THE JOURNAL OF INDONESIA SUSTAINABLE DEVELOPMENT PLANNING

VOL. 6 NO. 3 - DECEMBER 2025

E-ISSN: 2722-0842 | P-ISSN: 2721-8309

Available online at
http://journal.pusbindiklatren.bappenas.go.id/

Research Paper

Applying the Theory of Planned Behavior to Understand Universiti Malaya Students' Intent to Participate in Sustainability Initiatives

Nur Ainin Sofea Mohd Huzer[1], Anggita Rahmi Hafsari[1,2,3] and Zul Ilham[1,4*]

[1]Biomass Energy Laboratory, Institute of Biological Sciences, Faculty of Science, Universiti Malaya 50603 Kuala Lumpur, Malaysia
[2]Functional Omics and Bioprocess Development Laboratory, Institute of Biological Sciences, Faculty of Science, Universiti Malaya, Kuala Lumpur 50603, Malaysia.
[3]Department of Biology, Faculty of Science and Technology, Universitas Islam Negeri Sunan Gunung Djati Bandung, Jl. AH Nasution No 105 Bandung 40614, Indonesia.
[4]*Centre for Science and Environment Studies, Institute of Islamic Understanding Malaysia, 2 Langgak Tunku Off Jalan Tuanku Abdul Halim, 50480, Kuala Lumpur, Malaysia*.

***Correspondence author**: ilham@um.edu.my*

Abstract

As universities increasingly implement sustainable practices, student engagement in pro-environmental behavior is crucial for establishing a lasting sustainable culture. While the Theory of Planned Behavior (TPB) is extensively utilized in environmental research, there is a gap in understanding student participation in university sustainability initiatives in Malaysia. This study aims to investigate the gap by analyzing student intention to participate, based on attitude, subjective norms, and perceived behavioral control through the Theory of Planned Behavior (TPB) framework. Data were acquired from 381 respondents via internet platforms and were then analyzed using statistical analysis. Results indicate no significant correlation between attitude and intention to participate. Nonetheless, subjective standard and perceived behavioral control substantially impacted intention. Additionally, gender and study background show a significant difference in intention. These findings indicate that the impact of society and perceived competence significantly impacts student participation, providing an opportunity for universities to focus on designing effective sustainability programs.

Keywords: Theory of Planned Behavior; Attitude; Intention; Sustainability; University.

ARTICLE INFO
Received: June 16, 2025
Received in revised form: October 13, 2025
Accepted: December 01, 2025

doi: 10.46456/jisdep.v6i3.882

THE JOURNAL OF INDONESIA SUSTAINABLE DEVELOPMENT PLANNING
Published by Centre for Planners' Development, Education, and Training (Pusbindiklatren), Ministry of National Development Planning/National Development Planning Agency (Bappenas), Republic of Indonesia

Address: Jalan Proklamasi 70, Central Jakarta, Indonesia 10320
Phone: +62 21 31928280/31928285
Fax: +62 21 31928281
E-mail: journal.pusbindiklatren@bappenas.go.id

Supported by Indonesian Development Planners Association (PPPI)

Please cite this article in APA Style as:
Mohd Huzer, N. A. S., Hafsari, A. R., & Ilham, Z. (2025). Applying the Theory of Planned Behavior to Understand Universiti Malaya Students' Intent to Participate in Sustainability Initiatives.*The Journal of Indonesia Sustainable Development Planning, Vol 6(3),* 359-370. https://doi.org/10.46456/jisdep.v6i3.882

1. Introduction

Sustainability has emerged as a significant strategic concern in higher education institutions due to its pivotal influence on the knowledge, values, and behaviors of future generations. The university serves as a hub for education and research, while also acting as a catalyst for social change and promoting the adoption of sustainable practices that influence economic, social, and environmental aspects over the long term (Viebahn, 2002; Katiliūtė et al., 2014; Bantanur et al., 2015). Universities have a lot of power to teach students, who will be the next generation of leaders, about sustainability through their policies, curricula, and activities on campus.

In Malaysia, sustainability issues are integrated into the national development agenda and higher education strategy, in line with the country's commitment to global frameworks such as the Sustainable Development Goals (SDGs). Universities are expected to play an active role in supporting the achievement of sustainable development goals, especially SDG 11 (Sustainable Cities and Communities) and SDG 12 (Responsible Consumption and Production). Therefore, many universities in Malaysia have initiated various campus-based sustainability programmes aimed at reducing environmental impact, improving resource efficiency, and building student awareness and participation.

Universiti Malaya (UM), as the oldest and leading research university in Malaysia, has demonstrated a strong commitment to sustainability through various initiatives, including UM Eco-Campus Initiatives, UM Living Labs (UMLL), Water Warriors, UM Zero Waste Campus, and The RIMBA Project. These programmes are designed to integrate sustainability into campus operations and encourage active student engagement. Nevertheless, despite the availability of institutional support and sustainability programmes, the level of student participation in these initiatives remains a significant challenge (Filho et al., 2024). This raises important questions about the factors that encourage or hinder student involvement in sustainability programmes in the university environment.

Understanding the psychological factors that affect student participation is crucial to increasing the effectiveness of sustainability programmes in higher education. Several studies have shown that positive knowledge and attitudes towards the environment do not necessarily translate directly into sustainable intentions or behaviors (Ajzen, 1991; Bamberg & Möser, 2007). Therefore, a behavioral theory-based approach is needed to explain the mechanisms underlying individual intentions and decisions in participating in sustainability activities.

The Theory of Planned Behavior (TPB) is one of the most widely used theoretical frameworks for analysing intention-based behavior. TPB explained that behavioral intentions are influenced by three main constructs, namely attitudes towards behavior, subjective norms, and perceived behavioral control (PBC) (Ajzen, 1991). Attitudes reflect an individual's evaluation of a behavior, subjective norms describe the social pressures felt from the surrounding environment, while PBC reflects an individual's perception of the ability and resources he or she has to perform the behavior. TPB has been widely applied in environmental and sustainability studies, including recycling behavior, energy conservation, sustainable consumption, and student pro-environmental participation (Lo et al., 2016; Yadav & Pathak, 2017; Han et al., 2018).

However, empirical studies that apply the SDGs to understand students' intentions in participating in university sustainability initiatives in Malaysia are still relatively limited. Most previous research has focused more on pro-environmental behavior in general without specifically examining student engagement with sustainability programs provided by higher education institutions. In addition, there are still limited understandings of the relative role of attitudes, subjective norms, and perceived behavioral control in shaping student participation intentions in the context of research universities' campuses.

Based on these research gaps, this study aims to apply the theory of planned behavior to analyse the factors that influence the intention of Universiti Malaya students to participate in campus sustainability initiatives. In particular, this study examines the relationship between attitudes, subjective norms, and perceived behavioral control on student participation intentions using a survey-based quantitative approach. The results of this study are expected to make a theoretical contribution to expanding the application of the SDGs in the context of the sustainability of higher education in Malaysia, as well as provide practical implications for university policymakers in designing more effective and behavior-oriented sustainability strategies for students.

2. Methods

2.1 Research framework and hypothesis development

Based on the theoretical foundation of the Theory of Planned Behavior (TPB) put forward by Ajzen (1991), an individual's intention to perform a behavior is influenced by three main psychological constructs, namely attitude, subjective norm, and perceived behavioral control. The SDG framework affirms that behavioral intentions are the most direct predictors of actual behavior, so understanding the factors that shape intentions is critical in the study of sustainable behavior (Figure.1)

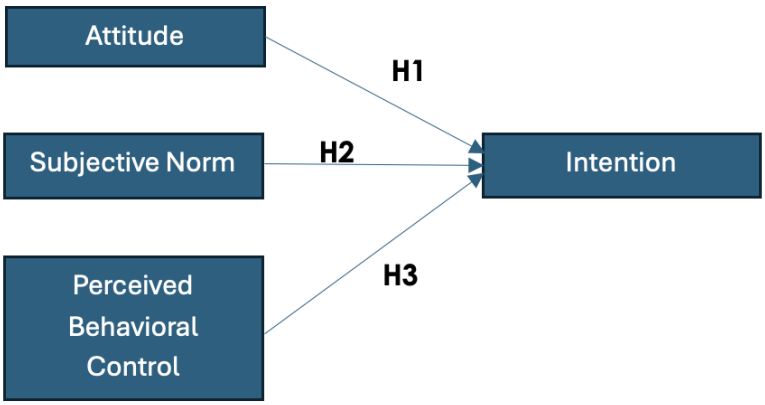

Figure 1. Research Framework of TPB (Ajzen, 1991)

2.1.1 Attitude

One of the key beliefs that exists in the theory of planned behavior is the perspective and the attitude towards the behavior itself. According to TPB, people form an attitude towards a behavior based on what they think will happen as a result of the behavior, which is known as instrumental belief, and how they expect to feel when doing it, which is known as experiential belief (Stark et al.,2025). Meanwhile, in this study, attitude refers to how students at University Malaya feel about participating in sustainability initiatives that the university provided. Therefore, if they believe that these activities are beneficial, their attitude is more likely to be positive, which increases their intention to participate. A study made by Yazdanpanah and Forouzani (2015) demonstrated that attitude positively influenced the intention of Iranian students to acquire organic food. Hence, the subsequent hypothesis is formulated:

H1: There is a significant relationship between students' attitude towards sustainability and their intention.

2.1.2 Subjective Norm

Subjective norm (SN) can be described as the social pressure that determines whether to perform or not the behavior (Peters & Templin, 2010). In the context of this research, it relates to whether students believe that important people in their lives support or expect them to take part in sustainability initiatives. Thus, if they believe that others, especially those they respect, value sustainability or are themselves participating, they are more likely to participate in it. A study by Tang et al. (2022) on residents' participatory intention to participate in micro-renewal initiatives shows a significant positive relationship impact on behavioral intentions. Therefore, the second hypothesis is formulated:

H2: There is a significant relationship between subjective norm and student intention.

2.1.3 Perceived Behavioral Control

Perceived behavioral control (PBC), as defined by Ajzen (1991), refers to an individual's perceived capacity to execute a behavior, which elucidates their intention to engage in it. Perceived behavioral

control is legitimate as it can serve as a substitute for actual control or help in the prediction of the behavior occurring (Bosnjak et al., 2020). In this study, perceived behavioral control represents whether students feel they have the resources, time, knowledge, or opportunity to participate in UM sustainability initiatives. So, if they think it's easy to get involved and they can manage it alongside their studies, they are more likely to have the intention to do so. Besides, there is a study on sustainable usage of bike sharing that shows perceived behavioral control is positively correlated to sustainable user intention (Si et al., 2019). Thus, the following hypothesis is formulated:

H3: There is a significant relationship between perceived behavioral control and students' intention.

2.1.4 Intention

Intention can be referred to as the motivational component, capturing how the effort of an individual is willing to put into performing a behavior. It is the most immediate predictor of actual behavior. In this study, intention is referred to as the likelihood of UM students to participate in sustainability initiatives. Over the past few years, intentions have been widely used as a key variable of TPB to predict students' behavior. For example, a study by Halder et al. (2015) shows that the TPB model is effective in understanding students' intention to use bioenergy across different cultures.

2.2 Design and sample size

This research used a quantitative, cross-sectional survey design in order to determine the relationships between the TPB variables and students' intent to participate in UM sustainability initiatives. The TPB variables measured in this study include their behavior, SN, PBC, and intention. The ideal sample size was determined using Raosoft sample calculator, which calculates sample sizes based on 5% margin of error and 95% confidence level. As of 28 February 2025, there are about 39840 students who are enrolled in Universiti Malaya. Therefore, according to Raosoft calculator, the recommended sample size is 381. Additionally, following Krejcie and Morgan (1970), the table evaluates the significant relationships between the TPB variables, with a target sample size minimum of 380 respondents, which is appropriate for a population size of 40000 to ensure adequate statistical power (Chaokromthong & Sintao, 2021).

2.3 Target population and participation recruitment

The target population for this study consists of undergraduate and postgraduate students at UM. This study focused exclusively on students, as they are the primary stakeholders in university sustainability initiatives. Their attitudes, subjective norms, and perceived behavioral control are among the main keys that shape the success of these initiatives, given that they are the main participants of these initiatives. Additionally, universities often design sustainability initiatives with students as the primary target group, making their engagement crucial for evaluating the effectiveness of the programs. To ensure a representative sample across different faculties, ages, and genders, a random sampling method was employed. The finalized survey was distributed through various online platforms and in physical form. This study managed to collect around 381 responses after data cleaning.

2.4 Research instrument

The survey was conducted using a questionnaire consisting of five sections. The first section is the demographic information of the respondents, which contains the gender, year of study, study background, and residential status. The remaining sections were assessed using a 5-point Likert scale, with response options ranging from "strongly disagree" to "strongly agree". Section A measures attitudes, Section B assesses SN, Section C evaluates PBC, and Section D examines intention.

2.5 Data analysis

The data from the response were then analyzed using SPSS software (version 27). The evaluation was then divided into four different sections; the first section presents descriptive statistics of the respondents' demographic information. The second section analyzed the relationship between intention and demographic variables (gender and study background) using an independent sample t-test. Other than that, this study also assessed the reliability of the constructs through Cronbach's Alpha. Finally, the

study evaluates the relationship between attitudes, SN, PBC, and the purpose of participating in sustainability initiatives using correlation analysis and multiple linear regression.

3. Results and Discussions

3.1 Results

3.1.1 Descriptive statistics

Figure 2 shows the gender of the respondents, 39.01% of the respondents are male, and 60.99% is female. Meanwhile, Figure 3 represents the year of study, 22.77% of respondents in the first year, 24.35% in the second year, 34.82% in the third year, and 18.06% in their fourth or final year. For Figure 4, which is the background of the study, 60.21% of respondents are from a science background, while 39.79% are from a non-science background. Furthermore, Figure 5 shows that 39.53% of students live on campus, whereas 60.47% live off campus.

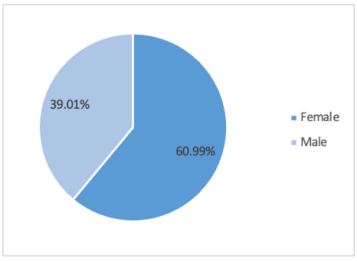

Figure 2. Gender of the respondents

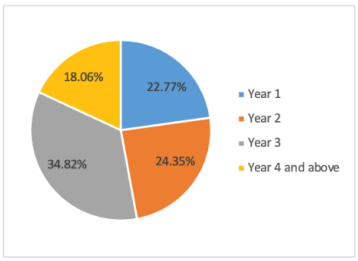

Figure 3. Year of Study

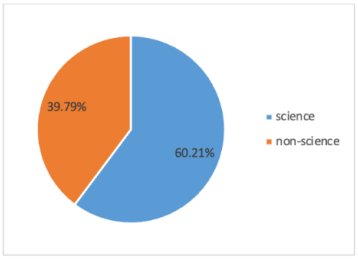

Figure 4. Respondents study background

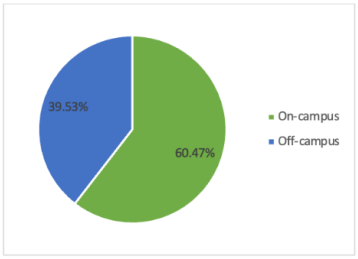

Figure 5. Respondents' residential status

3.1.2 Sample t-test analysis

a. Relationship of intention towards socio-demographic variables

Based on Table 1**,** the results show a significant difference between gender and intention (t=-2.330, df=380, p≤0.05). This result aligns with Hunter et al.'s (2004) study of environmental behavior across 22 countries, where they found women more likely than men to engage in pro-environmental behavior such as recycling, purchasing organic or chemical-free products, and reducing car usage. Similarly, stated that females showed greater involvement in pro-environmental behaviors than males. This study may suggest that female students will be more likely to participate in university environmental clubs or events due to stronger peer influence. In contrast, male students might remain unaware of these matters since they do not align with their interests. These gender differences highlight the importance of alternative engagement strategies that appeal to a wider student demographic.

Table 1. Independent sample t-test to examine the relationship among the gender and intention

		F	Sig.	T	df	Sig.(2-tailed)
Intention	Equal variances assumed	3.823	0.051	-2.330	380	0.020
	Equal variances not assumed			-2.246	277.569	0.025

Table 2 indicates that there is a significant difference between the background of study and intention (t=4.291, df=380, p≤0.05). This results difference may be due to variations in exposure and educational focus across different fields of study. This finding aligns with a study by Owo and Ephraim (2020), which found a significant difference in knowledge and participation in the solid waste management among the science and non-science students. Students with science backgrounds may show greater concern for environmental issues, making them more likely to engage in sustainability initiatives. This is likely due to the fact that environmental topics and sustainability are usually embedded in science courses (Zsóka et al., 2013). In contrast, non-science students may view sustainability as less relevant to their academic goals, thereby reducing their motivation to participate in such initiatives.

Table 2. Independent sample t-test examining the relationship between the background of study and intention

		F	Sig.	T	df	Sig.(2-tailed)
Intention	Equal variances assumed	4.709	0.031	4.291	380	<0.001
	Equal variances not assumed			4.171	291.666	<0.001

3.1.3 Reliability analysis

According to the research done by Tavakol and Dennick (2011), the Cronbach's alpha value above 0.7 is considered acceptable for assessing internal consistency. Based on Table 3, all items across the measured variables exceeded this threshold. Although attitude recorded the lowest Cronbach's alpha value at 0.75, it still meets the acceptable value. The intention variable exhibited the highest reliability score (α=0.900), followed by SN (α=0.891) and PBC (α=0.835). To improve reliability, a few items from the initial set were excluded to ensure that Cronbach's alpha values remained above the acceptable value. As a result, 22 out of 24 were retained in the final analysis.

Table 3. Convergent validity results for the constructs

Construct	Item	Mean	SD	Cronbach's α
Attitude	A1	4.48	0.678	
	A2	4.33	0.728	
	A3	4.35	0.740	
	A4	3.21	1.122	
	A5	4.37	0.832	
	A6	4.10	0.836	**0.759**
Subjective Norm	B2	4.11	0.952	
	B3	4.23	0.812	
	B4	4.08	0.933	
	B5	4.28	0.786	
	B6	4.07	0.866	**0.891**
Perceived Behavioral Control	C1	3.52	0.974	
	C2	3.87	0.933	
	C3	4.28	0.771	
	C4	4.25	0.833	**0.835**
Intention	D1	4.09	0.858	
	D2	3.77	1.011	
	D3	3.92	0.904	
	D4	4.20	0.784	
	D5	3.57	0.952	
	D6	3.53	0.979	**0.900**

3.1.4 Correlation analysis

Table 4 shows the correlation results between attitude, SN, PBC, and intention to participate in sustainability initiatives at University Malaya. The findings indicate a significant and positive correlation between all the variables.

There is a moderate positive and significant correlation between attitude and intention (r=0.57, p<0.001). This implies that favorable personal evaluations are associated with stronger intention. Universiti Malaya's sustainability cultures, such as the UM Zero Waste Campaign, UM Living Labs (UMLL), Water Warriors UM, and The RIMBA project, may have contributed to this positive attitude. These efforts

aim to foster students' belief that sustainability is beneficial and important to the environment. This is supported by Han (2015), who found a significant positive relationship between attitude and intention to act pro-environmentally.

In addition, there is a strong positive and significant relationship between SN and intention (r=0.77, p<0.001). These results suggest that social pressure from peers, community, or cultural expectations plays an important role in shaping students' intention to participate. This is similar to an earlier study by Aziz (2019), which reported that there is a positive relationship between subjective norm and students' pro-environmental behavior in Jordan.

Furthermore, Table 4 shows there is a strong and positive correlation between PBC and intention (r=0.79, p<0.001). This shows that students' confidence in their ability to engage in sustainability due to access to resources, knowledge, or time is the strongest predictor of intention. This finding aligns with Romero-Colmenares and Reyes-Rodríguez (2022), who find a similar positive influence of perceived behavioral control on eco-entrepreneurship intentions among university students in Bucaramanga, Colombia.

Table 4. Pearson correlation results among all variables

No.	Variable		1	2	3	4
1	Attitude	Pearson Correlation	1			
		Sig. (2-tailed)	—			
2	Subjective Norm	Pearson Correlation	0.701**	1		
		Sig. (2-tailed)	0.000	—		
3	Perceived Behavioural Control	Pearson Correlation	0.672**	0.828**	1	
		Sig. (2-tailed)	0.000	0.000	—	
4	Intention	Pearson Correlation	0.572**	0.768**	0.789**	1
		Sig. (2-tailed)	0.000	0.000	0.000	—

***Correlation is significant at the 0.01 level (two-tailed).*

3.1.5 Multiple linear regression analysis

Based on Table 5, the relationship among the dependent and independent variables was examined using multiple linear regression analysis. In this analysis, the predictor variables were attitude, SN, and PBC, while the main intention was to serve as the dependent variable. The results show that SN and PBC significantly influenced students' intention to participate in sustainability initiatives conducted by UM. The strongest predictor was PBC (β=0.493, t=9.023, p<0.05), followed by SN (β=0.374, t=6.582, p<0.05). Therefore, hypotheses H2 and H3 are supported. These findings are aligned with previous studies (Han, 2015) and suggest that UM's initiatives effectively enhance students' confidence in their ability to participate.

However, the results show no significant link between attitude and intention (β=- 0.021, t=-0.500, p>0.05). As a result, hypothesis H4 is rejected. Similar findings were reported by Park and Yang (2012), who found a significant relationship between attitude and intention to participate in environmental activities. Besides, Vu et al. (2021) reported that attitude was not directly associated with green purchase intention. A plausible explanation for this result could be the presence of barriers such as busy academic schedules, lack of awareness of available programs, or students' perceptions that their participation may not make a meaningful impact.

Table 5. Results of multiple linear regression analysis on intention

Model	Unstandardized Coefficients Beta	Std. Error	Standardized Coefficients Beta	t	Sig.
Constant	2.105	1.001	—	2.103	0.036
Attitude	-0.029	0.057	-0.021	-0.500	0.617
Subjective Norm	0.390	0.059	0.374	6.582	0.000
Perceived Behavioral Control	0.770	0.085	0.493	9.023	0.000

Dependent variable: Intention
Notes : *P<0.01, ** P<0.05, ***P<0.01
Adjusted R^2 = **0.661**, F-statistic = **248.920**, Sig at = **p < 0.001**

Table 6. Summary of the results of the hypotheses

Hypothesis	Statement	Result
H1	There is a significant relationship between attitude and intention	Rejected
H2	There is a significant relationship between subjective norm and intention	Supported
H3	There is a significant relationship between perceived behavioural control and intention	Supported

3.2 Discussions

The results of this study indicate that students' attitudes towards campus sustainability do not significantly influence their intention to participate, whereas subjective norms (SN) and perceived behavioural control (PBC) exert a significant positive effect. In other words, social pressure from the environment (SN) and confidence in one's own abilities (PBC) have been shown to be the main reasons why students want to get involved in sustainability initiatives, more so than just judging their own attitudes. The analysis of multiple linear regression confirmed that PBC is the strongest predictor of participation intention (β=0.493), followed by SN (β=0.374). This means that students are more likely to want to participate if they feel capable and in control of their participation, and if they get support or influence from important people in their lives. Conversely, a positive attitude towards sustainability is insufficient to foster intention when isolated from social support and self-efficacy. This finding aligns with the Theory of Planned Behaviour (TPB), which posits that intention is influenced by a combination of attitudes, subjective norms, and perceived behavioural control. However, the case of the insignificant influence of attitude reinforces the view that a positive environmental attitude does not always translate into behavioural intention, especially when there are hindering factors. It is possible that students at Universiti Malaya, despite recognising the importance of sustainability, encounter practical obstacles such as academic demands, insufficient information about available programs, or a perception that their participation lacks significant impact, resulting in a disconnect between positive attitudes and intentions.

The Pearson correlation results between the variables also support the above findings: attitude, SN, and PBC all have significant positive relationships with intention. When the three variables were modelled together, however, the contribution of attitude weakened and became insignificant, while SN and PBC remained significant. The predictive power of this research model is high (R^2 adjusted ~66%), indicating that the combination of SN and PBC can explain most of the variation in students' intentions to participate in campus sustainability programs. Overall, these main findings confirm that subjective norms and perceived behavioural control are key factors in encouraging students' participation intentions, while merely having a positive personal attitude is insufficient without the support of other factors.

The findings of this research align with certain previous studies while differing from others. The insignificance of the influence of attitudes on intentions contradicts the findings reported by Han (2015) and Park & Yang (2012). In the context of environmentally friendly hotels, Han (2015) found that pro-environmental attitudes are significantly positively related to intentions to behave in an environmentally friendly manner. Likewise, Park and Yang (2012) reported that attitudes significantly influence the intentions of online community members to participate in environmental activities. The differences indicate that the role of attitude can vary across contexts; in some studies, individuals' positive beliefs about environmental behaviour significantly influence intentions, whereas in the context of UM students, this effect is not significantly observed. Interestingly, similar results to this study were reported by Vu et al. (2021), who found that attitudes do not have a direct influence on the intention to purchase green products. The findings of Vu et al. (2021) align with our results, suggesting that in specific domains of pro-environmental behaviour, attitudes may influence through mediators or alternative factors (e.g., norms or control) rather than directly.

Meanwhile, the positive influence of subjective norms (SN) on student intentions is consistent with the findings of many previous researches. The results of this study indicate that subjective norms (SN) exhibit a strong correlation and influence on intentions, aligning with Aziz's (2019) study in Jordan, which reported a positive relationship between subjective norms and pro-environmental behavioural intentions among students. This means that social support, expectations from close friends, and a positive campus culture tend to encourage students to take part in sustainability efforts. This finding is also consistent with the research conducted by Tang et al. (2022) in Shanghai, China, which revealed that community support and social environment significantly contribute to residents' intentions to participate in environmental renewal programs. In this way, empirical evidence generally supports the important role of social norms

in various contexts of environmental behaviour, including student participation in green campus initiatives.

For perceived behavioural control, the results of this study are consistent with previous literature that emphasises the significant role of PBC in predicting pro-environmental behavioural intentions. PBC has been proven to be the most dominant predictor in this study, consistent with the findings of Romero-Colmenares & Reyes-Rodríguez (2022), who found that PBC has a significant positive effect on the intention to engage in sustainable entrepreneurship among university students in Colombia. In the context of eco-friendly entrepreneurship and participation in green campus programs, an individual's belief in their ability, time, and resources to take action is a significant determinant of their intention to engage. Si et al. (2019) reported similar results, finding that PBC has a positive correlation with the intention to use sustainable bike-sharing services. These cross-context findings reinforce the conclusion that when an individual perceives themselves as capable and unimpeded in engaging in pro-environmental behaviour, their intention to do so will increase. Conversely, if individuals perceive numerous obstacles or limitations, their intentions are likely to be weak, even if they maintain a positive attitude. The results of this study are in line with most of the previous research on SN and PBC, but provide a new perspective on the role of attitudes that turned out to be insignificant in the context of UM students – this is different from some previous studies (e.g Han, 2015; Park & Yang, 2012) but in line with others (Vu et al., 2021).

Theoretically, this research contributes to the development of the Theory of Planned Behavior in the context of sustainability in higher education, especially in Malaysia. This study addresses a gap in the literature due to the limited research on the intentions of students to participate in campus sustainability initiatives in Malaysia. The finding that SN and PBC are the main determinants of intention, while attitude is not significant, suggests that the TPB model may be contextual. In the more collectivist culture of Southeast Asia, this result shows how important social norms are: support and influence from others may be more important than a person's own evaluation of their own actions. This does not negate TPB; rather, it enhances our understanding of the relative weight of each TPB construct in specific situations. Ajzen (1991) states that the three factors (attitude, subjective norm, PBC) collectively influence intention; however, prior research acknowledges that a positive attitude does not invariably ensure the emergence of intention without accompanying supportive factors. The findings of this study corroborate the notion that a positive environmental attitude among UM students must be reinforced by perceptions of ease and social norms to translate into a genuine intention to participate. Consequently, this research provides a theoretical contribution by presenting an empirical context in which the Theory of Planned Behaviour (TPB) operates partially: two of the three determinants of intention (Subjective Norms and Perceived Behavioural Control) are predominant, while the role of attitude may be mediated or moderated by other factors. This insight can stimulate further development of TPB, for instance, by incorporating additional variables pertinent to the campus context (such as moral obligation or environmental awareness) to enhance the model's explanatory power.

In practical terms, these results provide guidance for policymakers and campus sustainability program designers. First, because subjective norms have a strong effect, universities should create a social climate that encourages participation. Sustainability programs can be designed by involving student role models, such as student organization leaders or supervisors, as well as mobilizing campus communities to encourage collective engagement. For instance, an environmental campaign should include groups of friends and student organisations. This will create positive peer pressure, which will make students more likely to participate when they see their friends doing so and when social values of sustainability are recognised. Second, considering that PBC is the most dominant factor, strengthening students' perceived behavioral control is key. The campus must ensure that students find it easy to be involved in existing initiatives. Some practical steps that can be taken are: providing clear information about engagement opportunities and their benefits, scheduling sustainability activities at times that do not conflict with lecture hours, providing training or orientation to make students feel confident, and providing facilities or incentives (e.g., certificates, co-curricular credits) for program participants. With fewer barriers to participation, students will be more likely to get involved. The finding that students are more motivated by social support and a sense of capability than merely the knowledge that "this is important" indicates that environmental communication programs focused solely on raising awareness must be supplemented with empowerment strategies and community-building initiatives. Universiti Malaya and other campuses

can use the results of this study to design more effective and targeted sustainability programs. For example, they can build a network of sustainability ambassadors or champions among students to spread positive norms and ensure that each initiative is supported by resources and ease of access for students. Thus, the campus's efforts towards a sustainable culture can be more successful because they are in line with the main factors that drive students' intentions.

This research undoubtedly possesses limitations that must be acknowledged. In terms of design, this study is cross-sectional and based on self-report surveys, so the relationships found are correlational and susceptible to respondent perception bias. As a result, the causal relationship cannot be definitively established—specifically, whether SN and PBC induce an increase in intention, or if other factors are also influencing it. In terms of population, the research sample consisted only of University of Malaya students, so generalization of findings to the context of other universities or different populations should be done with caution. The characteristics of UM as a leading research university with various green initiatives may distinguish it from other campuses. In addition, although the study involved a diverse range of students (from different genders, years of study, and majors), the focus was only on the group of students as respondents. This study focuses solely on three primary constructs of the Theory of Planned Behaviour (attitude, subjective norm, perceived behavioural control) and intention, excluding other potentially relevant variables. The literature on pro-environmental behavior suggests that additional factors such as personal norms or moral obligations, environmental knowledge and awareness, and past experiences can influence intentions and behaviors. These limitations open up space for future research development.

Further research is recommended to overcome these limitations. First, to broaden the perspective, subsequent studies could include a more diverse range of respondents, not limited to students. For example, including professors and campus staff will provide a complementary perspective, considering they are also stakeholders in the sustainability initiatives at the university. This approach will help to understand whether the factors that drive participation are the same for groups other than students, or if there are different dynamics. Second, the addition of new variables to the theoretical framework may be considered to enrich the TPB model. For example, incorporating the element of moral obligation can assess the dimension of an individual's personal norms regarding pro-environmental behaviour, as suggested in previous environmental studies (e.g., the integration of TPB with personal norm theory by Han, 2015). Other variables, such as environmental awareness or knowledge about green campus programs, as well as related past behaviours (for instance, students' experiences in previous environmental volunteer activities), may also be included. The inclusion of these factors has been proposed in this study due to their potential to offer a more comprehensive explanation regarding participation intentions. Third, further research can utilize longitudinal or experimental designs to identify the dynamics of changes in intent over time and test causality more clearly. For example, watching students from their first year to their last can show how their experiences in college affect their plans to participate in sustainability efforts. Last but not least, it would also be interesting to do comparative research between cultures or institutions. Is it true that the attitude is not important and the PBC is the most important thing in Malaysian or Asian universities? Cross-border studies can answer these questions and deepen understanding of the role of cultural context in the SDGs.

By implementing the aforementioned recommendations, future research can enhance theoretical insights while producing more robust practical guidelines. Enriching the TPB model with additional variables and expanding the population scope will help build a stronger foundation of knowledge to encourage deep and broad participation in sustainability programs at universities. In turn, this will support the creation of a more sustainable campus culture that is in line with the goals of sustainable development (SDGs) as a whole.

Conclusion

To summarize, this research indicates that both of the gender and background of students truly have a significant difference in their willingness to participate in UM sustainability initiatives. The Pearson correlation conducted in this study shows that all of the variables have a positive and significant correlation with each other, supporting the theoretical framework of TPB. However, Multiple linear regression revealed that SN and PBC have a significant impact on the intention to participate in UM sustainability initiatives. In contrast, attitude did not show a significant relationship with intention. This suggests that SN and PBC are more critical drivers of students' intention to participate. In other words,

the students are likely engaging in sustainability activities when they feel encouraged by others or believe they are capable of participating, more than they think that sustainability is important.

Furthermore, this study offers valuable insights for Universiti Malaya and other higher education institutions that could use them in designing more effective, sustainable programs for their students. These findings highlight factors that should be prioritized to increase student participation in such initiatives. Nevertheless, this research has several limitations that were identified and can be addressed in future studies. This research focused on students, as they are the crucial stakeholders in adopting sustainable practices in the university. However, future research can be conducted with lecturers and staff involved to obtain a more comprehensive view. Additionally, future studies should include other variables such as moral obligation, environmental awareness, or past behaviors to gain more comprehensive insights into the factors that affect participation in sustainability initiatives. By expanding both the target population and theoretical approach, future research can develop the basis to encourage deep and broad participation in sustainability programs at the university.

Acknowledgments

This work was supported, in part, by UM Livings Labs FYP SDG@UM (LL2025FYPSDG037) and the Toyota Foundation Research Grant (D24-HS-0069).

References

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*(2), 179–211. https://doi.org/10.1016/0749-5978(91)90020-t

Aziz, A. (2019). Applying theory of planned behavior to understand pro-environmental intention and behavior of students. *Arthatama: Journal of Business Management and Accounting*, *3*(1), 1-15.

Bantanur, S., Mukherjee, M., & Shankar, R. (2015). Emerging dimensions of sustainability in institutes of higher education in India. *International Journal of Sustainable Built Environment*, *4*(2), 323–329.

https://doi.org/10.1016/j.ijsbe.2015.03.004

Bosnjak, M., Ajzen, I., & Schmidt, P. (2020). The theory of planned behavior: Selected recent advances and applications. *Europe's Journal of Psychology*, *16*(3), 352–356.

https://doi.org/10.5964/ejop.v16i3.3107

Chaokromthong, K., & Sintao, N. (2021). Sample size estimation using Yamane and Cochran and Krejcie and Morgan and Green formulas and Cohen statistical power analysis by G* Power and comparisons. *APHEIT International Journal*, 10(2), 76-86.

Filho, W. L., Trevisan, L. V., Dinis, M. a. P., Ulmer, N., Paço, A., Borsari, B., Sierra, J., & Salvia, A. (2024). Fostering students' participation in the implementation of the sustainable development goals at higher education institutions. *Discover Sustainability*, *5*(1).

https://doi.org/10.1007/s43621-024-00204-7

Halder, P., Pietarinen, J., Havu-Nuutinen, S., Pöllänen, S., & Pelkonen, P. (2015). The Theory of Planned Behavior model and students' intentions to use bioenergy: A cross-cultural perspective. *Renewable Energy*, *89*, 627–635. https://doi.org/10.1016/j.renene.2015.12.023

Han, H. (2015). Travelers' pro-environmental behavior in a green lodging context: Converging value-belief-norm theory and the theory of planned behavior. *Tourism Management*, *47*, 164-177. https://doi.org/10.1016/j.tourman.2014.09.014

Hunter, L. M., Hatch, A., & Johnson, A. (2004). Cross-National Gender variation in Environmental Behaviors*. *Social Science Quarterly*, *85*(3), 677–694. https://doi.org/10.1111/j.0038-4941.2004.00239.x

Katiliūtė, E., Daunorienė, A., & Katkutė, J. (2014). Communicating the sustainability issues in higher education institutions world wide webs. *Procedia - Social and Behavioral Sciences*, *156*, 106–110.

https://doi.org/10.1016/j.sbspro.2014.11.129

Owo, W. J., & Ephraim, K. A. (2020). Knowledge and Involvement of Science and Non-science Students in Solid Waste Management: An imperative of Science and Environmental Science Education. *International Journal of Scientific Research in Education*, 13(5), 820-831.

Park, N., & Yang, A. (2012). Online environmental community members' intention to participate in environmental activities: An application of the theory of planned behavior in the Chinese context. *Computers in Human Behavior*, *28*(4), 1298–1306.

https://doi.org/10.1016/j.chb.2012.02.013

Peters, R. M., & Templin, T. N. (2010). Theory of Planned Behavior, Self-Care Motivation, and Blood Pressure Self-Care. *Research and Theory for Nursing Practice*, *24*(3), 172–186. https://doi.org/10.1891/1541-6577.24.3.172

Romero-Colmenares, L. M., & Reyes-Rodríguez, J. F. (2022). Sustainable entrepreneurial intentions: Exploration of a model based on the theory of planned behaviour among university students in north-east Colombia. *The International Journal of Management Education*, *20*(2), 100627. https://doi.org/10.1016/j.ijme.2022.100627

Si, H., Shi, J., Tang, D., Wu, G., & Lan, J. (2019). Understanding intention and behavior toward sustainable usage of bike sharing by extending the theory of planned behavior. *Resources Conservation and Recycling*, *152*, 104513. https://doi.org/10.1016/j.resconrec.2019.104513

Stark, J., Hössinger, R., & Ajzen, I. (2025). Explaining children's physical activity: Experiential attitudes in the theory of planned behaviour. *Transportation Research Part F Traffic Psychology and Behaviour*, *112*, 63–76. https://doi.org/10.1016/j.trf.2025.03.024

Tang, D., Gong, X., & Liu, M. (2022). Residents' behavioral intention to participate in neighborhood micro-renewal based on an extended theory of planned behavior: A case study in Shanghai, China. *Habitat International*, *129*, 102672. https://doi.org/10.1016/j.habitatint.2022.102672

Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. *International Journal of Medical Education*, *2*, 53–55. https://doi.org/10.5116/ijme.4dfb.8dfd

Viebahn, P. (2002). An environmental management model for universities: from environmental guidelines to staff involvement. *Journal of Cleaner Production*, *10*(1), 3–12. https://doi.org/10.1016/s0959-6526(01)00017-8

Vu, D. M., Ha, N. T., Ngo, T. V. N., Pham, H. T., & Duong, C. D. (2021). Environmental corporate social responsibility initiatives and green purchase intention: an application of the extended theory of planned behavior. *Social Responsibility Journal*, *18*(8), 1627–1645. https://doi.org/10.1108/srj-06-2021-0220

Yazdanpanah, M., & Forouzani, M. (2015). Application of the Theory of Planned Behaviour to predict Iranian students' intention to purchase organic food. *Journal of Cleaner Production*, *107*, 342–352. https://doi.org/10.1016/j.jclepro.2015.02.071

Zsóka, Á., Szerényi, Z. M., Széchy, A., & Kocsis, T. (2013). Greening due to environmental education? Environmental knowledge, attitudes, consumer behavior and everyday pro-environmental activities of Hungarian high school and university students. *Journal of Cleaner Production*, *48*, 126-138. http://dx.doi.org/10.1016/j.jclepro.2012.11.030