

Engineering Social Responsibility: Evaluating Civic Engagement in a Sustainability-Oriented Service-Learning Program

Zamry Ahmad Mokhtar^{1*}, Nur Ashikin Lakman², Norliza Md. Yusof³
^{1,2,3} Department of Civil Engineering, Politeknik Sultan Abdul Halim Mu'adzam Shah
*Corresponding author's email: zamry@polimas.edu.my

Abstract: This study explores the outcomes of a community-based service-learning program involving Politeknik Sultan Abdul Halim Mu'adzam Shah (POLIMAS) students in sustainability-oriented activities. The program, conducted at Sekolah Kebangsaan Lengkuas, Kedah, engaged 109 students from the Civil Engineering Department in various initiatives such as mural painting, decorating the school environment and recycling-based landscaping, all aligned with selected Sustainable Development Goals (SDGs), particularly SDG 4, SDG 11 and SDG 12. The primary objective of this study was to identify students' civic attitudes and behaviors after participating in the service-learning program. A quantitative survey approach was employed, with data collected from 92 students using a structured questionnaire adapted from the Civic Engagement Scale. The instrument measured both civic attitudes (8 items) and behaviors (6 items) on a 7-point Likert scale. Descriptive statistical analysis revealed high levels of civic engagement among participants, with average mean scores of 6.357 for attitudes and 6.390 for behaviors, indicating a strong sense of social responsibility and active community involvement. The findings suggest that well-designed service-learning experiences can significantly enhance students' civic awareness and actions. These results support the idea that hands-on learning experiences should be included in technical and vocational education. The study recommends integrating service-learning into academic programs and enhancing reflection to support lasting civic involvement among students.

Keywords: *Civic Responsibility, Community Participation, Experiential Learning, Student Engagement, Technical and Vocational Education*

1.0 INTRODUCTION

In today's higher education, service learning has become a powerful teaching method that connects classroom learning with real-life experiences. Unlike traditional volunteering, service learning includes meaningful community service as part of academic programs. It helps students reflect on their experiences, builds civic responsibility and improves professional skills (Cleveland & Peterson, 2022). With the global push for Sustainable Development Goals (SDGs), universities and colleges are expected to work more closely with communities to support both education and social development. One of the main challenges in engineering education is the gap between theory and real-world practice. Engineering students often focus more on technical skills and less on civic engagement. Service learning helps close this gap by allowing students to use their technical knowledge in real community projects. This strengthens their academic learning and builds important skills like teamwork, leadership, and personal growth (Prentice & Robinson, 2010). This is especially useful in polytechnic institutions where hands-on skills are important.

Working with the community is a key part of service learning. It creates a two-way exchange of knowledge, builds trust and empowers both students and community members (O'Connor et al., 2011). For example, students can take part in activities like painting murals to raise environmental awareness, repainting school walls or creating green spaces using recycled materials. These efforts support various SDGs such as SDG 4 (Quality Education), SDG 11 (Sustainable Cities and Communities), and SDG 12 (Responsible Consumption and Production). These types of projects offer valuable learning experiences while also improving the community. In Malaysia, service learning in engineering programs is still developing and is often seen more as volunteering rather than a structured part of the curriculum. However, research shows that service learning can lead to better academic results, stronger civic engagement and personal growth. For instance, Siti Manisah et al. (2020) found that students who took part in service learning had a better understanding of their coursework and showed improved critical thinking and civic awareness. Asio et al. (2023) also noted that service projects are more effective when they match students' skills and interests. Therefore, this paper aims to

evaluate the civic attitudes and behaviors of civil engineering students at Politeknik Sultan Abdul Halim Mu'adzam Shah after participating in a community-based service-learning program.

2.0 LITERATURE REVIEWS

Service-learning is an educational approach that combines classroom learning with community service, helping students develop civic responsibility and real-world skills (Pinto & Costa-Ramvalho, 2023). It aligns well with Dewey's philosophy of "learning by doing," enabling students to apply their knowledge in practical settings while addressing community needs. According to Aláez et al. (2022), service-learning also encourages universities to redesign their curricula to promote social justice, intergenerational learning, and ethical awareness. Incorporating service-learning into learning communities keeps students more engaged and leads to better academic performance and civic values (Pike et al., 2011).

One of the key benefits of service-learning is its ability to bridge the gap between theory and practice. Traditional teaching often struggles to help students apply what they learn in the classroom to real-life situations. Service-learning offers students the opportunity to translate classroom learning into meaningful community projects. Pinto and Costa-Ramvalho (2023) found that students involved in service-learning showed significant improvements in social behavior, personal development, and life goals compared to those in conventional classes. Students often report that service-learning experiences give them a stronger sense of purpose and a clearer understanding of their professional roles (Zhang et al., 2018).

Moreover, service-learning also aims to build students' civic attitudes and behaviors. Doolittle and Faul (2013) developed the Civic Engagement Scale to measure these qualities, emphasizing that civic engagement involves both attitudes and actions that are important to a democratic society. Research by Pinto and Costa-Ramvalho (2023) supports this, showing that service-learning significantly enhances students' civic and social competencies. Aláez et al. (2022) note that service-learning can also reduce age-related stereotypes by encouraging meaningful interactions between students and older community members. Participation in learning communities has been shown to greatly increase student engagement, particularly when service-learning is part of the experience (Pike et al., 2011). Engagement is linked to better academic performance, increased motivation, and higher satisfaction with college life. These findings support the integration of service-learning into learning communities to enhance student development. Yet, as Pinto and Costa-Ramvalho (2023) note, outcomes can vary depending on the field of study, suggesting the need for more tailored service-learning programs.

Furthermore, while service-learning improves students' attitudes and intentions toward community service, many studies lack consistent and reliable ways to measure these impacts. The lack of standardized frameworks and long-term validation remains a common limitation (Doolittle & Faul, 2013; Pike et al., 2011). Although many studies have been done on service-learning, most of them were carried out in universities or focused on general education students. There are still not many studies that involve diploma-level engineering students in Malaysian polytechnics, especially those that look at structured service-learning activities that support the Sustainable Development Goals (SDGs). Also, only a few studies use proper tools like the Civic Engagement Scale to measure both students' civic attitudes and behaviors in technical and vocational education. Because of this, the current study is important as it focuses on how service-learning can help polytechnic engineering students develop civic values and actions. It also uses a reliable instrument to measure the effects of the program.

3.0 METHODOLOGY

3.1 Research Design

This study used a quantitative survey to find out how service-learning affects the civic attitudes and behaviors of polytechnic students who took part in a community program focused on sustainability. The survey method was chosen because it can quickly gather information from many students, making it easier to measure things like attitudes and behaviors related to civic engagement.

3.2 Participants

The target population for this study consisted of 109 students from the Civil Engineering Department at POLIMAS in a service-learning program conducted at Sekolah Kebangsaan Lengkuas, Kedah. This program focused on promoting sustainability and fostering community collaboration through activities such as mural painting (Figure 1), decorating the school environment (Figure 2) and recycling-based landscaping. Based on the Krejcie and Morgan (1970) sampling table, a sample size of 92 respondents was deemed sufficient to represent the population.



Figure 1
Students participating in mural painting during the service-learning program.



Figure 2
Students are decorating the school environment as part of the community project.

3.3 Instrumentation

Data were collected using a structured questionnaire adapted from Doolittle and Faul's (2013) Civic Engagement Scale. The instrument comprised 14 items divided into two subscales:

- a) Civic Attitudes Subscale: This subscale included eight statements designed to assess students' feel and perceptions regarding their role in the community. Civic attitudes were defined as what people believe about their involvement in the community and how much they think they can make a positive impact.
- b) Civic Behavior Subscale: This subscale consisted of six statements measuring actual behaviors indicative of civic participation. Civic behaviors were defined as real actions that show a person's involvement in community activities.

All items were measured on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree), enabling the quantification of respondents' level of agreement with each statement.

To check the reliability of the questionnaire, Cronbach's alpha was calculated for both subscales. The Civic Attitudes Subscale had a Cronbach's alpha of 0.930 and the Civic Behavior Subscale had a value of 0.951, indicating excellent internal consistency for both parts of the instrument.

3.4 Data Collection

The survey was conducted using Google Forms, allowing for accessible and efficient data collection. Participants were briefed on the purpose of the study, assured that their answers would remain

anonymous and confidential. Data collection took place within one week after the service-learning activities ended to capture the students' immediate reflections on their experiences.

3.5 Data Analysis

The collected data were analyzed using descriptive statistics, specifically the calculation of mean and standard deviation for each item on the Civic Engagement Scale. These calculations helped show the overall trends in students' answers and how much their responses varied. The main goal of the analysis was to understand how the service-learning activities influenced students' sense of civic responsibility and their willingness to participate in community activities.

4.0 DATA ANALYSIS AND FINDINGS

The analysis of the Civic Attitudes Subscale in Table 1 shows that participants reported high levels of civic attitudes across all eight items. Mean scores ranged from 6.21 to 6.42 on a 7-point scale, indicating that most participants agreed or strongly agreed with the statements. The highest mean score was for the statement "I believe that it is important to volunteer" (Mean = 6.42, SD = 0.829), with 87% of respondents selecting a response of 6 or 7. This suggests that participants strongly value volunteering as part of their civic responsibility. The statement with the lowest mean score was "I believe I should make a difference in my community" (Mean = 6.21, SD = 0.859), with 80.5% choosing 6 or 7. Although still high, this indicates that some participants might not feel fully confident in their ability to make a difference. Overall, the standard deviations were low (between 0.768 and 0.890), showing that participants' responses were quite consistent. Other statements such as "I believe that all citizens have a responsibility to their community" (Mean = 6.38, SD = 0.768) had 87% of students selecting 6 or 7, and "I am committed to serve in my community" (Mean = 6.35, SD = 0.777) saw 85.9% in the same high range. The item "I feel responsible for my community" (Mean = 6.39, SD = 0.798) had 86.9% of participants strongly agreeing, while "I believe that it is important to be informed of community issues" (Mean = 6.32, SD = 0.838) showed 82.6% agreement. The item "I believe that I have a responsibility to help the poor and the hungry" (Mean = 6.40, SD = 0.890) had 84.8% selecting 6 or 7. Lastly, "I believe that it is important to financially support charitable organizations" (Mean = 6.39, SD = 0.798) had 82.6% strong agreement. These results show that participants have strong civic attitudes, including a sense of responsibility, commitment, and a belief in the importance of volunteering and helping others. This may reflect the positive impact of community-based service-learning activities.

Table 1
Civic Attitudes Subscale Analysis

No.	Attitudes	Mean	Standard Deviation
1.	I feel responsible for my community.	6.39	0.798
2.	I believe I should make a difference in my community.	6.21	0.859
3.	I believe that I have a responsibility to help the poor and the hungry.	6.40	0.890
4.	I am committed to serve in my community.	6.35	0.777
5.	I believe that all citizens have a responsibility to their community.	6.38	0.768
6.	I believe that it is important to be informed of community issues.	6.32	0.838
7.	I believe that it is important to volunteer.	6.42	0.829
8.	I believe that it is important to financially support charitable organizations.	6.39	0.798

The Civic Behaviors Subscale analysis in Table 2 shows that participants reported high levels of civic behaviors during the community project. Mean scores ranged from 6.27 to 6.47 on a 7-point scale, indicating that most participants frequently engaged in the activities described. The highest mean scores were for the statements “I helped members of the community during the activity” (Mean = 6.47, SD = 0.733) and “I contributed (time/ effort/ materials) to this community project” (Mean = 6.47, SD = 0.777), with 90.2% and 92.4% of students respectively selecting responses of 6 or 7. This suggests that participants were highly committed to offering both assistance and resources during the project. The lowest mean score was for “I participated in discussions about social responsibility during the project” (Mean = 6.27, SD = 0.915), where 82.6% of respondents selected 6 or 7. While still high, this may indicate that fewer participants engaged deeply in reflective or dialogue-based aspects of the program. Overall, the standard deviations were low (ranging from 0.733 to 0.915), showing that participants’ responses were generally consistent. Other high-scoring behaviors included “I participated regularly in volunteer tasks throughout the project” (Mean = 6.38, SD = 0.900), with 87% of students choosing 6 or 7, and “I contributed positively to the community while working in a group” (Mean = 6.46, SD = 0.818) with 88.1% agreement. The statement “I kept myself informed about the progress and issues related to the project” (Mean = 6.33, SD = 0.786) was also rated highly, with 86.9% of participants reporting frequent engagement in staying updated. These findings indicate that participants demonstrated strong civic behaviors by actively participating in volunteer tasks, helping others, and staying informed. These results suggest that the community project effectively encouraged active participation and fostered a strong sense of civic responsibility.

Table 2
Civic Behavior Subscale Analysis

No.	Behaviours	Mean	Standard Deviation
1.	I participated regularly in volunteer tasks throughout the project.	6.38	0.900
2.	I contributed positively to the community while working in a group.	6.46	0.818
3.	I helped members of the community during the activity.	6.47	0.733
4.	I kept myself informed about the progress and issues related to the project.	6.33	0.786
5.	I participated in discussions about social responsibility during the project.	6.27	0.915
6.	I contributed (time/ effort/ materials) to this community project.	6.47	0.777

5.0 DISCUSSION AND CONCLUSION

5.1 Discussion

The findings of this study show that students developed strong civic attitudes and showed active involvement in community work after joining the service-learning program. This supports earlier studies that found service-learning helps students become more responsible and care more about their communities (Doolittle & Faul, 2013; Pinto & Costa-Ramvalho, 2023). The high scores for both attitude and behavior items show that the program successfully raised students’ awareness and encouraged them to take real action. Students strongly agreed with statements about volunteering and helping others, which matches the results of Aláez et al. (2022), who said that service-learning helps students become more caring and ethical, especially when they work together on real-life tasks. The high scores for

behaviors like contributing time, effort, and materials also support the idea that hands-on learning builds real community involvement (Pike et al., 2011).

In terms of alignment with the Sustainable Development Goals (SDGs), the activities carried out by the students clearly supported SDG 4 by enhancing their learning through community-based experiences that built both civic knowledge and personal growth. The mural painting and decorating the school activities contributed to SDG 11 by improving the school environment and making it more welcoming. In addition, the recycling-based landscaping activity supported SDG 12 by promoting the reuse of materials and raising awareness about caring for the environment.

However, the slightly lower score for the item “I believe I should make a difference in my community” shows that while students are willing to take action, some may still be developing a stronger belief in their personal role as change-makers. This is similar to what Tijsma et al. (2020) found that young people often take action first before fully understanding their role in society. Overall, the high average scores, all above 6.2 and the low variation in responses, around 0.8 show that most students had similar views and behaviors. This means the program had a clear and strong effect on all students. The results show that the service-learning program not only helped students become more active and responsible but also contributed meaningfully to the SDGs through real community activities.

5.2 Conclusion

In conclusion, the results of this study show that the community-based service-learning program had a strong positive effect on the civic attitudes and behaviors of civil engineering students at Politeknik Sultan Abdul Halim Mu'adzam Shah. Students scored highly on all attitude items from 6.21 to 6.42, which shows they feel responsible toward their community, believe in volunteering, and care about helping others. For behaviors, the scores were also high, from 6.27 to 6.47, meaning students actively joined activities, helped the community and gave their time and effort to the project. These results answer the study's objective, which was to identify the students' civic attitudes and behaviors after the program. The findings show that most students shared similar views and actions, suggesting the program had a clear and positive impact on all participants. This supports earlier studies that say service-learning helps students become more responsible, caring and involved in real-world community work. Overall, service-learning should be part of academic programs because it helps students grow as active and responsible citizens.

REFERENCES

- Aláez, M., Díaz-Iso, A., Eizaguirre, A., & García-Feijoo, M. (2022). Bridging generation gaps through service-learning in higher education: A systematic review. *Frontiers in Education*, 7, 841482. <https://doi.org/10.3389/educ.2022.841482>
- Asio, J. M. R., Sardina, D. P., & Olaguir, J. A. O. (2023). Student's community service involvement: Implications for a sustainable community extension service. *Asian Journal of Community Services*, 2(1), 65–76. <https://doi.org/10.55927/ajcs.v2i1.2523>
- Cleveland, K. M., & Peterson, S. A. (2022). Service learning and self-efficacy in exercise science: Outcomes of a community fitness training program involving undergraduate Exercise Science students. *Advances in Physiology Education*, 46(4), 621–629. <https://doi.org/10.1152/advan.00058.2022>
- Doolittle, A., & Faul, A. C. (2013). Civic Engagement Scale: A validation study. *SAGE Open*, 3(3), 2158244013495542. <https://doi.org/10.1177/2158244013495542>
- Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement*, 30(3), 607–610.

- O'Connor, K. M., Lynch, K., & Owen, D. (2011). Student-community engagement and the development of graduate attributes. *Education + Training*, 53(2/3), 100–115. <https://doi.org/10.1108/00400911111115654>
- Pike, G. R., Kuh, G. D., & McCormick, A. C. (2011). An investigation of the contingent relationships between learning community participation and student engagement. *Research in Higher Education*, 52(3), 300–322. <https://doi.org/10.1007/s11162-010-9192-1>
- Pinto, J. C., & Costa-Ramalho, S. (2023). Effects of service-learning as opposed to traditional teaching-learning contexts: A pilot study with three different courses. *Frontiers in Education*, 8, 1185469. <https://doi.org/10.3389/feduc.2023.1185469>
- Prentice, M., & Robinson, G. (2010). Improving student learning outcomes with service learning. *American Association of Community Colleges*. <https://www.aacc.nche.edu>
- Siti Manisah, I., Zainudin, H., & Rudy, B. (2020). Benefits of service learning for undergraduate students of education, Universiti Teknologi Malaysia. *Jurnal Kemusiaan*, 18(2), 22–31.
- Tijmsma, G., Hilverda, F., Scheffelaar, A., Alders, S., Schoonmade, L., Blignaut, N., & Zweekhorst, M. (2020). Becoming productive 21st century citizens: A systematic review uncovering design principles for integrating community service learning into higher education courses. *Educational Research*, 62(4), 390–413. <https://doi.org/10.1080/00131881.2020.1836987>
- Zhang, J., et al. (2018). Students' community service involvement: Psychological, academic and behavioral outcomes. *BMC Research Notes*, 11, 3940. <https://doi.org/10.1186/s13104-018-3940-2>