



## **Sustainable Education Model through Recycling and Ekorelawan Volunteering Activities**

**S. M. Zain<sup>1,2\*</sup>, N. A. Mahmood<sup>1</sup>, N. E. A. Basri<sup>1,2</sup>, M. A. Zawawi<sup>1</sup>, L. F. Mamat<sup>1</sup> and N. F. M. Saad<sup>1</sup>**

<sup>1</sup>Department of Civil and Structural Engineering, Faculty of Engineering and Built Environment, Universiti Kebangsaan Malaysia, 43600 UKM Bangi, Selangor, Malaysia

<sup>2</sup>Centre for Engineering Education Research, Faculty of Engineering and Built Environment, Universiti Kebangsaan Malaysia, 43600 UKM Bangi, Selangor, Malaysia

### **ABSTRACT**

The sustainable education model with the combination of UKM's recycling centre (PKSUKM) is an educational innovation in UKM's waste management system. Volunteering activities through environmental education and recycling activities are important components in this model. This study aims to establish *ekorelawan* service among the students of the Faculty of Engineering and Built Environment (FKAB) through their involvement in recycling activities on campus and within the larger community beyond campus. Therefore, surveys were conducted to determine the acceptance and willingness of students to engage in *ekorelawan* activities. A pilot study was done with the involvement of second-year students (73 students) of the Department of Civil & Structural Engineering in three programmes that were carried out during their first semester of the academic session 2014/2015. The programmes were Mengasahi Alam Anugerah Maha Pencipta (MAMA); recycling activities with students from a school in Bandar Baru Bangi; and an event to create awareness of the need for the conservation of Alur Ilmu UKM. Two surveys were conducted before (the start of the semester) and after the three programmes were run (the final semester). Only 23 students (32%) were interested in pursuing these voluntary

activities. Time was the main constraint that prevented students from participating in *ekorelawan* programmes. The results of this pilot study are important in order to improve the programme and at the same time to devise strategies to attract more students of FKAB to participate in *ekorelawan*'s programmes in the future.

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#### E-mail addresses:

smz@ukm.edu.my (S. M. Zain),

nurajlaam@gmail.com (N. A. Mahmood),

noorezlin@ukm.edu.my (N. E. A. Basri),

Afiq\_zawawi90@yahoo.com (M. A. Zawawi),

lailatulfariha@siswa.ukm.edu.my (L. F. Mamat),

fateensaad01@yahoo.com (N. F. M. Saad)

\* Corresponding author

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## INTRODUCTION

The processes and outcomes of teaching are more easily and more systematically studied through the use of a model. A model is a conceptual framework that clearly captures relevant components of the concept and shows how the components relate in order for the concept to work effectively. The sustainable education model that is discussed in this paper is part of the research related to the operation of UKM's recycling centre. This model presents a concept of how UKM's recycling centre can be used as the basis for the teaching and learning process in accordance with the prescribed learning outcomes through a combination of research, education, sustainability and entrepreneurship. This triggers learning and teaching innovation for the overall good of the students and the entire UKM community. Md Zain et al. (2012), Md Zain et al. (2013) and Md Zain et al. (2014) discussed the implementation stage for whole-model development based on a problem that occurred in the operation of UKM's recycling centre that can be improved with student involvement in order to increase UKM's recycling rate. The discussion was concerned with the whole education model with analysis from a related survey on students' acceptance towards recycling; the relevant thinking style that aids the solving of problems; students' acceptance of activities that encourage them to think in a creative,

innovative and critical way. A positive outcome would be students' acceptance of volunteering activities. The aim of this study in using a model was to complete the whole education model using UKM's recycling centre as the context.

Education through volunteer activities can be beneficial to students (Ouma & Dimaras, 2013). Volunteering means participating in an activity willingly or sincerely without expecting material reward. The act of volunteering is increasingly diminishing among individuals because of self-interest that drives people to think of and seek remuneration for any work done. Azizan (2014), in discussing the social problems of youth, emphasised involvement in community work as a means of addressing this problem. Community work requires volunteers who can help make a difference for the betterment of the community, the environment and their own moral development. Thus, it is important to study a model to see how it can be used in order to produce engineering graduates who do not only act as engineers but who are aware of their moral duty to society as well as their accountability to present and future generations. In an effort to produce professional engineers, the Faculty of Engineering and Built Environment (FKAB) has established six objectives and 12 outcomes of the programme (PO) to be achieved by each department. One of the programme outcomes relates to sustainable development and the environment, and states, "Having understanding of social, cultural, global and environmental

responsibilities and ethics of a professional engineer and the need for sustainable development” (PO7, EAC, 2012).

According to Palmer and Neal (1994), the three areas that are closely related to environmental education is education about the environment, education for the environment and education through the environment. This is related to the care and positive attitude and actions towards the environment with a sense of responsibility to nature. The *ekorelawan* programme conducted in this study included all three components. Severe environmental deterioration in recent years has prompted educators to incorporate green engineering concepts and sustainability in their undergraduate syllabi (Bauer et al., 2012). Environmental sustainability education in the form of volunteer work will add value to this by developing awareness in students to be more responsible towards protection of the environment.

Sustainable education relates to the environment as the main focus. There are many definitions related to education and sustainability, both of which have the same relationship with the environment. Generally, education for sustainability is a process for the development of apprehension, ability, attitude and other values that can enhance student involvement in sustainable development at local, national and international levels as well as enable them to work in a sustainable future. Sustainable education enables students to integrate environmental considerations in making decisions more sparingly (Bauer

et al., 2012). Environmental education and education for sustainable development have seen the importance of equality in the application environment through education. This has also been discussed by Ciegas and Gineitiene (2006), who also established the similarities and differences between the two concepts. Higher learning institutions are responsible for developing students who possess awareness, knowledge, skills and other values to enhance sustainability.

### **The Sustainable Education Innovation Model through Recycling**

Conventional education allows for the teaching and learning process to unfold only in the lecture hall but with innovations in educational methods, opportunity is given to students to think outside the box and apply what they learn in real-life settings. Students have to think critically, actively, gain experience and learn to solve problems, all of which work together to bring them to awareness. When innovative education is conveyed with passion, it can trigger the eagerness of students to understand concepts deeply and to learn to make decisions through proper critical thinking. The sustainable education innovation model is built upon these considerations.

The sustainable education innovation model shown in Figure 1 was developed based on research into and the operational experience of UKM’s recycling centre. Innovation and sustainability were made the main components of the model, acting as the ‘roof’ of a house that protects and

holds up the standards of innovation and sustainability while education is the base that provides strength to the whole structure, supporting its six crucial components, namely, research, entrepreneurship, users, management, policy and finances. Each component is connected to the others. Research can identify weaknesses in a model and can provide an answer to the problem statement, while also adding value to the model. Entrepreneurship as a component of this model provides opportunities in

terms of business that can generate profit from UKM's recycling centre. Users come from different backgrounds and include students, the UKM community and the Bandar Baru Bangi community who are invited to bring recyclables to the centre for small sums of money. This makes it imperative for UKM's recycling centre to find an effective management system, develop effective recycling policies and source for adequate financial resources for its operation and ongoing research.

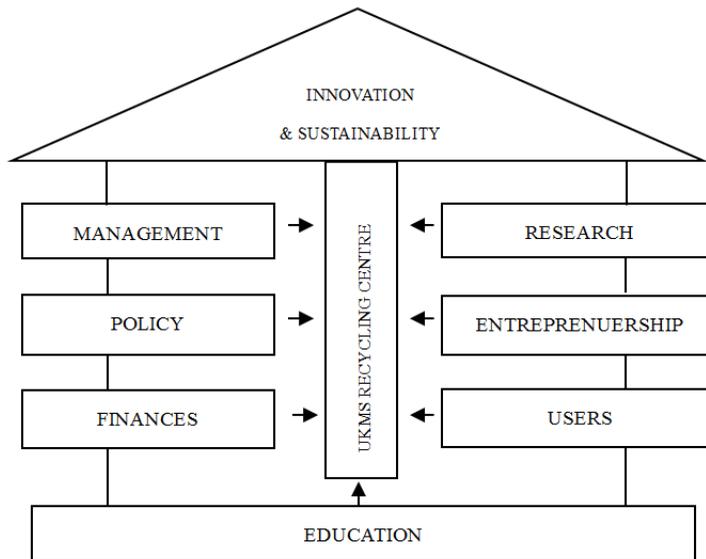


Figure 1. Sustainable education innovation model based on operation of UKM's recycling centre (Shahrom et al., 2013).

This model was developed from ongoing action research that was first started in 2010; this research has contributed much to students and the overall UKM community. Osman et al. (2010) discussed education in action research that can improve practices, understanding and situations through examples from other

research action models that use both research and action elements. Thus, both research and action are used to enhance the teaching and learning process in order to prioritise creativity, innovation, critical thinking and volunteering activities. Education refers to the teaching and learning process that covers all courses

offered by different faculties. The initial phase for this action research was student involvement, which came from the Self Development course (ZT1052 & ZT1062) and the Users' Behaviour course (EPPM3113) with a total of 70 students. The test results of the questionnaire showed that students received the teaching and learning process through involvement in recycling activities and they were encouraged to think using creativity, innovation and critical thinking (Md Zain et al., 2013; Md Zain et al., 2014). Md Zain et al. (2012), Md Zain et al. (2013) and Md Zain et al. (2014) discussed the

implementation of the model development. Table 1 shows the involvement of undergraduate students in the operation of UKM's recycling centre from 2011 to 2015. This study discusses the volunteering activities related to sustainable education and recycling activities by analyzing the survey on the student's acceptance and willingness to engage in *ekorelawan* activities in CITRA courses (HHHC9101, HHHC9201, HHHC9301, HHHC9401, HHHC9501 & HHHC9601). The study considers the sustainability and innovation education model based on the operation of UKM's recycling centre.

Table 1  
*Involvement of Undergraduate Students in the Operation of UKM's Recycling Centre (2011-2015)*

Courses	Faculty
ZT1052 Self Development I & ZT1062 Self Development II	Centre for General Studies
EPPM3113 Users' Behaviour	Faculty of Economics & Management
KW4014 Solid-Waste Management	Faculty of Engineering & Built Environment
KH2184 Environmental Engineering Studies	Faculty of Engineering & Built Environment
KW4102 Research Project I & KW4206 Research Project II	Faculty of Engineering & Built Environment
CITRA: HHHC9101 Social & Accountability HHHC9201 Communication Skills HHHC9301 Information Management Skills and Lifelong Learning HHHC9401 Values, Attitudes and Professionalism HHHC9501 Critical Thinking, Problem Solving and Science Approach HHHC9601 Leadership Skills and Teamwork	Faculty of Engineering & Built Environment

## METHODOLOGY

A pilot study was conducted with the involvement of second-year students (73 students) from the Department of Civil and Structural Engineering in the three

programmes that were carried out during the first semester of the academic session 2014/2015, namely, '*Mengasahi Alam Anugerah Maha Pencipta*' (MAMA), 'Green Schools Programme' with students

from a school in Bandar Baru Bangi and an awareness programme for the conservation of *Alur Ilmu* UKM. A survey administered in the early stage before the programme was launched was conducted to determine the students' understanding of the importance of volunteer activities and environmental stewardship and their willingness to engage in volunteer activities. A survey carried out after the activity sought the students' viewpoint on the three activities and also sought to monitor their inclination to continue participating in future *ekorelawan* activities.

## RESULTS AND DISCUSSION

### Respondent Background

This study involved the administration of a set of questionnaires before and after the activity. Students who answered the questionnaires were second-year students from the Department of Civil and Structural Engineering. The number of students who answered the questions before the activities were 27 while 45 answered the second

questionnaire after the activities carried out. The total number of students involved in the programme was 73. Figure 2 shows the percentage of students by gender, while Figure 3 shows the percentage of students who answered the survey before and after the programme according to departmental programme. The number of female students may reflect Brzozowski's (2013) proposal that women with careers and higher education are more likely to participate in volunteer activities. Figure 3 shows that the percentage of students from the Civil and Structural Engineering programme (Structural) was greater than that from the Civil and Environmental Engineering programme (Environmental) before and after the event. The difference was not significant, that is by only 2% to 4%. This indicates that interest in the programme did not have a significant influence on interest in volunteer activities. Figure 4 shows the percentage of students by race comprising Malays, Chinese, Indians and others. The percentage of Malays is the highest followed by Chinese, Indians and others.

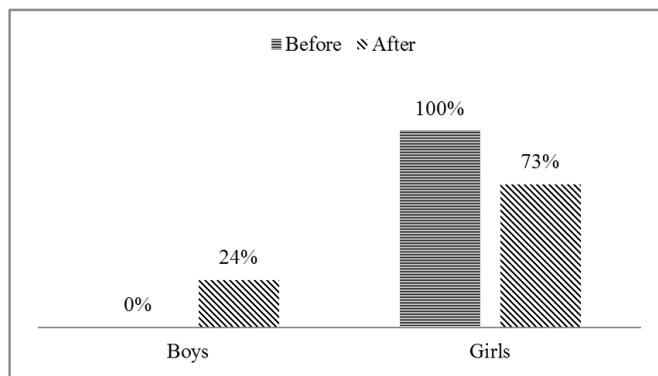


Figure 2. Percentage of students who answered the survey before and after the programme according to gender.

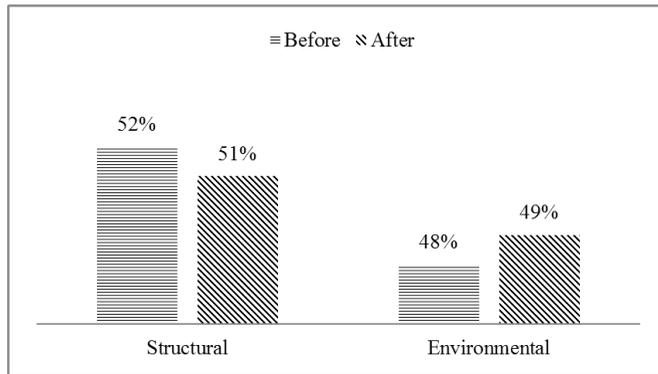


Figure 3. Percentage of students who answered the survey before and after the programme according to departmental programme.

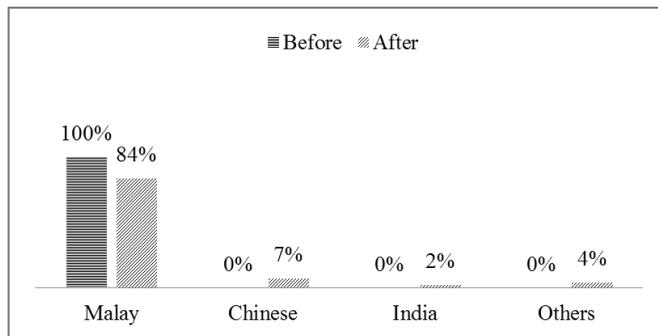


Figure 4. Percentage of students who answered the survey before and after the programme according to race.

### The Importance of Volunteer Activities

Overall, the students agreed and strongly agreed that volunteer activities are important in preserving the environment. Students also agreed that it was important to be effective in volunteer activities, with 96% agreeing and strongly agreeing that they were aware of the establishment of *ekorelawan* UKM and its importance in preserving the environment. However, 67% said they would participate

in volunteer activities if that could increase their CGPA or if they were given a financial reward to do so. This shows that the students understood and agreed with the importance of volunteering but they were not willing to carry out such activities in the absence of a reward. However, there were also students who were willing to participate in volunteer activities without receiving a reward (15%), as shown in Figure 5.

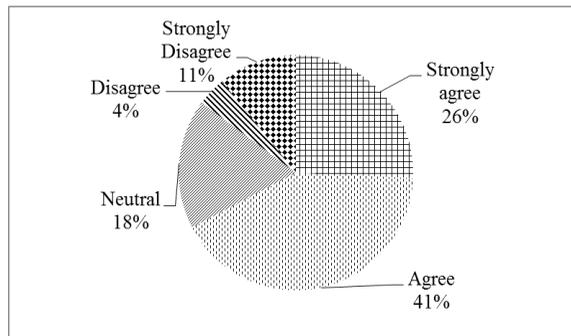


Figure 5. Percentage of students responding to the question about wanting a reward for doing volunteer activities.

The number of students who wanted a reward was high. These were students who had previously never volunteered their services before. Figure 6 shows that 67% of the students who had never participated in any volunteer activities previously were willing to gain new experience and wanted to understand the importance of volunteering. According to a study conducted by Che Nawi and Asmuni (2013), understanding is the second most important factor in an individual's involvement in volunteer activities. The experience of participating in volunteer activities leads to awareness of the deeper issues of life and can enhance the individual's self-motivation. There were also students who honestly declared that participation in the activities would help them with the CITRA course that was compulsory for every student in UKM. Some students participated in the events with the conscious intention of wanting to protect the environment while others simply wanted to broaden their network of contacts. Therefore, the reasons for student participation in these volunteer

activities were varied. It should be noted that participation would indeed have been of more value if they had obtained a grade that could have helped in their studies.

About 75% of the students disagreed and strongly disagreed with the statement "Volunteer activities are suitable only for people who can afford them," while the rest were not sure, agreed and strongly agreed, as shown in Figure 7. This statement was addressed to the students to determine if they were aware of the cost to the individual of participating in volunteer activities. The survey provided writing space that allowed students to give suggestions and comments regarding volunteer activities organised by the university. Almost all of the students proposed to have more interesting activities that took them on visits outside the university; involved non-governmental agencies and other organisations related to the activities; and added more practical or hands-on knowledge. In addition, the students proposed that promotion of volunteer activities or *ekorelawan* be extended.

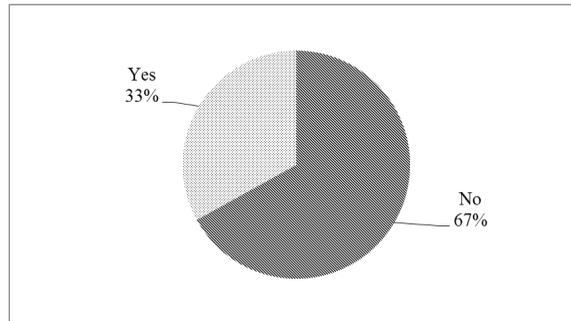


Figure 6. Response to the question on gaining experience from participation in volunteer activities.

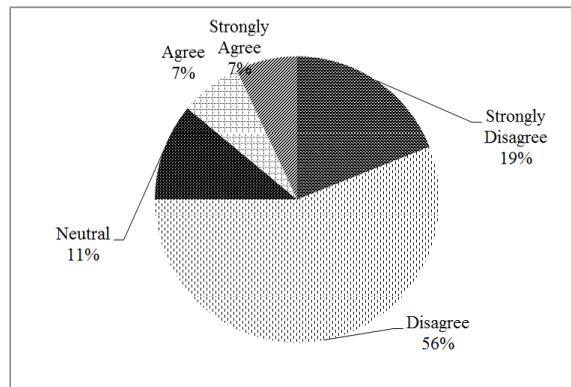


Figure 7. Response to the statement, "Volunteer activities are suitable only for people who can afford them."

### After Exposure to Environmental Volunteer Activities

The students accepted their participation in the three activities as being beneficial, stating that their understanding of volunteerism had been enhanced and they were more aware of the importance of protecting the environment. The activities had also helped the students with their extra-curricular and academic work. Sixty per cent of the students agreed that

volunteer activities can help them build self-confidence. However, 53% of the students agreed and strongly agreed that volunteer activities are a waste of time (Figure 8). This may give the perception that students are materialistic but according to Yahaya and Yahaya (2013), in order to encourage and maintain the spirit of volunteerism, gifts in the form of recognition are necessary to a degree.

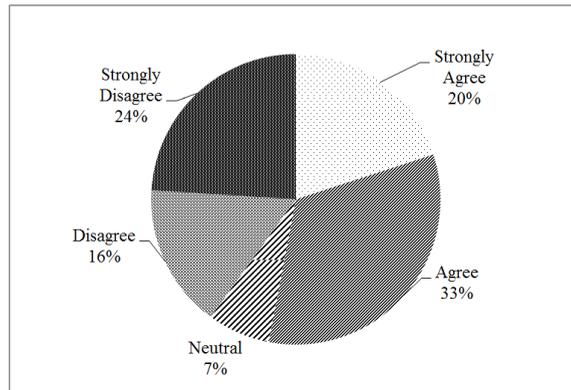


Figure 8. Response to the statement, “Volunteer activities are activities that waste time.”

Positive response to participation in the MAMA programme showed that the students were aware of the link between environmental care and gratitude to nature as created by the Creator, with 91% agreeing and strongly agreeing with the statement, “This brings me closer to my Creator.” Therefore, exposure to the relationship between the Creator and the environment can help students see an added relevance of protecting the environment. In this study, the students were exposed to the importance of environmental protection as vicegerents on Earth; this was to foster a sense of responsibility among

them as they developed the awareness that environmental protection not only benefitted the environment but also fulfilled a religious requirement (Figure 9). Apart from activities in the university, the students were also involved in the Green Schools programme with students from a school in Bandar Baru Bangi. They were required to deliver environmental knowledge to the students about recycling. Figure 10 shows that 89% agreed and strongly agreed that such community activities are good, and 85% said that they would like to engage in activities that promote social awareness.



Figure 9. Students involved in the MAMA programme being exposed to the relevance between religion and environmental protection.

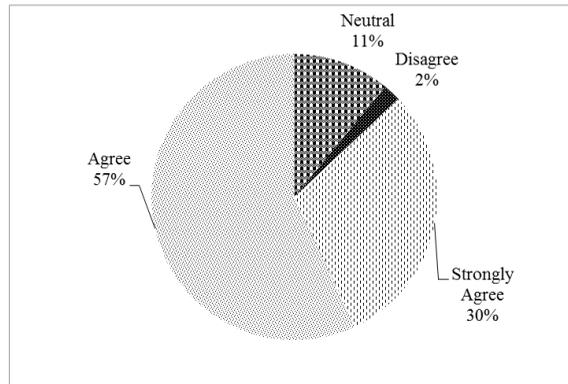


Figure 10. Response to the statement, "I want to be involved in awareness programmes and in serving the community."

Fifty-one per cent of the students agreed to continue participating in voluntary activities organised by the university. All the students who wished to continue their participation in volunteer activities were female students. The rest stated they were not interested in continuing with volunteer activities as they did not have the time to do so. Figure 11 shows the interaction of the students with pupils from the school in Bandar Baru Bangi, who ranged in age from 7

to 12 years. Activities that benefitted the community also involved activities that supported the university community; these students required the students to share the knowledge and experience they had obtained about the importance of the 3Rs (reduce, reuse, recycle) and its impact on *Alur Ilmu UKM*, as shown in Figure 12. These activities helped to enhance the students' confidence and communication skills, thus increasing their marketability upon graduation.



Figure 11. Ekorelawan in schools interacting with the pupils of a school in Bandar Baru Bangi under the Green School programme on recycling activities.



Figure 12. Students distributing pamphlets around UKM about the awareness programme and recycling activities for the conservation of *Alur Ilmu* UKM.

Education from home and its environment are the factors that can affect human behaviour concerning the environment. In an earlier study (Md Zain et al., 2014), students were asked to answer the question, “If you do not recycle, are you ever going to do it, and when are you going to do it?” (Table 2). In their response,

they attested that they would recycle, and they would do so after they had learnt more about recycling, after exposure to recycling and after being involved in activities held by UKM’s Recycling Centre. This indicates that their involvement in recycling activities in the process of teaching and learning as conducted in this study had provided knowledge, developed awareness of the importance of recycling activities and encouraged willingness to engage in future recycling activities. The activities had led to development of interest in and willingness to put in effort into recycling-related activities in the teaching and learning process. The students had been able to increase knowledge, understanding and awareness to practise environmental protection and more importantly, to act more responsibly towards the environment.

Table 2  
Response to the Question, “If You Do Not Recycle, Are You Ever Going to Do It and When Are You Going to Do It?”

No	Comments
1	Yes, now
2	<b>Yes, when there is a chance.</b>
3	Yes, this week.
4	Yes, when there are items and nearest places to do recycling.
5	Yes, if there is time.
6	Yes, not sure.
7	Yes, after segregating items according to their types.
8	<b>Yes, when I know more facts about recycling.</b>
9	<b>Yes, after being exposed to recycling.</b>
10	Yes, maybe next time.
11	Yes, if there are items and places to segregate and recycle.
12	Yes, when there are recycle bins in dormitories.
13	<b>Yes, after involved in PKS.</b>

## CONCLUSION

The educational model of sustainability combined with research, through involvement in PKSUKM gives priority to education regarding the environment and its preservation through creative problem-solving, innovation and critical thinking. Awareness of the importance of volunteer activities is still low among students. Factors such as the granting of rewards in the form of credit scoring and also recognition from the university can go a long way in encouraging students to participate in volunteer activities. An added benefit is that this allows them to explore and appreciate knowledge of nature while sharing that knowledge with the wider community. *Ekorelawan*, who are students of the Faculty of Engineering and Built Environment, provide service to the community and at the same time build morale and motivation, thus becoming better prepared to face life after graduation. *Ekorelawan* volunteer activities are also undeniably important in supporting and sustaining the operational and awareness programmes run by PKSUKM.

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