

Community Readiness for Plastic Waste Reduction Through Recycled Craft-Making: A Case Study in Parit Jelutong, Batu Pahat, Johor

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Abstract

Plastic waste management remains a critical environmental challenge in Malaysia due to increasing plastic consumption, rising waste generation, and limited sustained public participation in sustainable practices. This study examines community readiness for plastic waste reduction through recycled craft-making activities as a practical, community-based approach in Parit Jelutong, Batu Pahat, Johor. A recycled plastic craft-making demonstration programme was conducted to provide hands-on exposure, followed by a questionnaire survey involving students, teachers, and members of the Parent-Teacher Association. A quantitative approach was adopted, and the data were analysed using descriptive analysis, reliability test, and the Mann-Whitney U test to examine differences in awareness based on respondents' demographic characteristics and programme participation. The results indicate that respondents generally demonstrated positive perceptions towards recycled craft-making activities, particularly in relation to plastic waste reduction and potential economic value. However, the analysis revealed no significant differences, $p > 0.05$ in awareness levels based on respondents' status, gender, or attendance at the demonstration programme. Feedback from respondents showed strong support for expanding recycled craft-making initiatives to a wider community, although willingness to invest financially in recycled products or paid training programmes remained moderate. Overall, the findings suggest that while recycled craft-making activities are well accepted, sustained engagement and continuous practical exposure are essential to strengthen long-term awareness and promote behavioural change in plastic waste management.

1. Introduction

Plastic waste has become a critical environmental issue worldwide due to the rapid increase in plastic production, the extensive reliance on single-use plastics, and ineffective waste management practices [1][2]. In Malaysia, this problem is particularly pronounced, with more than 40,000 tonnes of solid waste generated daily, of which plastics constitute a substantial proportion of household waste streams [3][4]. Despite the implementation of recycling initiatives, separation-at-source policies, and national strategies such as the

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Malaysia Roadmap Towards Zero Single-Use Plastics 2018–2030 [5], recycling rates and sustained pro-environmental behaviour remain moderate, indicating a gap between awareness and actual practice. Previous studies have shown that awareness alone is insufficient to drive behavioural change, as practical knowledge and direct engagement play a more significant role in shaping sustainable waste management behaviours [6][7][8]. Research further highlights that hands-on, experiential learning approaches, such as community-based recycling and reuse activities, are more effective in enhancing environmental attitudes and behavioural intentions compared to purely theoretical programmes [9][10]. However, limited studies have specifically examined recycled craft-making as a structured, community-based intervention for reducing plastic waste in Malaysia. Accordingly, this study investigates whether recycled plastic craft-making activities can enhance community readiness, awareness, and behavioural intentions toward sustainable plastic waste management. Specifically, the study aims to assess existing awareness and practices related to plastic waste reduction, examine the feasibility of recycled craft-making as a practical approach to waste reduction, and evaluate community acceptance and willingness to integrate craft-making into sustainable 3R practices in Parit Jelutong, Batu Pahat, Johor.

2. Literature Review

Over the years, numerous studies have been conducted worldwide on waste management behaviour and the role of practical knowledge in shaping sustainable practices. Previous research has identified several factors that influence whether individuals adopt responsible waste management behaviours and engage in 3R practices in their daily lives. The key factors include: (i) socio-demographic characteristics, (ii) awareness and behaviour, and (iii) key predictors of 3R engagement. These factors are discussed further in the following sub-sections.

2.1 Socio-Demographic Characteristics

Socio-demographic characteristics are widely recognised as key factors influencing waste management behaviour and the application of practical knowledge in daily life. Attributes such as age, gender, educational level, household income, and residential background affect environmental awareness, access to information, and opportunities for hands-on engagement, thereby shaping individuals' participation in recycling, waste segregation, and other sustainable waste management practices.

Previous studies have shown that educational level and income strongly influence recycling behaviour [11], while age and gender also play important roles, with older individuals and females generally demonstrating higher environmental responsibility [12]. In Malaysia, waste separation practices are influenced by educational level and type of residence [13]. Exposure to environmental education or community-based recycling programmes has been found to increase waste segregation, regardless of income [14].

2.2 Awareness and Knowledge

Awareness is crucial for understanding the environmental impacts of plastic waste and shaping individuals' responses to it. In Watamu Ward, Kenya, most households disposed of plastic through dumping or burning; however, many also reused plastic containers, indicating that awareness can promote practical behaviours such as reuse, which could be extended into more structured recycling programmes [7].

However, awareness alone does not necessarily lead to consistent action. Malaysian students demonstrated good knowledge of the 3R (Reduce, Reuse, Recycle) principles, but rarely applied them in practice due to limited facilities and low community involvement, highlighting the gap between knowledge and action [8]. Education and hands-on experience can bridge this gap, as students' understanding, attitudes, and intended behaviours improved their readiness to adopt sustainable plastic waste management practices [6].

2.3 Key Predictors of 3R Engagement

Several studies have identified key factors that influence engagement in 3R (Reduce, Reuse, Recycle) practices by shaping waste management behaviour and the application of practical knowledge in daily life. Positive attitudes towards recycling, combined with access to recycling infrastructure, strongly predict household recycling behaviour, indicating that knowledge alone is insufficient without supportive conditions [15].

Evidence from developing countries also highlights the importance of practical knowledge in translating intention into action. The convenience and availability of waste separation facilities influence the link between awareness and actual behaviour, meaning that even knowledgeable individuals may exhibit low 3R engagement without adequate infrastructure [14]. Studies on plastic waste further show that positive attitudes, social norms, perceived behavioural control, and habitual behaviours significantly affect engagement in reducing, reusing, and recycling plastics [16]. These findings underscore that 3R practices depend on the interaction of awareness, practical knowledge, habits, and environmental support systems.

3. Methodology

This study was conducted in Parit Jelutong, Batu Pahat, Johor, a semi-rural community actively engaged in local environmental initiatives. Sekolah Kebangsaan Jelutong (SK Jelutong) was selected as the study site due to its established environmental programmes and its role as a community focal point. The respondents included students, teachers, and members of the school's Parent-Teacher Association (PTA), representing key influencers of household and community waste management practices.

In this study, a structured questionnaire was employed to assess participants' knowledge, attitudes, and practices (KAP) regarding plastic waste management. Section A collected demographic information, Section B measured awareness, behaviours, and attitudes towards plastic recycling, and Section C evaluated participants' feedback on the programme's effectiveness and craft-making activities. The questionnaire was administered in Bahasa Malaysia following the demonstration programme to assess its impact on participants' understanding, recycling practices, and continued engagement in sustainable waste management.

The data collection is carried out in three main stages: pre-implementation, implementation, and post-implementation. The pre-implementation stage focused on capacity building and preparation, beginning with a Training-of-Trainers (ToT) session that equipped the researcher with knowledge on environmental sustainability, recycled craft-making techniques, and facilitation skills, followed by engagement with the headmaster of SK Jelutong and the Parent-Teacher Association to align objectives, arrange logistics, recruit a representative sample of 100 participants, and involve the community in collecting recyclable materials. The implementation stage involved the direct delivery of the program through live recycled craft-making demonstrations supported by trained facilitators, distribution of supplementary learning resources, and continuous monitoring via online platforms and physical visits to reinforce learning, provide guidance, and encourage sustained practice among participants. Finally, the post-implementation stage emphasized evaluation and reflection, where participants completed survey questionnaires to assess changes in knowledge, attitudes, and behaviours related to plastic waste management, with systematic follow-ups conducted to ensure a high response rate and reliable data for measuring the overall effectiveness of the community-based environmental education initiative.

4. Results and Discussion

The data were analysed using SPSS, employing descriptive statistical techniques, mean score analysis, and the Mann-Whitney U test. This combination of methods provided a systematic and reliable approach for examining respondents' characteristics, awareness levels, and differences between groups. Such an analytical approach enhances the robustness of the findings and offers a reference for similar community-based environmental initiatives.

4.1 Background of Respondents

This study collected responses from 70 participants. Although there is no established guideline for determining an ideal sample size [17], a minimum of 40 respondents is generally considered adequate to represent population behaviour [18]. Therefore, the sample size in this study is deemed sufficient for statistical analysis.

Respondents were asked to provide their demographic details, including age, gender, employment status, household size, and participation in the demonstration programme. The findings are presented in Table 1.

Table 1: Demographic profile of respondents (n=70)

Item		Frequency (n)	Percentage (%)
Are you a school student?	Yes	49	70
	No	21	30
Employment status	Unemployed / Retired	11	15.7
	Homemaker	2	2.9
	Government sector	5	7.1
	Self-employed	3	4.3
Age	Below 30 years old	53	75.7
	31-40 years old	3	4.3
	41-50 years old	4	5.7
	51-60 years old	2	2.9
	61 years old and above	8	11.4
Gender	Male	28	40.0
	Female	42	60.0
Household size	Below 3 members	11	15.7

	3-5 members	34	48.6
	6-8 members	24	34.3
	9-10 members	1	1.4
Did you attend the demonstration programme?	Yes	36	51.4
	No	34	48.6

Overall, Table 1 summarises the demographic profile of the respondents involved in this study. A total of 70 respondents participated, comprising students, teachers, and members of the Parent-Teacher Association (PTA) at SK Jelotong. The sample included both male ($n = 28$) and female ($n = 42$) respondents, with representation across different age groups, predominantly school-age students and adults. In terms of educational background, the majority of respondents had attained primary and secondary education, which was appropriate for participation in awareness-based and practical recycling activities. Regarding programme involvement, 36 respondents attended the recycled craft-making demonstration programme, while 34 did not.

4.2 Awareness Level on Waste Management and 3R Behaviour

In assessing awareness levels, 10 statements were prepared to examine respondents' understanding of plastic-related issues. The overall results are presented in Table 2.

Table 2: Descriptive statistics of respondents' awareness levels on waste management and 3R behaviour.

Statement	N	Minimum	Maximum	Mean	Std. Deviation
I believe that turning plastic waste into craft products can generate side income.	70	2	5	4.14	.728
I will invite people around me to attend training and recycling craft workshops as an effort to preserve the environment and generate additional income.	70	1	5	4.01	.825
I am willing to pay for products made from waste materials if they are of good quality.	70	1	5	3.41	.925
I believe that society still lacks exposure to the potential of plastic waste in the productions of craft products.	70	1	5	3.96	.882
I believe that training and workshops on recycled crafts should be made available to all levels of society.	70	3	5	4.30	.709
I am convinced that recycling craft training and workshops can help reduce the problems associated with plastic waste generation.	70	1	5	4.20	.809
I am willing to participate in recycling craft training and workshops if a reasonable fee is charged.	70	1	5	3.49	.913
I believe that recycling plastic waste into craft products is a challenging task.	70	1	5	3.36	.948
I think that unplanned plastic waste management does not harm the environment and	70	1	5	3.47	1.402

human health.					
I think that recycling craft training and activities are a waste of time and provide no benefit.	70	2	5	4.57	.650

In general, the mean scores presented in Table 2 were used to interpret respondents' perceptions in this study. The mean values ranged from 3.36 to 4.57, indicating a generally high level of positive perception. The statement "Training and recycling craft workshops should be expanded to all levels of society" recorded the highest mean score ($M = 4.30$), reflecting strong support for wider implementation. Respondents also agreed that converting plastic waste into craft products can generate additional income ($M = 4.14$) and that such training workshops can help reduce plastic waste-related problems ($M = 4.20$). Moderate agreement was observed for willingness to purchase recycled products ($M = 3.41$) and willingness to pay for training fees ($M = 3.49$), suggesting lower financial readiness compared to other aspects. For negatively worded items that were reverse-coded, the mean scores indicate general disagreement with negative perceptions, such as the views that recycling craft activities are difficult (reversed $M = 3.36$) or a waste of time (reversed $M = 4.57$). Overall, the results demonstrate positive and supportive attitudes towards recycling-related activities.

A reliability test was also conducted in SPSS to assess the consistency of the questionnaire items. Reliability ensures that the instrument produces stable results when measuring the same concept. Cronbach's Alpha is commonly used, with higher values indicating stronger consistency among items [19]. The 10-item scale yielded a Cronbach's Alpha of 0.646, indicating moderate internal consistency and suggesting that the items reliably measure the intended construct, although further refinement may be warranted.

4.3 Comparisons Between Respondents' Background and Awareness Level of Plastic Waste Management

The Mann-Whitney U test, a non-parametric statistical method suitable for comparing two independent groups with ordinal or non-normally distributed data [20], was employed to examine differences in awareness levels of plastic waste management among respondents. Statistical significance was determined at a p-value threshold of 0.05 [21]. This analysis was conducted to assess whether respondents' background characteristics affected their awareness levels, with the results of the comparison presented in Table 3.

Table 3: Comparison of awareness level by respondents' status using the Mann-Whitney U Test

Grouping variable	Ranks			
	Mean likert scale awareness			
		N	Mean Rank	Sum of Ranks
Are you a school student?	Yes	49	32.94	1614.00
	No	21	41.48	871.00
Test Statistics				
	Mean likert scale awareness			
Mann-Whitney U	389.000			
Wilcoxon W	1614.000			
Z	-1.615			
Asymp. Sig. (2-tailed)	0.106			

The finding indicates that respondents' status as school or non-school participants did not significantly influence their level of awareness of plastic waste management, as the observed difference was not statistically significant ($p = 0.106$). This finding contradicts previous research, which reported significant variations in environmental knowledge based on socio-demographic factors such as age and education level [22]. The discrepancy may be attributed to differences in study context, sample composition, or the nature of the intervention employed, particularly the emphasis on hands-on, community-based activities in the present study.

Based on the statistical analysis presented in Table 4, gender was not found to be a determining factor in respondents' awareness of plastic waste management ($p = 0.241$). This finding aligns with previous research, which reported no significant gender differences in recycling intentions [23].

Table 4: Comparison of awareness level by respondents' gender using the Mann-Whitney U Test

Grouping variable	Ranks			
	Mean likert scale awareness			
		N	Mean Rank	Sum of Ranks

Gender	Male	28	32.02	896.50
	Female	42	37.82	1588.50
Test Statistics				
	Mean likert scale awareness			
Mann-Whitney U	490.500			
Wilcoxon W	896.500			
Z	-1.174			
Asymp. Sig. (2-tailed)	0.241			

Table 5 shows that attendance at the demonstration programme did not significantly influence respondents' awareness of plastic waste management, as no statistically significant difference was observed between participants and non-participants ($p = 0.671$). This finding aligns with previous research, which suggests that participation in a single environmental programme may not necessarily lead to substantial improvements in awareness, due to the influence of pre-existing attitudes, prior knowledge, and personal experiences [24].

Table 5: Comparison of awareness levels by participation in craft-making activities using the Mann-Whitney U Test

Grouping variable	Ranks			
	Mean likert scale awareness			
		N	Mean Rank	Sum of Ranks
Have you previously participated in any craft-making programmes that use plastic waste?	Yes	36	36.50	1314.00
	No	34	34.44	1171.00
Test Statistics				
	Mean likert scale awareness			
Mann-Whitney U	576.000			
Wilcoxon W	1171.000			
Z	-0.425			
Asymp. Sig. (2-tailed)	0.671			

Table 6 shows that respondents willing to continue making plastic crafts had a higher average score ($M = 37.75$) than those who were unwilling. This finding aligns with previous research, which has reported that engaging in craft activities can enhance environmental awareness, as it encourages individuals to adopt eco-friendly habits both in their creative work and in daily life [25].

Table 6: Comparison of awareness levels by willingness to continue plastic craft-making using the Mann-Whitney U Test

Grouping variable	Ranks			
	Mean likert scale awareness			
		N	Mean Rank	Sum of Ranks
Would you like to continue producing plastic crafts from plastic waste?	Yes	58	37.75	2189.50
	No	12	24.63	295.50
Test Statistics				
	Mean likert scale awareness			
Mann-Whitney U	217.500			
Wilcoxon W	295.500			
Z	-2.042			
Asymp. Sig. (2-tailed)	0.041			

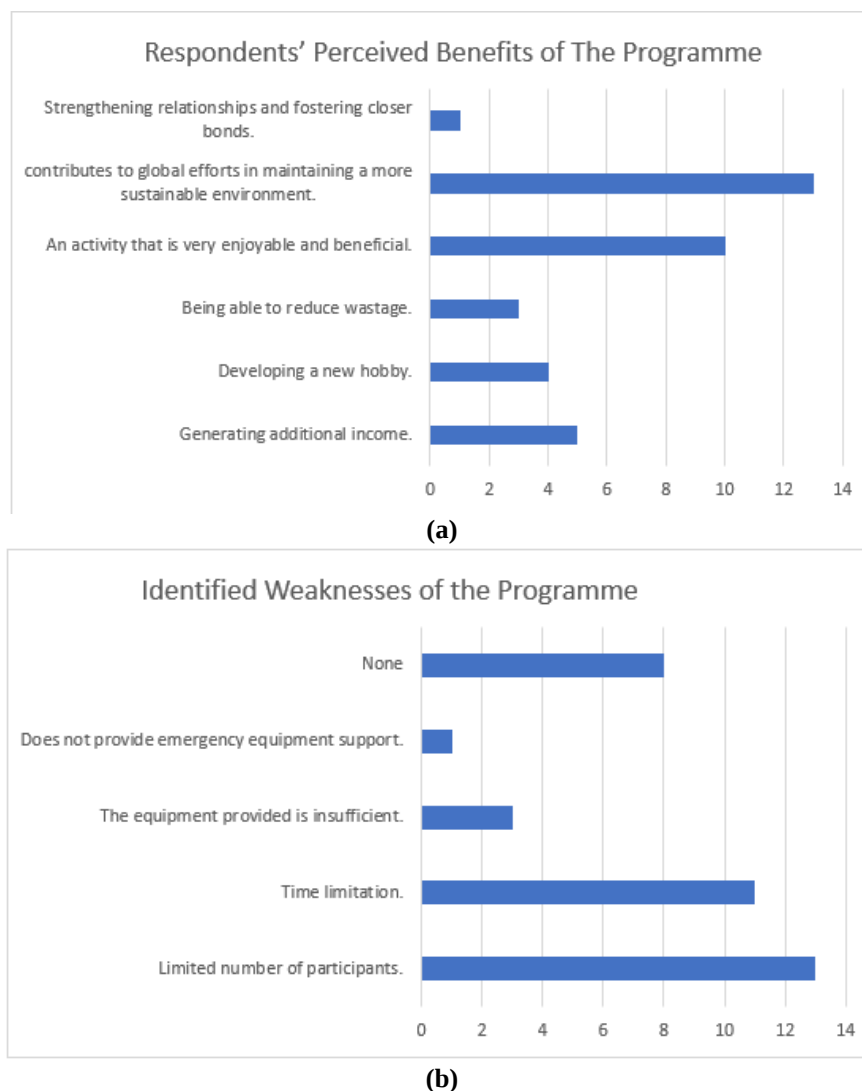
5. Feedback on the Program

In this section, only respondents who participated in the demonstration programme were invited to provide feedback on its implementation and potential areas for improvement. Although not all participants responded, the analysis focuses on the feedback received, which was quantified to facilitate systematic interpretation.

Respondents were first asked to identify the benefits gained from participating. Most reported that the programme promoted global sustainability (13 respondents) and provided an enjoyable learning experience (10 respondents). Other benefits included opportunities to earn additional income (5 respondents) and develop a new hobby (4 respondents), while fewer participants noted reduced waste (3 respondents) and stronger social connections (1 respondent). Overall, the responses indicate that the programme was effective in raising environmental awareness, developing skills, and fostering community engagement.

Next, respondents were asked about the programme's weaknesses. The most reported issues were limited participant numbers (13 respondents) and time constraints (11 respondents), indicating that some participants were unable to fully engage or master the crafting techniques. A few participants noted inadequate equipment (3 respondents) and insufficient emergency support (1 respondent). Interestingly, 8 respondents reported no weaknesses, suggesting that many participants viewed the programme as well-organised and effective despite some limitations.

Finally, respondents suggested improvements to enhance future programmes. Key recommendations included promoting the programme more widely (8 respondents) and organising continuation sessions (7 respondents) to allow ongoing engagement. Other suggestions were offering specialised craft-making courses (4 respondents), organising competitions (3 respondents), providing additional equipment (3 respondents), and improving participant engagement strategies (2 respondents). A small number (1 respondent) suggested clearer scheduling, while 8 respondents reported that no improvements were needed. Overall, these suggestions reflect participants' interest in programme expansion, resource support, and deeper skill development. The feedback obtained from respondents is summarised in Fig. 1.



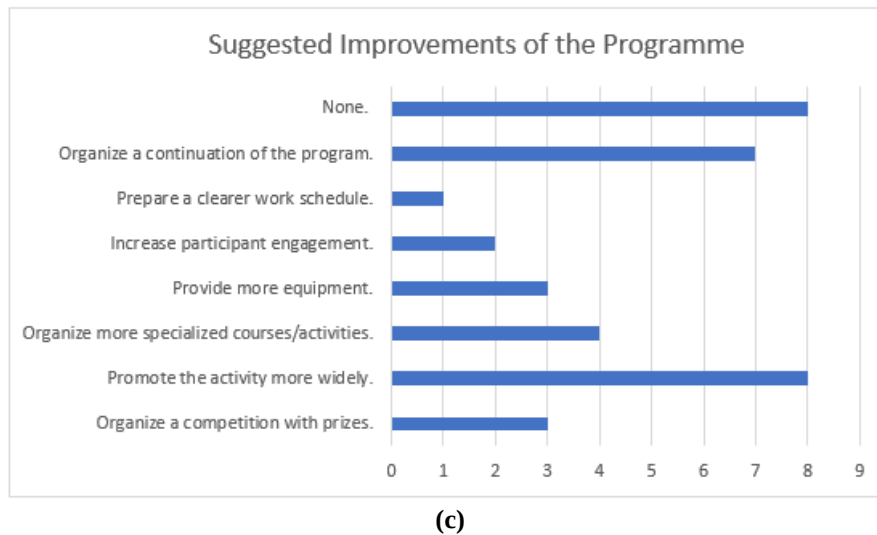


Fig. 1 Feedback of the programme from the respondents (a) Perceived benefits of the programme; (b) Identified weaknesses of the programme; (c) Suggested improvements of the programme

6. Conclusion

In summary, this study demonstrated that the recycled craft-making programme effectively enhanced participants' awareness, knowledge, and skills related to plastic waste reduction. The programme was particularly successful in illustrating how household plastic can be transformed into useful crafts, although some limitations were noted, including time constraints, limited resources, and varying levels of participant engagement. Overall, the programme shows strong potential to encourage positive behavioural change by motivating participants to perceive plastic waste as a valuable resource. However, the relatively small and localized sample limits the generalisability of the findings. Future research should therefore involve larger and more diverse participant groups to provide more comprehensive insights into the long-term impact of recycled craft-making interventions on awareness, recycling behaviour, and sustainable waste management practices.

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Conflict of Interest

The authors declare that they have no conflict of interest regarding the publication of this paper.

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