

Examining Participation in the “No Plastic Bag Day” (NPBD) Campaign among UiTM Seremban 3 Students

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Abstract

Plastic bags remain among the most widely used single-use plastics worldwide, with harmful environmental and health effects because of their non-biodegradable nature and contribution to pollution. Malaysia has launched several initiatives, such as the No Plastic Bag Day (NPBD) campaign, to reduce consumption; however, participation rates remain low despite continued efforts. This study examines the factors that influence student participation in the NPBD campaign at Universiti Teknologi MARA (UiTM) Seremban 3, focusing on three determinants drawn from the Theory of Planned Behavior (TPB): environmental knowledge, campaign awareness, and attitude. A total of 230 respondents took part in this survey-based study through stratified sampling. Data were analyzed using descriptive statistics, Pearson correlation, and multiple regression analysis. The results show that all three variables significantly and positively influence participation, with awareness emerging as the strongest predictor, followed by environmental knowledge and then attitude. The regression analysis revealed that these factors jointly explained 66.7% of the variance in campaign participation. The findings highlight the important role of awareness campaigns in shaping pro-environmental behavior, while also showing the complementary influence of knowledge and attitude. This study contributes to both theoretical and practical understanding by validating the TPB in a Malaysian higher education setting and offering useful insights to help policymakers, universities, and NGOs design more effective interventions. Strengthening awareness strategies, embedding environmental education, and shaping positive attitudes are essential to develop sustainable practices among youth, thereby supporting Malaysia's roadmap to reduce single-use plastics and promote long-term environmental responsibility.

Keywords: Plastic bag consumption, No Plastic Bag Day (NPBD), Theory of Planned Behavior (TPB), Environmental Knowledge, Awareness, Attitude

INTRODUCTION

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Plastic is a material widely used by people across the world for various purposes. It is used as a carrier, in household products (buckets, bottles, and kitchen utensils), in the automotive and construction industries (vehicle components and building materials), and in the medical field, such as medical supplies. The earliest development of plastic occurred in 1284 when natural materials such as horn, tortoiseshell, amber, rubber, and shellac were used. The first synthetic plastic was developed to address the scarcity of animal-derived materials as a result of the rise of industrialized goods manufacturing in the 19th century (Science Museum, 2019). The

inventor Alexander Parkes patented the first man-made plastic, called Parkesine, in 1892. It was made of cellulose treated with nitric acid to produce pyroxylin, which was then dissolved in alcohol to make buttons, combs, and cutlery handles (Advanced Plastiform, n.d.).

However, among the many uses of plastic, the most produced and consumed plastic product is the plastic bag. The largest consumer of plastic bags is the retail sector, owing to their durability and lightweight material (Madigele et al., 2017). They have been used as carriers to replace paper bags since the 1970s (O'Brien & Thondhlana, 2019). Half of the plastics produced are single-use plastic bags intended to be discarded after a single use (Abdullah et al., 2023). According to data from The World Counts, 160,000 plastic bags are used every second, amounting to an estimated 5 trillion plastic bags by the end of 2024 (The World Counts, n.d.). According to a report published by Towards Packaging, the global plastic bag packaging industry is projected to grow from USD 26.89 billion in 2025 to around USD 35.41 billion by 2033. In 2023, the Asia Pacific region dominated the plastic bag packaging market with the largest market share (Towards Packaging, 2024). This shows that plastic bags are still in high demand and that Asian countries are the leading plastic manufacturers in the world.

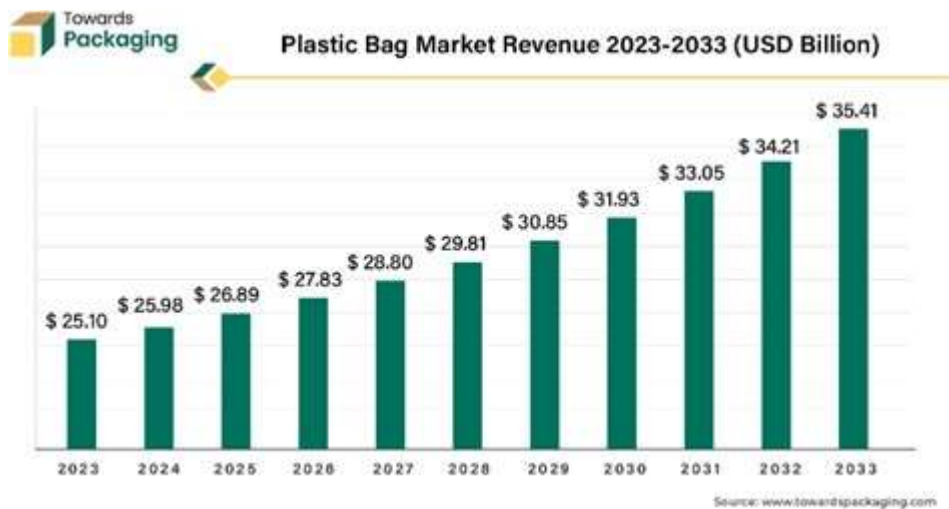


Figure 1: Plastic Bag Market Revenue
Source: (Towards Packaging, 2024)

Plastic bags contain a harmful substance called polyethylene or polythene film, which damages the environment because of its strong resistance to degradation (Kamaruddin & Yusuf, 2012). Plastic bags also pose serious health risks when consumed. Aquatic species such as sea turtles, manatees, and whales have been found consuming plastic bags at sea (Uçman & Yazici, 2023). Research shows that the number of animals dying from plastic ingestion exceeds deaths from several diseases in some African countries (Bashir, 2013). This is because plastic bags floating in the sea are mistaken for food, and they often entangle marine animals (Kühn et al., 2015). Plastic bags form a large share of the plastic waste in landfills. Plastic waste accounts for 24% of the 19,000 tonnes of solid waste produced in Malaysia (Asmuni et al., 2015). The waste takes about 1,000 years to decompose and releases many toxic gases into the environment during this process (Musa et al., 2013). Methane and carbon dioxide are gases that harm human health and contribute to global warming (Abdullah et al., 2023).

Worldwide, governments have responded to the plastic bag crisis through bans, levies, and awareness campaigns. Countries such as Bangladesh, Kenya, and Ireland have introduced outright bans or steep charges that have significantly reduced plastic bag consumption (Convery et al., 2007; Umapathy, 2019). In Malaysia, Penang introduced plastic bag restrictions in 2009, followed by Selangor in 2010 (Asmuni et al., 2015). The No Plastic Bag Day (NPBD) campaign was launched nationally in 2011 by the Ministry of Domestic Trade, Cooperative and Consumerism (MDTCC, 2012), charging consumers MYR 0.20 per plastic bag and encouraging the use of reusable alternatives (Zen et al., 2013). Despite these measures, participation among Malaysians remains low, with about nine billion plastic bags still used each year (Nurqalby, 2023).

In May 2023, the Minister of Natural Resources, Environment, and Climate Change, Nik Nazmi Nik Ahmad, announced a review of the campaign to make it more ambitious, in line with Malaysia's Roadmap Towards Zero Single-Use Plastics 2018–2030. This is despite the new policy being intended to eliminate plastic bag use by 2025 across business sectors that include roadside stalls, to be implemented in phases (Gomes & Tan, 2024). According to Nik, the phased implementation is intended to make the policy effective and to allow time for public adoption and for understanding of its rationale. This policy review was undertaken because, since the introduction of the NPBD campaign, Malaysians have continued to use plastic bags daily. According to Reek Checks, 11.52% of the total waste collected during the coastal clean-up in September 2022 consisted of plastic bags (Gomes & Tan, 2024). Several studies have been

conducted to examine factors that influence the effectiveness of the campaign, including knowledge, awareness, and attitude toward it.

The effectiveness of the government's ongoing NPBD campaign has been questioned, given that the Malaysian Plastics Manufacturers Association estimates that nine billion plastic bags are used by Malaysians each year. Despite initiatives to raise awareness and reduce dependence on plastic bags, many customers still prefer to use them and often leave stores without making a purchase when plastic bags are unavailable. Research shows that most consumers do not carry their own reusable bags at major supermarkets, with fewer than 10% of respondents reporting that they did so. The goals of the campaign are weakened by this reliance and by the fact that some stores still charge for plastic bags (Nurqalby, 2023).

This study examines university students' participation in the No Plastic Bag Day campaign at UiTM Seremban 3, Malaysia. Unlike earlier studies that examined NPBD participation among the general public or students at research-intensive universities such as UPM and IIUM (Abdullah et al., 2023; Yuhani et al., 2020), UiTM Seremban 3 is a mid-sized public university campus in Negeri Sembilan with a mainly Bumiputera student body from varied socioeconomic backgrounds. This institution-specific setting is important because awareness campaigns and environmental education strategies may produce different outcomes depending on institutional culture, campus infrastructure, and the socio-demographic profiles of students. Studying this distinct population therefore extends the existing literature beyond the common urban, research-university context and provides insights relevant to a wider range of Malaysian higher education institutions. The findings of the study can provide useful information to help the state government, the federal government, universities, and other stakeholders plan better future policies, regulations, or legislation.

LITERATURE REVIEW

Theory of Planned Behavior (TPB)

A theoretical and empirical review of the motivation constructs used in previous studies is given in the next section, which has drawn on established models to examine the antecedents or determining factors of consumer participation. Previous research has used the Theory of Planned Behavior to explain consumers' attitudes toward NPBD

campaign participation. Previous research (Yuhani et al., 2020; Kuppusamy & Gharlegghi, 2015) has commonly applied this theory to examine consumers' behavioral intentions in several contexts, thus making it a key framework for considering the factors that influence their decisions.

The Theory of Planned Behavior (TPB) predicts an individual's motivation to perform a behavior. TPB proposes that, in the process of performing behaviors, the immediate determinants are behavioral intentions. Three determinants believed to underlie intentions and behavior are attitude toward the behavior, subjective norms, and perceived behavioral control (Ajzen, 1991). The TPB was developed as an extension of the line of research linked to the Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975) which was developed to predict and explain human behavior in various areas of life. According to TPB, a person's intention to perform a behavior is a function of their attitude toward the behavior and the relevant subjective norm. While the original TPB framework includes subjective norms and perceived behavioral control as key constructs, the present study represents these dimensions through the proximal antecedents of environmental knowledge and campaign awareness, which have been empirically shown to be significant drivers of pro-environmental behavioral intention in the Malaysian context (Hashim et al., 2023; Yuhani et al., 2020). Environmental knowledge serves as a cognitive foundation that informs and strengthens individuals' attitudes, closely aligning with the attitudinal component of TPB, while campaign awareness captures the informational and normative social cues that shape perceived behavioral norms (Indriani et al., 2019). This theoretical adaptation is consistent with extended TPB applications in environmental research, in which domain-specific knowledge and awareness constructs have been included to better reflect the contextual realities of pro-environmental participation (Van Le et al., 2024; Mei et al., 2012).

According to Condeza-Marmentini & Flores-González (2019), environmental knowledge involves a sound understanding of environmental concerns, ideas, and the complex relationships between different ecological elements. It covers not only scientific findings on ecosystems, biodiversity, and pollution, but also the social and cultural perspectives that shape how people interact with their surroundings. This knowledge is essential for making informed decisions in both the private and public sectors and for guiding sustainability and environmental management efforts. By having a broad understanding of environmental concerns, individuals become more aware of how their

decisions affect the wider world, fostering a sense of responsibility toward natural resources and encouraging sustainable behaviors.

The second factor that may influence participation in the NPBD campaign is awareness. According to Sayers (2006), awareness raising is a process that seeks to inform and educate people about a topic or cause with the aim of shifting their attitudes, behaviors, and beliefs in order to achieve a particular purpose or objective. A public awareness campaign is a strategic effort to inform and educate the public about issues, products, or causes, and ultimately to influence attitudes and behavior. These campaigns use various communication methods, including media outreach, social media engagement, community events, and educational programs, to reach a wide audience over a set period.

Awareness of the campaign alone does not always translate into action. Individuals' attitudes toward the environment and their personal beliefs about sustainability may shape this relationship. If people are aware of the campaign but hold weak environmental attitudes, they may be less likely to participate. Therefore, positive environmental attitudes are expected to mediate the relationship between campaign awareness and participation, which suggests that attitudes are strong predictors of behavior, particularly in pro-environmental actions (Indriani et al., 2019). Awareness of a campaign directly affects the likelihood that individuals will take part in it. When people are aware of the 'No Plastic Bag Day' campaign, they are more likely to adopt the behaviors it promotes, such as avoiding plastic bag use on the specified day. This indicates that awareness is a precursor to engagement and participation (Zamri et al., 2020). Thus, individuals who are more aware of the campaign are expected to show higher levels of participation.

The third factor is attitude. In the context of psychology, attitude refers to a psychological tendency expressed through the evaluation of a particular entity with some degree of favor or disfavor. Attitude is made up of a combination of beliefs, affect, and tendencies toward behavior in relation to an object, person, event, or idea (Haddock & Maio, 2008). Attitudes play an important role in shaping behavior and decision-making. They are either explicit, in which individuals are aware of their judgments, or implicit, in which attitudes operate without their awareness. Strong attitudes are more likely to predict behavior than weak ones when individuals have a personal interest in the object of the attitude (Hogg & Vaughan, 2005).

Individuals who hold more favorable views toward environmental sustainability, such as believing in the importance of reducing plastic waste, are more likely to engage in behaviors that match these values. This hypothesis proposes that individuals with positive environmental attitudes will be more willing to participate in the ‘No Plastic Bag Day’ campaign. There is a positive link between attitudes and environmentally conscious behaviors (Liu et al., 2020). Although environmental attitudes are influential, individuals often need to form the intention to engage in a specific behavior before doing so. People with positive environmental attitudes are more likely to form strong behavioral intentions to participate in the campaign, which in turn drives their actual participation. Studies of environmental behavior have shown that intentions mediate the relationship between attitudes and actual behavior (Saeed et al., 2019). Based on the above discussion, the following hypotheses were proposed:

H1: Environmental knowledge significantly influences participating in the “No Plastic Bag Day” (NPBD) Campaign among UiTM Seremban 3 students

H2: Awareness of campaign significantly influences participating in the “No Plastic Bag Day” (NPBD) Campaign among UiTM Seremban 3 students

H3: Attitudes significantly influences participating in the “No Plastic Bag Day” (NPBD) Campaign among UiTM Seremban 3 students

Figure 2 below shows the conceptual framework that underpins this study.

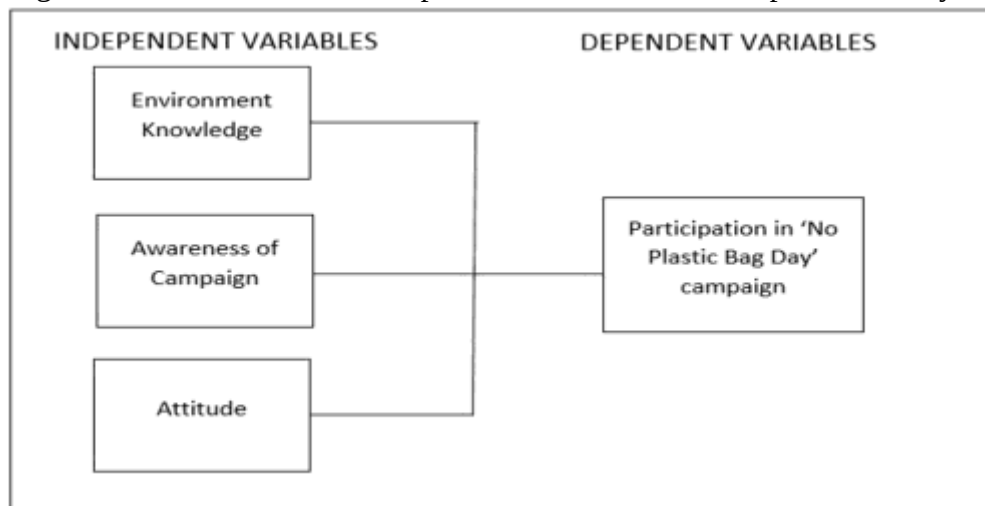


Figure 2 : Conceptual Framework

METHODOLOGY

This section describes the data collection process, including the sampling frame and the survey procedure. The population of this study consists of undergraduate and diploma students enrolled at UiTM Seremban 3, specifically from three faculties: the Faculty of Administrative Science and Policy Studies (FSPPP), the Faculty of Computer Science and Mathematics (KPPIM), and the Faculty of Sport Science and Recreation (FSR). These faculties were selected as the sampling frame because their diverse academic backgrounds provide a representative cross-section of the student population at UiTM Seremban 3. The sample size was calculated based on Krejcie and Morgan (1970) and Roscoe's (1975) rule of thumb.

A total of 230 respondents were selected for this study using a stratified sampling method. The respondents vary across demographic characteristics such as age, gender, race, religion, education level, and others. The respondents consisted of students from the Faculty of Administrative Science and Policy Studies, the Faculty of Computer Science and Mathematics, and the Faculty of Sport Science and Recreation at UiTM Seremban Campus. This study used a survey research method based on a structured questionnaire. The researchers developed the questions based on past studies such as Afroz et al. (2017). The study questionnaire consisted of five parts: Part A, Part B, Part C, Part D, and Part E. Part A covers the demographics of the respondents, and Parts B to E contain the measurement items for the independent and dependent variables. Respondents were asked to answer the items in Parts B to E using a five-point Likert scale ranging from 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, to 5 = Strongly Agree.

The study data were analyzed using descriptive and inferential statistics. Descriptive analysis was used to describe the background of the respondents and the level of each variable through measures of central tendency. Descriptive analysis was also used to assess the level of each independent and dependent variable, classified as low (1.00 to 2.33), medium (2.34 to 3.66), and high (3.67 to 5.00). In contrast, inferential analysis was used to summarize the data by measuring the relationships between variables. In this study, the analyses included the Pearson correlation test and multiple regression analysis. The Pearson correlation test was used to examine the strength of the relationship between the independent variables (environmental knowledge, campaign awareness, and attitude) and participation in the NPBD campaign. Multiple regression analysis was then used to determine the relative predictive strength of each independent variable. The decision

about each hypothesis was based on the level of significance, where $p < 0.05$ indicates a significant relationship, while $p > 0.05$ indicates insufficient evidence to support the hypothesis.

FINDINGS

Respondents Backgrounds

Table 1 presents the background information of the respondents. The results show that 140 female respondents (61%) and 90 male respondents (39%) took part in this study. In terms of age, 157 respondents (68%) were 21 to 24 years old, 66 respondents (29%) were 18 to 20 years old, and the remaining 7 respondents (3%) were 25 to 30 years old. Forty-eight percent of respondents lived in urban areas, 41% in semi-urban areas, and the remaining 11% in rural areas. Forty-six percent of respondents belonged to the middle-income group, followed by 41% in the lower-income group, while the smallest share, 14%, came from the high-income group.

Table 1:
Respondent Background

Profile		Frequency (n)	Percentage (%)
1. Gender	Male	90	39.1
	Female	140	60.9
2. Age	18-20 years	66	28.7
	21-24 years	157	68.3
	25-30 years	7	3.0
3. Place of Residence	Urban	111	48.3
	Semi Urban	94	40.9
	Rural	25	10.9
4. Marital Status	Single	228	99.1
	Married	1	0.4
	Widowed/Divorced	1	0.4
5. Educational Level	Diploma	68	29.6
	Bachelor's Degree	161	70
	Master	1	0.4
	Phd	0	0
6. Faculty	FSPPP	137	59.6
	KPPIM	51	22.2
	FSR	42	18.3
7. Current Year of Study	First year	51	22.2
	Second Year	86	37.4
	Third Year	93	40.4

8. Family Income	B40	94	40.9
	M40	105	45.7
	T20	31	13.5

Reliability and Normality Test

According to Andersson, Boateng and Abos (2024), a measurement is considered reliable if it produces the same results under constant conditions and remains stable and consistent across time, items, or raters. Cronbach's alpha is a common method used to test internal reliability, measuring the internal consistency of items in a scale or questionnaire. A value of 0.70 or above is generally acceptable for social science research (Tavakol & Dennick, 2011). Higher reliability is indicated by values closer to 1 on a scale from 0 to 1: > 0.90 is regarded as excellent, 0.80– 0.89 good, 0.70–0.79 acceptable, 0.60–0.69 problematic, 0.50–0.59 poor, and < 0.50 unsatisfactory.

Table 2:

Normality & Reliability Results

Variables	Mean	SD	Skewness	Kurtosis	Cronbach Alpha
Independent Variables:					
Environmental Knowledge	4.3880	0.53542	-0.871	0.572	0.889
Awareness of Campaign	4.1935	0.60750	-0.515	-0.155	0.884
Attitude	4.3750	0.54040	-0.676	0.012	0.836
Dependent Variable:					
Participation in 'No Plastic Bag Day' campaign	4.2761	0.59999	-0.732	0.115	0.97

Environmental Knowledge and Participation in the NPBD Campaign

Table 3:

Correlation between Environmental Knowledge and Participation in the NPBD Campaign among UiTM Seremban 3 Students

Variables	Pearson Correlation (r)	Sig. (1-tailed)	N
Participation in 'No Plastic Bag Day' campaign & Environmental Knowledge	0.703	0.000	230

As shown in Table 3, there is a significant relationship between environmental knowledge and participation in the NPBD campaign among UiTM Seremban 3 students ($r = 0.703$, $p = 0.000$, $p < 0.05$). Thus, as environmental knowledge increases,

participation in the NPBD campaign among UiTM Seremban 3 students also increases. As a result, this study accepted Ha1 and rejected Ho1.

The Relationship between Awareness of Campaign and Participation in the NPBD Campaign

Table 4:

Correlation between Awareness of Campaign and Participation in the NPBD Campaign among UiTM Seremban 3 students

Variables	Pearson Correlation (r)	Sig. (1-tailed)	N
Participation in 'No Plastic Bag Day' campaign & Awareness of Campaign	0.756	0.000	230

As shown in Table 4, there is a significant relationship between campaign awareness and participation in the NPBD campaign among UiTM Seremban 3 students ($r = 0.756$, $p = 0.000$, $p < 0.05$). Thus, as campaign awareness increases, participation in the NPBD campaign among UiTM Seremban 3 students also increases. As a result, this study accepted Ha2 and rejected Ho2.

The Relationship between Attitude and Participation in the NPBD Campaign

Table 5:

Correlation between Attitude and Participation in the NPBD Campaign among UiTM Seremban 3 Students

Variables	Pearson Correlation (r)	Sig. (1-tailed)	N
Participation in 'No Plastic Bag Day' campaign & Attitude	0.722	0.000	230

As shown in Table 5, there is a significant relationship between attitude and participation in the NPBD campaign among UiTM Seremban 3 students ($r = 0.722$, $p = 0.000$, $p < 0.05$). Thus, as attitude becomes more positive, participation in the NPBD campaign among UiTM Seremban 3 students also increases. As a result, this study accepted Ha3 and rejected Ho3.

The Most Important Factors Influencing Participation in the NPBD Campaign

Table 6:

Multiple Regression results

Variables	Beta	Sig.	Tolerance	VIF
Environmental Knowledge	0.259	0.000	0.422	2.372
Awareness of Campaign	0.430	0.000	0.473	2.114
Attitude	0.226	0.000	0.360	2.777
R ²	0.671			
Adjusted R ²	0.667			
F change	153.667			
Sig.	0.000			

As shown in Table 6, the multiple regression analysis indicates that all three variables are significant predictors of participation in the NPBD campaign among UiTM Seremban 3 students, with an adjusted R² of 66.7%, indicating that the model explains a large proportion of the variance in participation. The tolerance values of all the variables are above 0.200 and the VIF values are less than 10, which confirms that the assumption of no multicollinearity has been satisfied. In addition, the ANOVA test produces a statistically significant value ($p = 0.000$), confirming that the overall regression model is significant. It is also worth noting that, while the VIF values are well within the acceptable threshold (all below 3.0), the Pearson correlations among the independent variables are moderately high, ranging from $r = 0.703$ to $r = 0.756$. This indicates some conceptual overlap between Environmental Knowledge and Awareness, which is theoretically expected, since awareness of a specific campaign (NPBD) is partly built on a foundation of general environmental knowledge. However, the separate beta coefficients obtained for each variable in the regression model (Environmental Knowledge: $\beta = 0.259$; Awareness: $\beta = 0.430$; Attitude: $\beta = 0.226$) show that each construct contributes unique predictive variance to campaign participation, confirming their conceptual and empirical distinctiveness. The tolerance values (all above 0.35) further confirm that multicollinearity does not threaten the integrity of the regression model. Among the predictors, Campaign Awareness was the strongest ($\beta = 0.430$, $p = 0.000$). This shows that campaign awareness is the most important predictor and has the greatest influence on participation in the NPBD campaign among UiTM Seremban 3 students.

DISCUSSION

The findings of this study contribute to a clearer understanding of the determinants that influence university students' participation in the No Plastic Bag Day (NPBD) campaign at UiTM Seremban 3. By examining the relationships of environmental knowledge, campaign awareness, and attitude with students' involvement in the NPBD initiative, the study provides both theoretical and practical insights that are useful for environmental management and policy implementation in higher education institutions.

The Role of Environmental Knowledge

The results confirm that environmental knowledge is significantly and positively associated with student participation in the NPBD campaign. This finding aligns with previous studies (Nurul et al., 2024; Baba-Nalikant et al., 2023; Gkargkavouzi et al., 2019), which stress that informed individuals are more likely to translate knowledge into pro-environmental practices. At UiTM Seremban 3, students with greater awareness of environmental consequences, such as the dangers of single-use plastics, show a stronger willingness to reduce plastic bag use. This highlights the important role of knowledge in shaping behavior, and supports the view that educational institutions play a central role in instilling sustainable habits. Notably, knowledge not only drives direct action but also strengthens attitudes and emotional commitment to environmental causes (Mago et al., 2024).

Awareness as the Strongest Predictor of Participation

Among the variables examined, awareness of the NPBD campaign emerged as the strongest predictor of participation. This finding supports prior research (Hashim et al., 2023; Asmuni et al., 2015; Sedek, 2021), which stresses the importance of visibility, messaging, and social exposure in motivating environmental action. Students are more likely to participate when they are regularly reminded of the campaign's objectives and benefits, whether through campus announcements, social media, or peer influence. Awareness functions not only as an informational tool but also as a motivational driver that turns passive recognition into active involvement. The evidence suggests that continuous and visible awareness strategies can strengthen campaign outcomes, making awareness an essential foundation of sustainable behavioral change.

The findings further highlight the important role of positive attitudes in driving participation in the NPBD campaign. Consistent with Ajzen's Theory of Planned Behavior (1991), which proposes that attitudes are strong predictors of intention and behavior, the study shows that students who view the campaign positively are more likely to engage in environmentally responsible practices. Examples such as a willingness to carry reusable bags, to support businesses that adopt plastic-free policies, and to promote awareness among peers show that attitude extends beyond awareness, representing internalized values that translate into consistent behavior. This supports the argument that campaigns addressing both cognitive (knowledge, awareness) and affective (attitude) dimensions can achieve stronger engagement.

CONCLUSION

This study examined the factors that influence student participation in the No Plastic Bag Day (NPBD) campaign at UiTM Seremban 3, focusing on environmental knowledge, campaign awareness, and attitudes. The results show that all three variables are positively and significantly associated with participation, with campaign awareness emerging as the strongest predictor. These findings confirm that exposure to clear, consistent, and relatable messages is essential in motivating pro-environmental behavior among youth.

This study makes several important contributions. Theoretically, it reinforces the view that knowledge, awareness, and attitude interact to shape sustainable behavior within the TPB framework. In practical terms, it confirms that campaign awareness is the most important predictor of active participation. From a policy perspective, universities and stakeholders should embed environmental education in curricula, strengthen collaboration with NGOs and retailers, and introduce incentive-based programs that reward sustainable practices. The study has several limitations, including its cross-sectional design, single-campus sample, and reliance on self-reported data, suggesting that future research using longitudinal, multi-site approaches would provide a more comprehensive understanding of pro-environmental participation.

In conclusion, this study highlights the importance of strengthening awareness, reinforcing environmental knowledge, and shaping positive attitudes in order to promote sustainable behavior among students. It highlights the potential of university campuses as important settings for building environmental responsibility, offering useful guidance for policymakers, administrators, and educators. By drawing on these insights, Malaysia can move closer to creating an environmentally conscious society in which sustainable practices, such as reducing plastic bag use, become part of everyday life.

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Author contributions

Nurul Huda Mohamad Zaid and Shazatul Balqis Mohamad Zairi developed the presented main concept and oversaw the data collection. Mazlan Che Soh verified the analytical method. Nurul Huda Mohamad Zaid, Shazatul Balqis Mohamad Zairi, and Nur Batrisyia Nordin led the manuscript writing, while Mazlan Che Soh was responsible for the final editing. All authors discussed the results and contributed to the final manuscript.

Conflict of interest

The author(s) declare no conflict of interest associated with this publication.

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