics have become a must in any meeting and policymakers' agenda as part of the discussions. Managing sustainability requires many contributors to ensure that the efforts are worthwhile. The increase in global waste production is a concern that needs to be addressed as it affects both the environment and individuals (Bianchini & Rossi, 2021; Deme et al., 2022; Okareh, Ibadapo, & Lateef, 2018). Understanding the pinning efforts towards a sustainable country is essential for each individual to be responsible for their actions. The role they need to pay attention to will impact the course of action

of the people around them (Gunjan, Bharti, & Sharma, 2021). The variety of waste is limitless as its term was defined from the length of our daily usage to the large production in the industries. Both developing and developed countries have their worries about managing waste. Although they have the same core problems, managing each requires different frameworks, as each country has a different environment, economy, and society (Browning, Beymer-Farris, & Seay, 2021; Gunjan et al., 2021). Many researchers, environmentalists, governments, and NGOs discussed the most crucial issues: increased plastic production and usage pollution. The uncontrolled behaviours of the public have impacted the environment not just in terms of health but also have destitute the livelihood of all human beings, animals, and plants (Browning et al., 2021). It is undeniable that plastics was once a revolutionary innovation in reducing the cost of production, but with the current phenomenon, we also cannot deny the problems that it brought to us in our daily life (Bianchini & Rossi, 2021; Horodytska, Valdés, & Fullana, 2018; Lee et al., 2021). Plastic contains components that would take a long time to decompose and would have taken up much space in our environment. Furthermore, with irresponsible public attitudes, the disposal of plastics was scattered in places that would generally be impossible to be reached. From the highest mountain to the deepest sea, uncontrolled human behaviour has made the environment covered with our littered (Browning et al., 2021; Gunjan et al., 2021; Horodytska et al., 2018; Lee et al., 2021; Napper, Wright, Barrett, Parker-Jurd, & Thompson, 2022).

Managing waste may be profound as it is costly and requires effort as well as time. Besides, operating a sustainable approach, in general, cannot be achieved with little effort from a single entity (Bianchini & Rossi, 2021; Horodytska et al., 2018). It is essential to distinguish and distribute the responsibility of managing plastic waste into macro-management and micro-management. This study will focus on micro-managing plastic waste to integrate it into art practice. The practice of micro-managing plastic waste is an offering of problem-solving propositions toward sustainability (Singh et al., 2017; Siragusa & Arzyutov, 2020).

2. MICRO-MANAGEMENT OF PLASTIC WASTE

Micro-managing plastic waste is considered a small-scale effort by individuals in a community. The contributions of managing waste on this scale are more related to the social responsibility of an individual. Each action taken may not be seen as changing the environment but more focus on creating ripple effects that will inadvertently affect others around them (Evode, Qamar, Bilal, Barceló, & Iqbal, 2021; Siragusa & Arzyutov, 2020). There are several stages in micro-managing plastic waste that individuals can get involved in within their daily life. The first stage is the most common method, 3R (reduce, reuse & recycle). We are aware of our responsibility to integrate the 3R methods into our routine, but it may not be the best option as it can cause several negative effects. Take recycling, for instance; the process in itself may contribute to air pollution through the heating process of thermal waste. Reusing plastic also may not be adequate as plastic has a certain lifespan, while reducing plastic usage may prove fatal as consumers may not be given a better alternative (Evode et al., 2021).

The second stage focuses on the education program centred around creating waste-free generations. Injecting knowledge at the early education stage proves crucial in shaping future generations. Researchers have proven that the higher the education level, the higher the environmental behaviour the public conducts. Education levels are not meant to rely solely on the education institutions. The educations come from many aspects, such as proper parenting, society and community, and ethics as the role model (Cordier, Uehara, Baztan, Jorgensen, & Yan, 2021). The third stage is the innovator and inventor, in which we focus on the concept proposed in this study. Innovations and inventions are part of the norm in a developing country. With insufficient resources, individuals are forced to find alternatives for their daily production that would reduce the cost and usage of materials. Individuals such as academicians, artists, and designers have been actively inventing and innovating, finding the best replacements for conventional materials. The efforts to mitigate resources and adapt new materials constructions into their work procedures have proven vital to the sustainability agenda. Coordinating inventions and innovations may require a

centralised governance structure, which provides a system that controls every input and output. Nonetheless, each individual can be innovative in procuring materials (Fujii & Managi, 2019; Lubango, 2020).

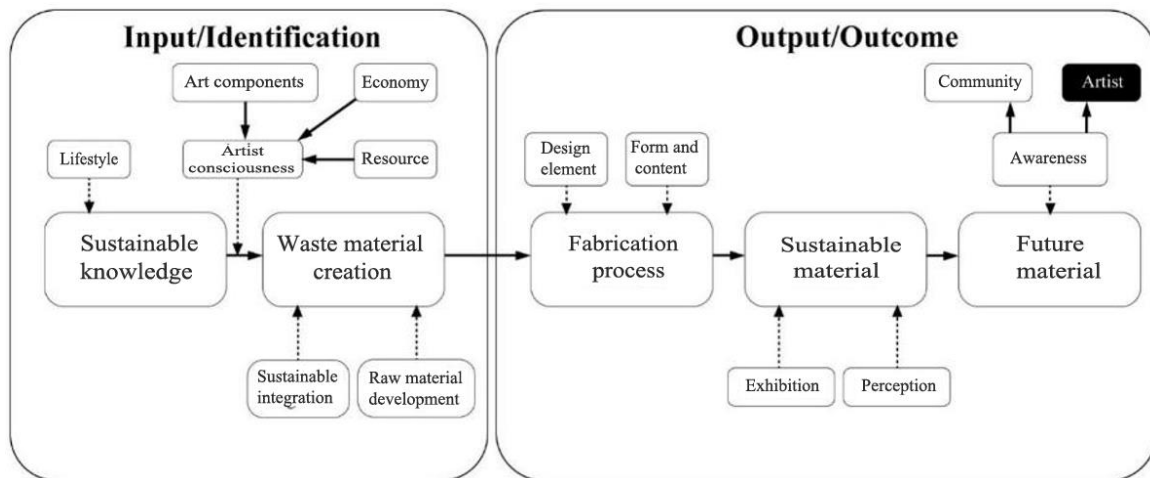


Figure 1. Conceptual framework on art practice towards innovative sustainable living.

Figure 1 demonstrates the conceptual framework for integrating art practice towards creating an innovative outcome from the concept of sustainable living. By obtaining knowledge through experience and life-long learning, individuals have the means to innovate and develop new ways and extended materials that are more suitable in the current global crisis. Through the identification of new developments and ideas, individuals will advance their knowledge of the possibility of fabricating and manipulating waste materials. Thus, the creation of new sustainable materials will become a new possibility for future generations to create awareness both for the artist and the community.

3. ELEMENTS OF SUSTAINABLE ART PRACTICE

3.1. Sustainable Knowledge

Micro-managing waste enables individuals to align their daily routines towards a comprehensive sustainable lifestyle properly. In creating this lifestyle, they must know how to manage it properly. It is a living environment that coexists with our harmonious lifestyle, and the surroundings promote a healthier and sustainable way of life (Cheng, Long, Zhang, & Li, 2021). In terms of knowledge, individuals need to obtain practical and theoretical input to manage plastic waste. Every input that was transferred and adaptability towards changes and creations of new lifestyles that would bring benefits would align with their interest. Creating innovative materials by sustaining the environment is vital to achieving the community's and the artist's objectives (Tadajewski & Hamilton, 2014). Our daily plastic waste production pattern is problematic as we use it without thinking to find the aftermath of our usage. Our responsibility is to determine the action we have taken to manage our plastic usage. One of the methods executed previously by many artists is restructuring plastic waste into compatible materials (Brown, 2013; Llamas-Pacheco, 2021; Tadajewski & Hamilton, 2014). Knowledge through research and development is crucial in determining the exact solutions towards materialising a sustainable material. Extending knowledge would further enable the capabilities of artists, communities, and organisations to expand the probability and opportunity gained from micro-managing plastic waste (Cheng et al., 2021; Cimpan, Maul, Jansen, Pretz, & Wenzel, 2015; Singh et al., 2017).

3.2. Artist Consciousness

Individuals do aware of the sustainable efforts then been made globally. Their consciousness regarding this matter was driven by their impression of what was happening around them. As artists, the increase in materials

costing, a scarce materials shortage, fewer available material choices, and strict regulation of materials procurement has led them to create an alternative that can satiate their aesthetic evaluation of art productions (Andreola, Barbieri, Lancellotti, Leonelli, & Manfredini, 2016; Kumar, 2021). Artists have recently begun investigating how to integrate sustainable practices into their work (Lase et al., 2023; Shrivastava, Ivanaj, & Ivanaj, 2016), reflecting a growing interest in sustainability in the arts. Artists may help the environment by practising waste minimization and material management (Wagner-Lawlor, 2018). According to a recent study, waste reduction and resource conservation can greatly benefit artists who incorporate sustainable practices into their work (Kueffer & Wiedmer, 2022). Artists can help reduce waste by selecting sustainably sourced, repurposed, or biodegradable materials and by finding new uses for old ones. Artists can also help the environment by teaching others about the value of recycling, refurbishing, remodelling, and manipulation (Lase et al., 2023). Inspiring others to take action and lessen their environmental effect is one of the many benefits artists may get by speaking openly about their sustainability practices and adapting them to the community and society (Wagner-Lawlor, 2018). Sustainable practices in the arts have been shown to positively affect trash reduction and material conservation while encouraging an eco-friendlier way of thinking about the creative process to increase economic and environmental performance (Shrivastava et al., 2016).

3.3. Plastic Waste Material Manipulations

There are many possibilities for innovating plastic waste materials. The creativity in experimenting with a new way of processing a waste material to produce a new type of raw material has proven to be a fruitful effort in controlling waste. The natural characteristic of plastic waste in its reshaping capabilities has proven essential for its purpose to be reused as other materials (Nawir & Mansur, 2021). By manipulating low-risk plastic waste, we will be able to ensure that the development of innovative plastic waste is within terms of sustainability. There is much scepticism and extreme thinking about manipulating plastic waste. Reusing the materials does not enable the means to develop materials that will pollute the environment through its processes (Evode et al., 2021). Artists and creative society can ensure that creating artwork will not leave marks on the environment, but further help creates a sustainable lifestyle.

There are many ways to manipulate plastic waste that artists and communities can integrate as part of their lifestyles. The most common practice in managing plastic waste is changing its compositions mechanically. Plastic waste materials are often processed through mechanical recycling, which entails the physical grinding, washing, and sorting of plastics to create pellets, flakes, or fibres. Properties of recycled goods produced through mechanical recycling are susceptible to the type of plastic waste materials employed in the process. For instance, research has shown that impurities in the plastic waste stream, like metals and other materials, can lower the quality and performance of recycled plastics (Benyathiar, Kumar, Carpenter, Brace, & Mishra, 2022). The qualities of recycled goods can be influenced by several factors, including the type of polymer used and the molecular weight distribution in the waste plastic. It shows that the techniques' requirements throughout its process are essential to ensure the manipulation reaches its purposes (Sadat-Shojai & Ghadiri-Ghalenazeri, 2020).

The other method of manipulating plastic waste materials is chemically breaking down the composition to manipulate its shape, function and purpose. Chemical recycling manipulates plastic waste by breaking its polymers into smaller molecules. The efficiency and quality of recovered products can be impacted by the composition of plastic waste materials utilised in chemical recycling. For example, research has shown that the output and quality of recovered goods might vary depending on the type of plastic waste materials used in the recycling process (Ragaert, Delva, & Geem, 2017). Chemical recycling procedures can be hampered by contaminants such as additives and pigments. By controlling the chemical components for the manipulation purpose, the breakdown of the molecules can be controlled to ensure that it would not increase the damage to the materials and environment (Geyer, Jambeck, & Law, 2017).

Upcycling plastic waste material into more valuable goods is a modern approach to dealing with this type of waste. Upcycled items' qualities can be profoundly influenced by the type of plastic waste materials utilized in the process. For instance, research has shown that the qualities of the end products, such as tensile strength, thermal stability, and water resistance, can be affected by the type of plastic waste materials used in upcycling (Balu, Dutta, & Roy Choudhury, 2022). Finally, the composition of plastic waste materials is crucial in their transformation into various pellets, fibres, films, and sheets. The plastic waste materials' composition might impact the recycled or upcycled product's quality, efficiency, and performance. To effectively and sustainably manage plastic waste, it is crucial first to comprehend the ingredients that make up this waste.

In conclusion, plastic waste materials' characteristics and recycling viability heavily depend on their composition. The recycling industry and the creation of new items manufactured from recycled plastics could benefit from a better understanding of plastic waste's composition.

3.4. Fabrication Process

Fabricating waste materials requires several dedicated stages where each part contributes toward developing sustainable materials. Artists must go through waste selections, Research & Development, Implementation, and Evaluations (Okareh et al., 2018). Efforts must align with the main objectives; as artists, creating artwork needs to bring back the fundamental of art: Elements, Forms, and Contents. Fabricating sustainable materials needs to be able to define the actual purpose of creating artwork. Regrettably, not all plastic waste can be fabricated, as the materials are made of unsustainable resources. The form and content need to be considered as the aspects rely on the purpose of the artwork's creation. The selection process will define the perspective of design elements that have been implemented during the construction of the design (Audy, Enfrin, Boom, & Giustozzi, 2022). Artists need to consider the possibility of the hazardous impact of their artworks on the environment. Each material fabrication process must go through the Research & Development process to maximize the artwork's output. Thermoforming is a typical method of fabrication of plastic production. It is a plastic moulding process that uses heat to soften the plastic into the desired shape. Preparing a mould to manipulate the softened plastic waste materials is then remodelled to its new shape according to the individual's desired compositions. Three-dimensional works like sculptures and installations are frequently made using plastic fabrication. Plastics provide artists with a wide range of possibilities for form and texture that are unavailable in more conventional mediums such as stone or wood. Even more importantly, plastic fabrication increased durability and portability for outdoor installations and public art projects. Plastic fabrication is based on the idea that the qualities of plastic materials can be used to produce works of art that go beyond the capabilities of more traditional forms of sculpture (ARTSWA, 2014).

3.5. Material Output for Exhibition

Creating fabricated waste materials suitable for artworks to be exhibited requires much attention toward its physical performance capabilities considering its safety measure towards the people and viewers. The viewers' perspective emerges whenever waste materials are exhibited in terms of their credibility, value, strength, weakness, and impact. The public's reaction to artwork made from plastic waste is a complicated phenomenon that depends on a wide range of variables, including individual beliefs, cultural norms, and the social setting in which the work is displayed through its location, characteristics, and objectives (Dümen, Koyaz, & Çeliker-Cenger, 2022). Considering all the mentioned aspects of waste materials, it can both bring in visitors and, at the same time, keep them away. It is a double-edged sword that needs to be aware of by the artist performing/conducting the exhibitions. The probability for the visitors to pay extra for the endeavour is higher as their perspective toward the artist's efforts to make a change for a better future. Art audiences are important shareholders in the creative industry. How far is the audience's awareness of sustainability and efforts in providing solutions? They may have a strong relationship with their willingness to participate in exhibitions that incline toward sustainability (Li, Su, & Du, 2021).

In recent years, the public's perspective on artwork made from plastic waste has become an increasingly arguable topic academically and practically. Some perceive this type of art as a way to bring forth awareness to the problem of plastic waste materials and its effect on the environment, while others see it as a way to glorify a harmful material unrelated to any other circumstances. The selection of appropriate materials for plastic waste and how it has been repurposed through the manipulation and fabrication process has a critical perspective unrepentant to the efforts to ensure acceptance among the public and art viewers (Asamoah, Adom, Kquofi, & Nyadu-Addo, 2022).

4. METHODS AND METHODOLOGY

This study integrates participatory research in executing the concept of plastic waste micro-management in the scope of the art application for community development. Participatory Research is a methodology in which researchers, community members, stakeholders, or participants work together. Knowledge creation, social transformation, and community empowerment are all participatory research aims (French & Curd, 2022).

Community members or participants in participatory research are not only the subjects of study but are instead engaged in every step of the process, from the drafting of the research through the distribution and collection of the findings. The research emphasises community knowledge, expertise, and views in analysing and resolving complex societal problems. Additionally, this study aims to strengthen relationships of trust, appreciation, and cooperation between researchers and participants (French & Curd, 2022).



Figure 2. The local maps of village a situation.

This study selected a rural village in Malaysia as part of the participatory elements based on location and situation. Figure 2 illustrates the location of Village A and its water flow on the map that shows the crucial situation of the local community. Village A was selected as it is situated at a point bar of a thalweg of a heavy, connected river flow. Excess from other villagers from the upper stream has made 'Village A' a location to trap trash and garbage. Thus, many waste materials have flowed into the village to create a thrash location site on the village's shore. The village was founded in the 1960s and allocated around 38 houses. The village has expanded and allocated around 300 houses accommodating more than 1000 villagers. As the village is located in the outback, their locals would journey outside to conduct economic affairs.

As the situation worsens, we have concluded that a solution needs to be adjusted according to the situation. A collaboration between artists and local communities has led to the co-creation of artworks as part of the solution to

this problem. The locals were gathered, and a program funded by the local government created an opportunity for the village to explore new ways of lifestyle through the collection of trash that would be part of the economic prospect.

The locals were gathered to extract the waste material that could be the new prospect of economic factors. Plastic waste was one of the most important and valuable materials mentioned in this study. Figure 3-5 shows the local endeavour to collect all the waste materials trapped within the villages as part of the program.



Figure 3. Local community gathered collecting waste materials.



Figure 4. Local community gathered collecting waste materials.



Figure 5. Local community gathered collecting waste materials.

The process to accommodate both community and artist according to the concept of micro-managing the plastic waste was divided into several phases, as described and explained in a flowchart shown in Figure 6. The first

step in the process requires experts from the perspective of artists and academicians to create a knowledge transfer to the community as part of their lifelong learning. The knowledge transfer was focused on plastic waste management that can be developed into art products as part of the increment for the community's economic performance. The community was explained regarding types and categories of potential plastic waste and further elaborated on how to manipulate and fabricate the materials. Once the community was enlightened, they started collecting and separating all the plastic waste materials around the village and placed them in a space provided, as shown in Figure 7.

This study has engaged the village youth as part of the main task force in this participatory research. As part of the lifelong learning process, youth tends to be the best community group to integrate any sustainable approach to ensure that the concepts remain part of the future generation's lifestyle. After the program, the community started to manipulate the collected plastic waste to be fabricated into several products. The outcome of the fabrication process was then part of the economic process to be exposed to the public, as shown in Figure 8.

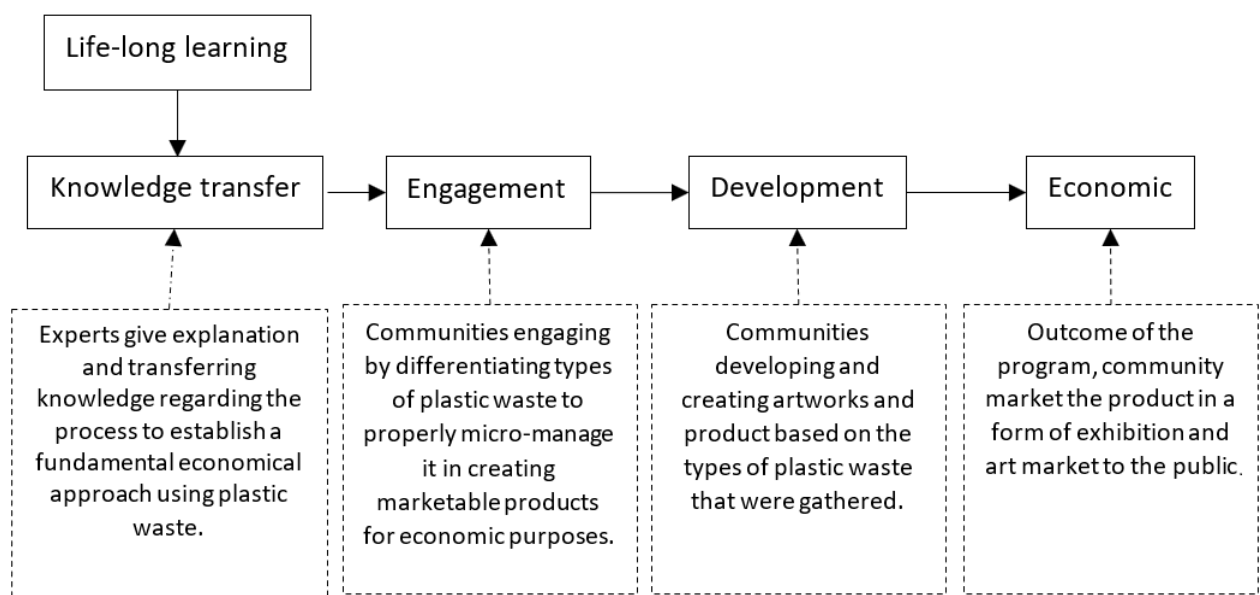


Figure 6. Community engagement with plastic waste micro-management.



Figure 7. Plastic waste collection process.



Figure 8. Public exposure to plastic waste products.

5. DISCUSSION

All industry drivers must be able to adapt to every change and requirement meant to achieve a better lifestyle. The movement of the economy needs to be able to cater for the possibility that it can be sustained for future generations. Whether from the perspective of value increase or leisure lifestyle development, every person is needed to perform the necessary for it to be achieved (Li et al., 2021). Artists have the capabilities not only to provide solutions as part of the community but provide awareness altogether. It falls under their responsibility to implement sustainability into their artworks or be ignorant of their capabilities. As innovation and creativity move together, it is accepted that each solution provided by the creation of artworks is meant to be able to execute the necessity for the future generation. The sustainability aspect is an idea that can be developed toward constructing artworks that can provide a better environment for the surroundings. Once an artist has put that particular idea and consciousness within themselves regarding sustainability, they unconsciously perform every bit of the artwork development toward the goals of sustainable output (Andreola et al., 2016) whether in terms of its function, materials, or awareness, its sole purpose would be to create a better future.

As the economic driver in the creative industry, it is expected for every artist to ignore environmental degradation, insufficient resources, and pollution. The hardship of acquiring suitable materials with the price increase, unavailability, and limitation proves to be a barrier to developing and producing artwork in the current market (Audy et al., 2022). To some extent, peer, public, and government pressure on sustainable policy has impacted artists' consciousness to perform sustainability—the first aspect of the artwork creation objectives led to the idea of integrating sustainability options. Curators, galleries, and event organizers can set the first stone by calling out for artwork toward achieving environmental goals. In itself, have input consciousness among artists to integrate sustainability in their artworks. Through the objective of the events, the artist will further construct ideas and implementation of sustainability to cater to its requirement, either towards functions, materials, or techniques. Each innovative aspect of the creation would subconsciously develop artists understanding regarding their role in proposing sustainable artwork.

The role of artists is not only to inspire aesthetic value in the audience, but it is also their role to entangle the role of artwork to create understanding regarding their responsibility towards humans and the environment, thus, creating a sustainable lifestyle. With the current environmental issues, artists no longer stay in their circle. The engagement with their surrounding has given birth to a new understanding of arts and their purpose to provide increment on the performance of others around them. The role of an artist is no longer in the perspective of individuality but are now open to new value involving the community and society. The definition of aesthetical

value and its function towards community development has become essential parts of the life cycle regarding humanity's progress. Youth involvement in this project has shown that opportunity, and life-long learning is crucial in developing a community. The involvement of many parts of society is crucial in providing the element of progress towards a subtle improvement of the way of life. It is part of where any individual with the credibility to enhance others may contribute to society and the community.

6. CONCLUSION

The shift of every role in human lifestyle has created the tendency to create a better environment for safer and healthier living. Each decision and the attitude shown by each individual has created ripple effects that can lead toward a much brighter future of a responsible community and culture. Micro-managing waste materials may seem small when conducted by a single artist by implementing it in artworks, but it has developed consciousness among the society and community in their perspective regarding the aesthetical value of performing micro-managing waste. As for the role of picking up trash and recycling, society may be seen the beauty of each decision they make to perform sustainable efforts. It proves that the indicators toward art integration of sustainable output are important factors towards a better, sustainable lifestyle. The art aspect creates a new definition as its purpose has shifted towards developing society, the environment, and the economy. The role of an artist has expanded to a new spectrum, which led to a more noble act as its function towards the development of others. The essence of art development sparks interest as it embarks on society's perspective instead of solely depending on the artist's movement and ideations.

From the perspective of the life cycle of communities, the role of art has developed a sense of relationship with their environment. Communities engage in the issues that affect their lifestyle and progress towards the proper solutions that help to solve their everyday problems. Arts have become one of the solutions that can increase their livelihood to ensure it can sustain future generations. The opportunity through life-long learning can provide an alternative to sustaining the communities to generate income to increase economic, social, and environmental performance.

Funding: This research is supported by the National Art Gallery, Malaysia; Universiti Teknologi MARA, Cawangan Sarawak; and Universiti Teknologi MARA, Malaysia, for supporting the project Bin 1.0, a community project development through the arts (Grant number: CE/2022/01479).

Institutional Review Board Statement: The Ethical Committee of the National Visual Arts Development Board, Malaysia has granted approval for this study on 30 August 2021 (Ref. No. BSVN/PP/400-03/07 JILID 2).

Transparency: The authors state that the manuscript is honest, truthful, and transparent, that no key aspects of the investigation have been omitted, and that any differences from the study as planned have been clarified. This study followed all writing ethics.

Data Availability Statement: The corresponding author may provide study data upon reasonable request.

Competing Interests: The authors declare that they have no competing interests.

Authors' Contributions: All authors contributed equally to the conception and design of the study. All authors have read and agreed to the published version of the manuscript.

Acknowledgement: The researcher acknowledges the Community of the involved village, the National Art Gallery, Malaysia; the Universiti Teknologi MARA, Cawangan Sarawak; and the Universiti Teknologi MARA, Malaysia.

REFERENCES

- Andreola, F., Barbieri, L., Lancellotti, I., Leonelli, C., & Manfredini, T. (2016). Recycling of industrial waste in ceramic manufacturing: State of art and glass case studies. *Ceramic International*, 42(12), 13333-13338. <https://doi.org/10.1016/j.ceramint.2016.05.205>
- ARTSWA. (2014). Materials and fabrication handbook. In (pp. 57-59). USA: Washington State Arts Commission.
- Asamoah, S. P., Adom, D., Kquofi, S., & Nyadu-Addo, R. (2022). Recycled art from plastic waste for environmental sustainability and aesthetics in Ghana. *Research Journal in Advanced Humanities*, 3(3), 29-58. <https://doi.org/10.58256/rjah.v3i3.872>

- Audy, R., Enfrin, M., Boom, Y. J., & Giustozzi, F. (2022). Selection of recycled waste plastic for incorporation in sustainable asphalt pavements: A novel multi-criteria screening tool based on 31 sources of plastic. *Science of the Total Environment*, 829, 154604. <https://doi.org/10.1016/j.scitotenv.2022.154604>
- Balu, R., Dutta, N. K., & Roy Choudhury, N. (2022). Plastic waste upcycling: A sustainable solution for waste management, product development, and circular economy. *Polymers*, 14(22), 1-23. <https://doi.org/10.3390/polym14224788>
- Benyathiar, P., Kumar, P., Carpenter, G., Brace, J., & Mishra, D. K. (2022). Polyethylene terephthalate (PET) bottle-to-bottle recycling for the beverage industry: A review. *Polymers*, 14(12), 1-29. <https://doi.org/10.3390/polym14122366>
- Bianchini, A., & Rossi, J. (2021). Design, implementation and assessment of a more sustainable model to manage plastic waste at sport events. *Journal of Cleaner Production*, 281, 125345. <https://doi.org/10.1016/j.jclepro.2020.125345>
- Brown, K. (2013). Undoing urban modernity: Contemporary art's confrontation with waste. *European Journal of Cultural Studies*, 16(6), 678-691. <https://doi.org/10.1177/1367549413497693>
- Browning, S., Beymer-Farris, B., & Seay, J. R. (2021). Addressing the challenges associated with plastic waste disposal and management in developing countries. *Current Opinion in Chemical Engineering*, 32, 100682. <https://doi.org/10.1016/j.coche.2021.100682>
- Cheng, X., Long, R., Zhang, L., & Li, W. (2021). Unpacking the experienced utility of sustainable lifestyle guiding policies: A new structure and model. *Sustainable Production and Consumption*, 27, 486-495. <https://doi.org/10.1016/j.spc.2021.01.020>
- Cimpan, C., Maul, A., Jansen, M., Pretz, T., & Wenzel, H. (2015). Central sorting and recovery of MSW recyclable materials: A review of technological state-of-the-art, cases, practice and implications for materials recycling. *Journal of Environmental Management*, 156, 181-199. <https://doi.org/10.1016/j.jenvman.2015.03.025>
- Cordier, M., Uehara, T., Baztan, J., Jorgensen, B., & Yan, H. (2021). Plastic pollution and economic growth: The influence of corruption and lack of education. *Ecological Economics*, 182, 106930. <https://doi.org/10.1016/j.ecolecon.2020.106930>
- Deme, G. G., Ewusi-Mensah, D., Olagbaju, O. A., Okeke, E. S., Okoye, C. O., Odii, E. C., . . . Oderinde, O. K. (2022). Macro problems from microplastics: Toward a sustainable policy framework for managing microplastic waste in Africa. *Science of the Total Environment*, 804, 150170. <https://doi.org/10.1016/j.scitotenv.2021.150170>
- Dümen, A., Koyaz, M., & Çeliker-Cenger, Y. (2022). Unfolding the material: A proposal of a multi-sensory experience oriented material exhibition medium. *Materials & Design*, 219, 110740. <https://doi.org/10.1016/j.matdes.2022.110740>
- Evode, N., Qamar, S. A., Bilal, M., Barceló, D., & Iqbal, H. M. (2021). Plastic waste and its management strategies for environmental sustainability. *Case Studies in Chemical and Environmental Engineering*, 4, 100142. <https://doi.org/10.1016/j.cscee.2021.100142>
- French, J., & Curd, E. (2022). Zining as artful method: Facilitating zines as participatory action research within art museums. *Action Research*, 20(1), 77-95. <https://doi.org/10.1177/14767503211037104>
- Fujii, H., & Managi, S. (2019). Decomposition analysis of sustainable green technology inventions in China. *Technological Forecasting and Social Change*, 139, 10-16. <https://doi.org/10.1016/j.techfore.2018.11.013>
- Geyer, R., Jambeck, J. R., & Law, K. L. (2017). Production, use, and fate of all plastics ever made. *Science Advances*, 3(7), e1700782. <https://doi.org/10.1126/sciadv.1700782>
- Gunjan, Bharti, R., & Sharma, R. (2021). Analysis of plastic waste management: Utilization, issues & solutions. *Materials Today: Proceedings*, 45, 3625-3632. <https://doi.org/10.1016/j.matpr.2020.12.1151>
- Horodytska, O., Valdés, F. J., & Fullana, A. (2018). Plastic flexible films waste management—A state of art review. *Waste Management*, 77, 413-425. <https://doi.org/10.1016/j.wasman.2018.04.023>
- Kueffer, C., & Wiedmer, C. (2022). Upscaling research and teaching on the Sustainable Development Goals in the arts, humanities, and social sciences. *GALA-Ecological Perspectives for Science and Society*, 31(1), 57-59. <https://doi.org/10.14512/gaia.31.1.14>
- Kumar, R. (2021). Tertiary and quaternary recycling of thermoplastics by additive manufacturing approach for thermal sustainability. *Materials Today: Proceedings*, 37, 2382-2386. <https://doi.org/10.1016/j.matpr.2020.08.183>

- Lase, I. S., Tonini, D., Caro, D., Albizzati, P. F., Cristóbal, J., Roosen, M., . . . Dewulf, J. (2023). How much can chemical recycling contribute to plastic waste recycling in Europe? An assessment using material flow analysis modeling. *Resources, Conservation and Recycling*, 192, 106916. <https://doi.org/10.1016/j.resconrec.2023.106916>
- Lee, M.-Y., Cho, N.-H., Lee, S.-J., Um, N., Jeon, T.-W., & Kang, Y.-Y. (2021). Application of material flow analysis for plastic waste management in the Republic of Korea. *Journal of Environmental Management*, 299, 113625. <https://doi.org/10.1016/j.jenvman.2021.113625>
- Li, X., Su, X., & Du, Y. (2021). The environmental sustainability of an exhibition in visitors' eyes: Scale development and validation. *Journal of Hospitality and Tourism Management*, 46, 172-182. <https://doi.org/10.1016/j.jhtm.2020.12.006>
- Llamas-Pacheco, R. (2021). A theoretical comparison between the restoration of two contemporary works of art made of plastic. *Journal of Cultural Heritage*, 51, 132-137. <https://doi.org/10.1016/j.culher.2021.07.007>
- Lubango, L. M. (2020). Effects of international co-inventor networks on green inventions in Brazil, India and South Africa. *Journal of Cleaner Production*, 244, 118791. <https://doi.org/10.1016/j.jclepro.2019.118791>
- Napper, I. E., Wright, L. S., Barrett, A. C., Parker-Jurd, F. N., & Thompson, R. C. (2022). Potential microplastic release from the maritime industry: Abrasion of rope. *Science of The Total Environment*, 804, 150155. <https://doi.org/10.1016/j.scitotenv.2021.150155>
- Nawir, D., & Mansur, A. Z. (2021). The impact of HDPE plastic seeds on the performance of asphalt mixtures. *Civil Engineering Journal*, 7(9), 1569-1581. <https://doi.org/10.28991/cej-2021-03091744>
- Okareh, O., Ibidapo, T., & Lateef, S. (2018). Design and fabrication of an eco-friendly waste bin for household solid waste segregation, storage and composting. *International Journal of Scientific & Technology Research*, 7(9), 20-26.
- Ragaert, K., Delva, L., & Geem, K. (2017). Mechanical and chemical recycling of solid plastic waste. *Waste Management*, 69, 24-58. <https://doi.org/10.1016/j.wasman.2017.07.044>
- Sadat-Shojai, M., & Ghadiri-Ghalenazeri, S. (2020). A modular strategy for fabrication of responsive nanocomposites using functionalized oligocaprolactones and hydroxyapatite nanoparticles. *New Journal of Chemistry*, 44(46), 20155-20166. <https://doi.org/10.1039/D0NJ03453C>
- Shrivastava, P., Ivanaj, S., & Ivanaj, V. (2016). Strategic technological innovation for sustainable development. *International Journal of Technology Management*, 70(1), 76-107. <https://doi.org/10.1504/ijtm.2016.074672>
- Singh, N., Hui, D., Singh, R., Ahuja, I., Feo, L., & Fraternali, F. (2017). Recycling of plastic solid waste: A state of art review and future applications. *Composites Part B: Engineering*, 115, 409-422. <https://doi.org/10.1016/j.compositesb.2016.09.013>
- Siragusa, L., & Arzyutov, D. (2020). Nothing goes to waste: Sustainable practices of re-use among indigenous groups in the Russian North. *Current Opinion in Environmental Sustainability*, 43, 41-48. <https://doi.org/10.1016/j.cosust.2020.02.001>
- Tadajewski, M., & Hamilton, K. (2014). Waste, art, and social change: Transformative consumer research outside of the academy? *Journal of Macromarketing*, 34(1), 80-86. <https://doi.org/10.1177/0276146713509631>
- Wagner-Lawlor, J. (2018). Poor theory and the art of plastic pollution in Nigeria: Relational aesthetics, human ecology, and “good housekeeping”. *Social Dynamics*, 44(2), 198-220. <https://doi.org/10.1080/02533952.2018.1481685>

Views and opinions expressed in this article are the views and opinions of the author(s), International Journal of Asian Social Science shall not be responsible or answerable for any loss, damage or liability etc. caused in relation to/arising out of the use of the content.