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## **Service Learning in Environmental Education: University students facilitating waste recycling awareness among school children in Malaysia**

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### **Abstract**

On 11 May 2024, a service-learning program on waste recycling literacy was held at a suburban primary school in Sabak Bernam, Malaysia, involving 55 pupils and 32 university students. The program featured an innovative card game for teaching waste sorting and recycling, which participants found informative and exciting. Additionally, an upcycling activity was included, which the students deemed beneficial. The program received overwhelmingly positive feedback, further reinforcing its impact. Integrating recycling literacy into school curricula can foster environmentally responsible behavior and support long-term sustainability goals.

**Keywords:** service learning, environmental education, waste recycling awareness, community engagement

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## **1.0 Introduction**

### **1.1 Service Learning in Environmental Education**

In Malaysia, service learning, known as SULAM, has been promoted by the Ministry of Education to encourage higher education institutions to address societal issues and develop students into responsible public intellectuals (Muhamad et al., 2022). It involves blends between students and community partners to work together and meet community needs. The activities and curriculum involved both facilitate a synergistic relationship between theoretical knowledge and practical application, enabling students to not only grasp abstract concepts more effectively but also to develop crucial competencies in areas such as analytical reasoning, innovative solution design, and proactive community involvement, thus shaping graduates into engaged citizens who actively contribute to societal advancement. (Savitri et al., 2021). This aligns with the Sustainable Development Goals set by the United Nations, especially in providing quality education, promoting environmental sustainability, and fostering global partnerships for sustainable development. (Gayatri et al., 2023). Environmental education in schools can play a pivotal role in shaping students' attitudes and behaviors toward waste management and recycling (Punzalan, 2020).

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### 1.2 Waste Recycling and Its Awareness

Waste management is a major global challenge, especially in developing countries like Malaysia, where rapid urbanization and industrialization have led to increased waste generation (Debrah et al., 2021). Traditional approaches by local governments, such as organizing cleaning teams and setting waste disposal schedules, have often failed in fostering a sense of responsibility and proactive waste management among the community (Ernawati et al., 2021). In Malaysia, only 28% of waste is recycled, falling short of the 40% target set for 2025, because of issues with waste separation, public awareness, and infrastructure (Ministry of Housing and Local Government Malaysia, 2022). Awareness of waste recycling among Malaysian children and young adults is crucial, as there is a notable gap between awareness and consistent practice, often because of inadequate education and engagement in schools and communities. This study examines how effective a service-learning program can be in helping primary school children become more aware of recycling and start building positive habits, primarily through engaging activities and structured reflection.

## 2.0 Literature Review

### 2.1 Service Learning in Malaysia

Service learning in Malaysia has progressed over the past few decades, with its roots tracing back to community engagement initiatives in universities during the late 1990s. Today, service learning is increasingly supported by government policies and institutional frameworks. It aims to address local community needs while developing students' skills and social awareness (Hidayah et al., 2020). At Universiti Teknologi MARA (UiTM), service learning is integral to the curriculum, designed to connect academic learning with real-world community service (Sulaiman et al., 2020). UiTM actively promotes service learning across various disciplines, emphasizing the development of students' social responsibility, leadership skills, and engagement with local communities. This literature review explores the integration of service learning across Malaysian educational domains, its advantages and disadvantages, and existing research on its implementation. Service learning is a community-based approach combining education with community service, where student activities address societal challenges while fulfilling academic goals (Marco-Gardoqui et al., 2020).

Malaysian universities have increasingly incorporated service learning into their curricula to develop students' professional skills and raise societal awareness. Institutions such as Universiti Kebangsaan Malaysia (UKM) and Universiti Malaya (UM) have launched service-learning initiatives focused on social engagement and community development (Roslan et al., 2020). Schools across Malaysia also integrate service learning into their curricula to foster civic engagement and social responsibility among students. Research indicates that service learning enhances academic performance by bridging theoretical knowledge with real-world applications (Muhamad et al., 2022). Through service-learning projects, students gain vital skills such as teamwork, problem-solving, and leadership, which are critical for personal and professional development (Kumar et al., 2020).

These programs address local community needs, thereby strengthening university-community relationships. Such initiatives often lead to tangible improvements in local environments and increased community participation (Adarlo, 2020). However, challenges persist, including insufficient funding and logistical support, which limit the scope and effectiveness of service-learning projects (Lee et al., 2020). Further research is needed to evaluate the long-term impacts of service learning on academic performance and social relationships and explore effective models tailored to the Malaysian context (Hidayah et al., 2020).

### 2.2 Service-Learning Experience in Malaysia Involving Environmental Education

Service-learning has gained momentum in Malaysia to connect university students with environmental issues while contributing to local communities. Supported by the SULAM framework (Department of Higher Education Malaysia, 2019), many universities now integrate projects promoting student sustainability and social responsibility. Recent studies show that hands-on and creative activities are efficient in this context. For instance, Mohamad et al. (2024) and Khani et al. (2021) found that recycling-themed play helped younger children understand environmental concepts and adopt positive habits early on. At the tertiary level, programs involving soap-making from used cooking oil (Rashid et al., 2024) or community garden development (Abd Wahid et al., 2023) gave students practical experience while supporting real community needs. These projects align with findings by Kumar et al. (2020) and Ng and Lim (2021), who emphasized that reflective, community-based learning leads to stronger environmental attitudes over time.

Educators are also calling for more flexible and student-relevant teaching methods. Karim et al. (2022) observed that teachers value approaches that relate to students' everyday lives, while Lamanauskas and Makarskaitė-Petkevičienė (2023) highlighted the need to balance knowledge and behavioral outcomes in environmental education for children. While service-learning is becoming more common in Malaysia, little work still examines how it helps young children build real recycling habits, primarily through fun and reflective activities. Filling this gap could support SDG 12 and SDG 4 efforts by encouraging early environmental awareness and meaningful learning experiences.

## 3.0 Methodology

### 3.1 The SULAM Program in Sabak Bernam

The community program met the needs of the SULAM (Service-Learning Malaysia) course at the university, addressing constraints in its preparation and implementation. The SULAM course can be undertaken using several approaches, such as community-based,

discipline-based, and community-based action research. This program, part of the Faculty of Business and Management at Universiti Teknologi MARA and for the ECO646 Environmental Economics course in the Bachelor of Business Economics (Honors) program, was named "Murid Bijak Kitar Semula" or "Students Smart in Recycling." A primary school in suburban Sabak Bernam was selected for the program after discussions with the district's Educational Office and approval from the Selangor State's Educational Office. The school helped get parental consent for pupils to participate in the one-day program on Saturday, May 11, 2024. The program ran from 8:00 AM to 4:00 PM at Sekolah Kebangsaan Parit 4 in Sungai Besar. Typically, a SULAM program requires approximately 20 hours over a semester, but for a one-off program like this, 8-16 hours of on-site work is recommended (Department of Higher Education Malaysia, 2019).

### 3.2 Activities in the Program

The program aimed to teach primary school pupils aged 10-12 about waste recycling. Participants were split into 15 groups of 4-5 children with 2-3 facilitators each. The day started with icebreakers and a role-play session called "Eco Warrior" to highlight environmental conservation. The main activity, "Recycle Roulette," was created by university students and involved 80 cards with images and information about different waste, which the children sorted into labeled bins. Action cards added movement and fun to the learning process. The game ended when a player sorted their cards first. Finally, the children upcycled used materials into cloth bags, pencil cases, calendars, photo frames, key chains, and jewelry stands.



Fig. 1 (a): Participants Playing Recycle Roulette Card Game; (b) Participants Displaying One of the Upcycle Products They Made

### 3.3 Reflection based on Gibbs' Reflective Cycle

The present paper aims to describe how university students use Gibbs' Reflective Cycle (Gibbs, G., 1988) for long-term reflection and learning, including feelings, evaluation, analysis, conclusion, and action plan. In this program, students start by indicating what happened in that program and then show how they felt about it; after which, they evaluate its good and bad aspects before proceeding to analyze some of those events' causes. Finally, they summarize their experiences in it as a whole while drawing up some ways forward (this can include both what-ifs).

### 3.4 Program Feedback by Participants

The 55 participants were required to fill in survey forms that relate to the program. As they are primary school children, the facilitators assist the pupils in filling in the forms to ensure that questions are understood and responses are taken. Questions relate to sociodemographic information and participants' evaluation of the program. For most of the questions, option answers are substituted with pictures to avoid participants getting bored with answering the questionnaire and to allow ease of answering.

## 4.0 Findings

### 4.1 Socio-demographic information

The 55 participants were required to fill out survey forms related to the program. As they are primary school children, the facilitators assist the pupils in filling out the forms to ensure that questions are understood and responses are taken. Questions relate to sociodemographic information and participants' evaluation of the program. For most questions, the answer options are substituted with pictures to avoid participants getting bored with answering the questionnaire and to allow for easy answering.

### 4.2 Reflection

The university students implementing the SULAM program are undergraduates from the Environmental Economics course in the Faculty of Business and Management at UiTM Selangor. SULAM activities account for 40% of their course assessment. Students present

reflections based on their experience handling the community during the program. These reflections follow the Gibbs Reflective Cycle, covering their feelings, interpretations, experiences, potential improvements, and future actions. For instance, one group felt the preparation process was tiring and nerve-wracking, but they were happy to share knowledge with the school children, who were eager to learn. The group found their efforts contributed to the program's success and suggested inviting more schools and including more outdoor activities for waste collection and sorting in future programs. There are 15 groups, each with reflections on their experience. While this paper does not detail all 14 other groups' reflections, themes, and insights from these experiences, they are noted but not discussed here.



Fig. 3: An example of a reflection as presented by one of the university student groups after the program ended

#### 4.3 Program Feedback

The program was conducted to promote awareness of waste recycling among the participants through engagement-based knowledge transfer activities. Given that the participants are primary school children, the activities they participated in are not too difficult for them to understand and get involved with. All the participants answered the questionnaire. All the program participants (55 pupils) find the program helpful. Overall, they see the facilitators' presentation as satisfactory (agree). They are also satisfied with the allocated time for the program. Most participants (89%) agree to apply what they have learned in the program, assuming they understand its application for real-life experiences. Most of the participants also understand what is being taught in the program. Survey responses show that 87% understand a large amount of the content (shown by the larger finger gap in the picture) while only 13% of the participants understand only a small amount. Overall, participants felt good about the program after engaging with the facilitators for the whole day. 96% selected a happy face to reflect their happy feeling, while only 2% selected a neutral face and 2% selected a sad face.

## 5.0 Discussion

### 5.1 Reflection of Program Preparation and Activities

The reflections provided by one of the 15 groups involved in the program offer valuable insights into the experiences and emotions of the university students as they engaged in the service-learning activity. This group reported initial nervousness and fatigue during the preparation phase, reflecting the challenges of organizing a program of this nature. However, these feelings were counterbalanced by a sense of fulfillment when the students saw their positive impact on the school children, who were eager to learn. The university students recognized that their efforts contributed significantly to the program's success and expressed a desire for future improvements, such as involving more schools and incorporating more outdoor activities focused on waste collection and sorting. This reflection aligns with the stages of Gibbs' Reflective Cycle, as the group moved from an initial emotional reaction, through an analysis of the situation, to a conclusion and an action plan for future programs. While this paper does not delve into the details of the other 14 groups' reflections, similar themes of personal growth, challenges, and suggestions for improvement will likely emerge, providing a rich area for further exploration and analysis.

### 5.2 Participants' Feedback

The waste recycling awareness program effectively engaged primary school children through interactive activities. Feedback from place 55 stated their intentions to use real-life lessons, assuming they understood everything. 87% of the respondents could remember information about most of this course, while 13% could only remember a few. Among these, the "Recycle Roulette" board game was liked by over 86% of them, but not so much by role-playing and up-cycling games, which were chosen by 7%. Emotionally, 96% of them expressed joy, and only 2% had no feelings or sadness towards it. Relying on the above facts, this program succeeded, especially for children, although there is room to improve its less favorite activities.

## 6.0 Conclusion & Recommendations

The service-learning program promoting waste recycling awareness among primary school children was highly successful. Initially, university students facilitating the program experienced challenges such as fatigue, but eventually, they could see their positive impact and felt satisfied. From their reflections on Gibbs' Reflective Cycle, structured reflection contributes to growth. Participants' feedback was overwhelmingly favorable, showing that most found the activities beneficial and pleasurable. The achievement of the "Recycle Roulette" game implies that for this specific age group, especially for gamified methods, interactive strategies yield more success; however, other activities still can be improved.

To further enhance the waste recycling awareness initiative's success, subsequent editions should involve more schools to reach a larger audience of young learners. By expanding participation, the impact of the program could be magnified. Some activities, such as role-play and up-cycling, can be made more interactive and engaging so that every aspect of the program is accepted positively. Based on what university students observed, more outdoor waste sorting and collection activities should be introduced. This is because children learn better when the lessons taught are related to real-life situations, which is why practical experiences would augment indoor learning. Moreover, Gibbs' Reflective Cycle should be among the reflective practices that continue to help students' development and provide helpful information for improving the program contents. Last, having a follow-up mechanism can enable an assessment of the long-term impact to know whether participants are using the knowledge gained during training in their everyday lives; hence, there is a need for further changes in this program to guarantee that any lasting transformations will be made. These insights show that with thoughtful adjustments to fit local needs, this kind of service-learning approach can be successfully carried out in other districts or countries to help young students build lasting awareness and habits around recycling. In doing so, it also supports the spirit of the United Nations' Sustainable Development Goal 12, which encourages people, starting from a young age, to adopt more thoughtful and sustainable habits regarding consumption and waste.

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## Paper Contribution to Related Field of Study

This research contributes to environmental education by demonstrating the effectiveness of service learning as a tool for promoting waste recycling awareness among primary school children. It highlights how engaging, hands-on activities, particularly gamified ones, can effectively impart important environmental knowledge to young learners. The study also contributes to understanding how university students can benefit from such programs through personal and professional growth, as evidenced by their reflections using Gibbs' Reflective Cycle. This research underscores the value of structured reflection in overcoming challenges and enhancing the impact of community engagement initiatives. The findings provide valuable insights into how educational programs can be designed and improved to maximize engagement and comprehension among young participants. By documenting both the successes and areas for improvement, this research offers practical recommendations for future programs, such as including active activities and expanding participation to include more schools. Overall, this study contributes to the broader discourse on effective community engagement and educational strategies in environmental education, particularly in primary education.

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