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Research Paper

Impact of Green University on Student Environmental Behaviour in SBM ITB

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Abstract

This study investigated the real-world impact of green university initiatives (GUIs) on students' Pro-Environmental Behaviour (PEB) at SBM ITB, while also examining environmental attitude (EA) and knowledge (EK) as possible mediating variables. A quantitative survey of 144 students, analysed using PLS-SEM, showed that GUIs had a significant effect on EA, which then positively predicted PEB. EA has also been found to significantly mediate the relationship between GUI and PEB. However, GUIs did not significantly affect EK, and the EK influence on PEB was insignificant from the analysis. Findings from this research suggest that GUIs primarily drive sustainable behaviour by supporting positive environmental attitudes rather than increasing knowledge. These findings urge higher education institution to prioritise attitudinal development in green campus programmes.

Keywords: *Green University Initiatives; Environmental Knowledge; Environmental Attitude; Pro-Environmental Behaviour*

INTRODUCTION

As the intricacies of ecological shifts continue to unfold, the escalating urgency of environmental issues demands a comprehensive and proactive involvement from various stakeholders to ensure the successful realisation of reaching Sustainable Development Goals, particularly those contributing to net zero emissions. The accelerating global population, projected to reach 9.8 billion individuals by 2050, has created an unsustainable demand for resources, pushing humanity towards critical resource depletion (United Nations, 2015). This trajectory implies a consumption pattern equivalent to requiring three Earths, necessitating a fundamental shift away from non-sustainable energy use (United Nations, 2015). The severity of this environmental crisis necessitates the implementation of robust environmental sustainability policies across all societal institutions, particularly those responsible for cultivating future leaders and decision-makers. The UN has announced Sustainable Development Goals (SDG) to support the future of mankind. Collectively, these goals underscore the imperative for a transformative shift in both individual and corporate conduct towards green behaviours (United Nations, 2015).

Achieving these ambitious sustainability targets relies on the widespread adoption of Pro-Environmental Behaviours (PEB) actions that minimise individual activity impact on local and global environments through reduced energy use, resource conservation, and waste minimisation. However, a gap exists between global environmental awareness and consistent sustainable behaviours, as individuals often fail to translate their understanding into environmental actions (Cinderby et al., 2023). Addressing this disconnect between awareness and action is a pressing concern that needs to be addressed, particularly within educational settings. Organisations such as the United Nations Global Compact (UNGC) have further implemented sustainability in management education through the Principles for Responsible Management Education (PRME), where signatory members regularly share reports of their sustainable actions. SBM ITB, located in

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Bandung, Indonesia, became a signatory member for PRME on October 08, 2014 (United Nations Global Compact, 2015; PRME, 2023).

Recent research highlights the growing importance of green campus initiatives in higher education institutions worldwide. Menon and Suresh (2022) developed a comprehensive assessment framework for environmental sustainability in higher education, where their research places the emphasis on the need for an institutional commitment to sustainability and measurable outcomes of sustainability initiatives. Similarly, Roy (2023) highlights the important roles of business schools in creating future business leaders who will play a role in creating a sustainability-focused approach to running their organisation and having a strong environmental stewardship.

Examples from the top 10 QS-ranked sustainable universities worldwide are the University of California, Berkeley (Rank #3) and the University of Edinburgh (Rank #7). Both universities successfully integrated their sustainability targets with impactful initiatives such as trainings, outreach activities, and student sustainability policies, which in turn created a high level of student participation to support their sustainability targets (PRME, 2024; University of California Berkeley, 2024). Within the Indonesian context, SBM ITB has implemented various green university initiatives, such as waste reduction, energy and water efficiency, and zero-plastic policies (PRME, 2023). Although promising, these efforts face challenges in student engagement, highlighting the need for further research and practical interventions to strengthen environmental behaviour among students in business education settings.

Significant hurdles persist despite a clear institutional commitment to sustainability. The current QS Sustainability ranking for ITB has dropped from 389 in 2024 to 524 in 2025, with a score of 60.7. This means that within one year, the organisation has dropped 135 ranks compared with the previous year. This data is particularly important because the QS sustainability ranking also measures the students' participation within campus-based sustainability initiatives (QS, 2024), meaning that strengthening student participation in PEB could positively impact the environmental sustainability ranking for ITB, which is currently on a substantial decline.

The results of the PRME report created by SBM ITB show that student participation in each initiative is lower than that of lecturer and staff participation (reducing waste by bringing a tumbler, minimising paper waste, turning off electrical appliances, using stairs when changing floors, and saving water). Currently, there are 3,328 active students in SBM ITB. Based on the university website, there is a 28:1 comparison of faculty members vs. students. When we place the percentage of participation into perspective, such as student participation in saving energy (81% staff vs. 67% student), there are approximately 1,100 students not participating vs 22 staff not participating in these particular initiatives compared with 22 staff who do not.

The initial FGD performed with 14 students from the Bachelor and Master programmes found that the students were well informed of the sustainability targets that the school aimed to achieve; however, these targets did not directly translate to a positive environmental behaviour. This happens due to limited communications from SBM ITB regarding sustainability targets and campaigns that repeat broadly known knowledge about the environment, rather than creating a sense of urgency for students to act in a more environmentally friendly way during their studies. Since the proportion of students is substantially larger than that of staff, their environmental impact in waste, water, and energy saving is also more substantial than that of staff (PRME, 2023). Such a gap in participation indicates serious issues of university culture and approach in engaging students with environmental initiatives. Hence, the university should strive to find the best suited initiatives to strengthen student PEB.

Although theoretical links between institutions environmental initiatives, and individual behaviours have been identified, only fragmented empirical evidence exists of the mechanisms by which green campus interventions engender students' environmental behaviour in a business

school context. A growing body of research illustrates how environmental knowledge and attitude influence pro-environmental behaviour; however, mediating and/or moderating variables specific to higher business education environments are not sufficiently delineated, especially in Indonesian business education settings. The literature is critical in this sense, particularly the pivotal position that the business professional holds with regard to implementing organisational sustainability practices and all the predictors of environmental behaviour adoption within a business education context.

This study's theoretical contribution focuses on advancing our understanding of the relationship between institutional green practices and the environmental behaviour of students in a business school context, bridging some key conceptual gaps to illuminate how educational institutions can encourage sustainable behaviour among future business leaders. This study provides novel contributions to the mechanisms by which green university initiatives impact student behaviour and specifically identifies the factors that mediate these associations in business education environments. This study addresses the following research questions:

1. How do green university initiatives influence students' Pro-Environmental Behaviour at SBM ITB?
2. To what extent do EA and EK mediate the relationship between green university initiatives and students' PEB?

LITERATURE REVIEW

Modern society has significantly thrived in the face of increasing environmental challenges, which has resulted in a new call to mission for educational institutions to focus on sustainability. As prominent institutions of knowledge and purveyors of knowledge to future world leaders, universities contribute greatly to creating environmentally conscientious behaviour. Through this literature review, we explore the theoretical assumptions underpinning the relationship between Green University Initiatives and students' environmental behaviour, with an emphasis on mediators: environmental knowledge and attitudes.

Pro-Environmental Behaviour: Theoretical Basis and Determinants

PEB refers to individual actions aimed at reducing negative environmental impacts (Suri et al., 2025). This concept extends beyond simply following regulations, encompassing voluntary behaviours that demonstrate environmental responsibility. Research often uses PEB interchangeably with terms like environmental behaviour (EB), environmentally responsible behaviour (ERB), or ecologically-directed behaviour, highlighting its broad scope (Suri et al., 2025). A key factor influencing PEB is others' perceived environmental actions. Suri et al. (2025) found that people are more likely to adopt sustainable practices if they know that their peers do. However, this social influence works best when the environmental outcomes of specific behaviours are clearly communicated and understood, emphasising the need for messaging transparency.

Cultural and personal value systems also drive PEB. Chwialkowska et al. (2020) demonstrated that personal culture and values shape how individuals integrate environmental considerations into their daily lives. While personal values do affect PEB, simply having "green" values does not automatically lead to consistent environmental behaviour. This creates a challenge for organisations trying to foster sustainable cultures.

In addition to individual and social dimensions, leadership influence is a crucial organisational factor for fostering PEB. Ansari and Khan (2024) demonstrated that green leadership positively impacts employee environmental behaviour through motivation, inspiration, and encouragement. Leaders committed to sustainable practices create a "green effect" within the organisation, promoting eco-friendly actions among staff. This highlights the importance of

institutional commitment in encouraging environmental behaviour.

Finally, although economic incentives can strongly motivate environmental behaviour, their effectiveness depends on underlying value systems. Kollmuss and Agyeman (2002) noted that while financial benefits can encourage pro-environmental actions, such behaviours might stop once incentives are removed. This suggests that value-based approaches are necessary for long-term behavioural sustainability.

Environmental Knowledge: Conceptualisation and Behavioural Impact

Environmental knowledge encompasses an individual's capacity to identify symbols, concepts, and behavioural patterns related to environmental protection based on received environmental information (Liobikiene & Poškus, 2019). This construct extends beyond factual awareness to include an understanding of environmental problems and potential solutions. The literature distinguishes between objective (factual) and subjective environmental knowledge, with further categorisation into systemic, action-related, and effectiveness knowledge (Liobikiene & Poškus, 2019). Systemic knowledge refers to awareness of the existence of environmental problems, while action-related knowledge encompasses understanding of behavioural impacts on the environment. Effective knowledge involves understanding tools and methods for reducing environmental impact. Among these categories, action-related knowledge has the strongest influence on PEB (Liobikiene & Poškus, 2019). This type of knowledge functions as a heuristic device, reducing cognitive load in decision-making processes and providing clear behavioural alternatives.

The mechanism through which environmental knowledge influences behaviour operates through confidence enhancement (Cappetta & Magni, 2015). A previous study conducted by Liobikiene and Poškus (2019) found that individuals who understand the outcomes of their behaviours demonstrate greater confidence and tendency to act according to their impact knowledge. This finding suggests that when properly structured and communicated, environmental knowledge serves not merely as information but as a behavioural catalyst.

Environmental Attitude: Components and Influences

Environmental attitude represents a latent construct that is mentally attached to environmental objects and encompasses cognitive, affective, and conative components (Gifford & Sussman, 2012). The cognitive component involves thoughts and evaluations about environmental issues, whereas the affective component encompasses emotional responses to environmental concerns. The conative component focuses on behavioural intentions and actions regarding environmental objects. Demographic factors significantly influence environmental attitudes. Age-related differences reveal that younger individuals demonstrate higher levels of environmental concern than older adults, with environmental concern declining over time due to "era effects" where previous generations experienced more environmentally liberal contexts (Gifford & Sussman, 2012). Gender differences manifest in women showing higher environmental concern levels, while men demonstrate higher PEB and environmental knowledge, potentially attributed to differential socialisation processes and educational encouragement patterns.

Socioeconomic status has complex relationships with environmental attitudes. While environmental engagement is often characterised as middle-class activity, Gifford and Sussman (2012) revealed that low-income families may display greater environmental knowledge than their high-income counterparts, challenging conventional assumptions about socioeconomic environmental engagement patterns. Media influence on environmental attitudes operates through both positive and negative mechanisms. Gifford and Sussman (2012) also identified American mass media as a driver of climate change scepticism, contributing to reduced support for environmental

policies. However, effective environmental communication can substantially increase environmental concern, with empowering messages proving more effective than sacrificial approaches (Gifford & Sussman, 2012).

Green University Initiatives: Institutional Framework and Impact

Green University Initiatives represent the comprehensive programmes designed to drive pro-environmental practices within higher education institutions (Fissi et al., 2021). These initiatives encompass environmental awareness and sustainable practices, with terms such as sustainable university, green university, and green campus reflecting institutional commitment to environmental stewardship (Menon & Suresh, 2022). The institutional role of universities in environmental behaviour development extends beyond policy implementation to active knowledge impartation and environmental health promotion (Roy, 2023). Green University Initiatives include awareness programmes educating students about SDGs to reduce unsustainable consumption while enhancing moral obligations towards sustainability.

Practical implementation of green initiatives includes energy conservation, carbon footprint reduction, greenhouse emission mitigation, water conservation, sustainable transportation promotion, waste separation, social development, and green purchasing policies (Alshuwaikhat & Abubakar, 2008). These comprehensive approaches demonstrate the multifaceted nature of EC commitment. Empirical evidence supports the positive influence of green university initiatives on environmental concern and Pro-Environmental Behaviour among university students (Amaral et al., 2020). This finding establishes the crucial role of institutional initiatives in shaping student environmental behaviour patterns.

Theoretical relationships and synthesis

The nature of environmental knowledge notably influences the formation of environmental attitudes, though this relationship presents complexities. While some studies, such as Liobikiene and Poškus (2019), suggest that enhanced environmental knowledge correlates with increased environmental concern. Also, Liobikiene and Poškus (2019) study presents insignificant correlations between these variables. Significantly, both the knowledge acquisition method and the information source impact attitude development. Compared with formal educational settings, informal learning channels, such as engaging with movies, books, or discussions, are associated with higher levels of environmental concern (Gifford & Sussman, 2012). Similarly, the medium through which information is received matters; for example, environmental news from newspapers appears to generate greater concern than information from television (Gifford & Sussman, 2012).

The environmental knowledge-behaviour relationship exhibits similar complexity. Liobikiene and Poškus (2019) study showed no significant relationships between environmental knowledge and PEB, yet others indicate significant but weak correlations. However, Liobikiene and Poškus (2019) revealed that people with greater environmental knowledge are more prone to Pro-Environmental Behaviour. Pro-Environmental Behaviour is predicted by environmental attitudes, a relationship often bridged through attitudes towards specific environmental actions. This connection can then be extended to broader behaviours such as energy conservation or organisational support (Gifford & Sussman, 2012). However, even when contextual barriers are absent, situational constraints and cultural factors can still affect the consistency between attitude and PEB (Smith & Doe, 2021).

Based on this understanding of the areas around green university initiatives, the following theoretical framework is proposed within this research, where green university initiatives serve as independent variables, environmental knowledge and environmental attitudes serve as mediating variables, and Pro-Environmental Behaviour serves as the dependent variable.

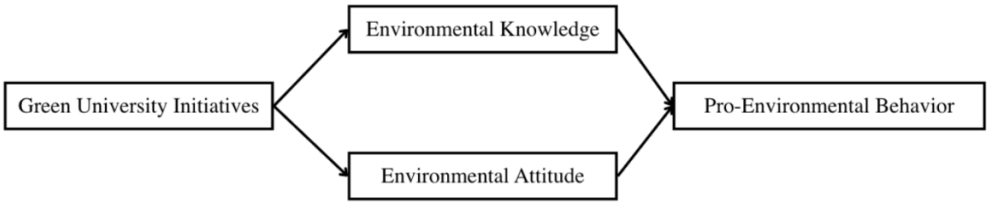

Figure 1. Conceptual Framework
Source: Authors

Based on the research framework, the following hypotheses are proposed:
H_1: Green university initiatives positively influence environmental knowledge.
H_2: Green university initiatives positively influence environmental attitudes.
H_3: Environmental knowledge positively influences PEB.
H_4: Environmental attitude positively influences PEB.
H_5: Environmental knowledge mediates the relationship between green university initiatives and PEB.
H_6: Environmental attitude mediates the relationship between green university initiatives and PEB.

RESEARCH METHOD

This investigation employed a quantitative research approach utilising a cross-sectional survey design to examine the influence of Green University Initiatives on students' environmental behaviour at SBM ITB. The research framework integrates descriptive analysis with PLS-SEM to assess complex theoretical relationships among multiple environmental variables. The analytical approach enables a comprehensive evaluation of interconnected constructs while accommodating the study's specific sample characteristics and distribution requirements. This study adopts an explanatory research design to investigate the causal relationships among green university initiatives, environmental knowledge, environmental attitude, and Pro-Environmental Behaviour.

The study uses a nonprobability purposive sampling methodology, which is set to capture SBM ITB students' environmental behaviour (Ayhan, 2011). Nonprobability purposive sampling is useful when aiming to understand specific perspectives or behaviours within a defined group (Callegaro et al., 2014). Purposive sampling ensures participant selection based on characteristics directly related to the research objectives. The sample criteria are active students who are currently pursuing academic study in SBM ITB, not including those who are on leave or have graduated from SBM ITB. This ensures that all the gained data remains relevant to the most recent SBM ITB initiatives. The initial sample size target of 96 participants was statistically defined using the Slovin formula, based on a 10% margin of error.

Primary data collection utilised a structured digital questionnaire distributed through the SBM ITB email system and social media platforms. The questionnaire initially had a total of 148 responses. After filtering out unfit students who filled out the questionnaire while being inactive, the final number of participants was 144. The questionnaire comprised five distinct sections: demographic characteristics, Green University Initiatives, environmental knowledge assessment through multiple-choice questions, environmental attitude measurement, and individual Pro-Environmental Behaviour evaluation. Response options: A five-point Likert scale (1=Strongly Disagree to 5=Strongly Agree) was used for construct measurement to capture the perspective of students (Siniscalco & Auriat, 2005).

Partial Least Squares Structural Equation Modelling (PLS-SEM) was performed using the SmartPLS 4 software platform for quantitative data analysis. This analytical technique is particularly suitable for evaluating complex theoretical relationships between multiple variables within social science research contexts. PLS-SEM can accommodate non-normally distributed data and can accommodate smaller sample sizes than CB-SEM (Hair & Alamer, 2022). Complementary statistical analyses were subsequently conducted using one-way analysis of variance (ANOVA) through the use of JAMOVI software to compare PEB scores across various demographic categories, facilitating a more comprehensive interpretation of the data. The comparison of demographic categories within this study will complement the results of the PLS-SEM analysis to understand further whether specific demographic aspects may influence the level of PEB among SBM ITB students. The methodological approach ensures reproducibility through detailed procedural documentation while maintaining analytical rigour appropriate for examining environmental behaviour patterns within higher education institutions.

FINDINGS AND DISCUSSION

Demographic Analysis

Table 1. Demographic Analysis

Demographic Category	Value (n)	Percentage (%)
Gender Distribution		
Female	82	57
Male	62	43
Generation Distribution		
Baby Boomers	1	1
Generation X	4	3
Millennials	23	16
Generation Z	116	80
Years on campus		
<1 year	20	14
1-2 years	68	47
2-3 years	53	36
3-4 years	3	2
Monthly Income		
No income (NA)	13	9
< IDR 5 million	66	46
IDR 5-10 million	41	28
IDR 10-15 million	13	9
IDR 15-20 million	4	3
IDR 20-30 million	3	2
> 30 million IDR	4	3
Campus Location		
Bandung-Ganesha	66	46
Bandung-Gelap Nyawang	30	21
Jakarta: Graha Irama	48	33
Academic Programme		
Master of Business Administration	77	54
Bachelor of Management	36	25
Bachelor of Entrepreneurship	25	19
Doctor of Science in Management	2	1
Master of Science in Management	1	<1

Sources: Author

The demographic analysis of the 144 samples found that the majority of respondents were female (57%). In the generation category, the majority are those who are Generation Z, comprising 80% of the total respondents, which is expected because most of the individuals with bachelor's degrees are presumably younger individuals and fit the age criterion of Generation Z. Other generations are also found within the sample; however, they are not as highly represented as Generation Z, Baby Boomers are only represented by one participant, and Generation X is only represented by 4 participants.

Most of the students filling this questionnaire are currently within their year 1-2 of study on campus (47%). This is expected because Master's students (54%) follow an academic programme of less than 2 years from start to finish, hence spending less time in study than Bachelor's students. In the academic programme category, certain academic programmes have smaller sample when compared to other, such as Doctor of Science in Management (n = 2) and Master of Science in Management (n = 1). When discussed with the university, the number of currently active students in those two academic programmes is actually less than 10 persons in total. Although the sample is small for the two academic programmes in this study, the actual student base is also the smallest in SBM ITB.

SmartPLS structural analysis

Measurement model assessment

The initial measurement model incorporated 55 indicators across four latent constructs. These indicators were derived from previous research on each variable. The Green University Initiatives consist of 19 items taken from the research of Pereira et al. (2021). The Environmental Knowledge section consists of 7 items that focuses on action-related knowledge regarding the environment (Player et al., 2023). Action-related knowledge was chosen due to its significance in influencing PEB (Player et al., 2023). The Environmental Attitude section consists of 11 items that focus on measuring the personal perspective of individuals towards their environment. The items were taken from the research of Zwickle and Jones (2018). Lastly, the Pro-Environmental Behaviour section consists of 18 items from the study of Mateer et al. (2022).

These initial 55 items were then tested for their statistical outer loading indicators, demonstrating that outer loadings below 0.60 were systematically eliminated, resulting in a refined model containing 43 items. The final configuration comprised 19 items for the GUI, 11 items for the EA, 3 items for the EK, and 10 items for the PEB.

Table 2. Initial Outer item loadings

Initial outer loadings								
	EA	**EK**	**GUI**	**PEB**	**EA**	**EK**	**GUI**	**PEB**
EA1	0.739			GUI13			0.726	
EA10	0.694			GUI14			0.733	
EA11	0.824			GUI15			0.720	
EA2	0.841			GUI16			0.749	
EA3	0.764			GUI17			0.615	
EA4	0.817			GUI18			0.667	
EA5	0.672			GUI19			0.670	
EA6	0.752			PEB1				0.740
EA7	0.826			PEB10				0.699
EA8	0.815			PEB11				-0.058

Initial outer loadings								
	EA	**EK**	**GUI**	**PEB**	**EA**	**EK**	**GUI**	**PEB**
EA9	0.781			PEB12				0.601
EK1		0.348		PEB13				0.766
EK2		0.443		PEB14				0.654
EK3		0.620		PEB15				0.561
EK4		0.342		PEB16				0.472
EK5		0.747		PEB17				0.383
EK6		0.398		PEB18				0.518
EK7		0.803		PEB2				0.654
GUI1			0.609	PEB3				0.717
GUI10			0.761	PEB4				0.497
GUI11			0.769	PEB5				0.627
GUI12			0.731	PEB6				0.678
				PEB7				0.610
				PEB8				0.747
				PEB9				0.643

Sources: Author

Table 3. Revised Outer-Loading Items

Revised outer loadings								
	EA	**EK**	**GUI**	**PEB**	**EA**	**EK**	**GUI**	**PEB**
EA1	0.740			GUI18			0.667	
EA10	0.693			GUI19			0.671	
EA11	0.823			GUI2			0.690	
EA2	0.842			GUI3			0.695	
EA3	0.764			GUI4			0.824	
EA4	0.816			GUI5			0.815	
EA5	0.674			GUI6			0.795	
EA6	0.753			GUI7			0.629	
EA7	0.826			GUI8			0.773	
EA8	0.814			GUI9			0.692	
EA9	0.782			PEB1				0.749
EK3		0.704		PEB10				0.720
EK5		0.772		PEB12				0.623
EK7		0.819		PEB13				0.788
GUI1			0.608	PEB14				0.682
GUI10			0.762	PEB2				0.636
GUI11			0.770	PEB3				0.694
GUI12			0.731	PEB6				0.692

Revised outer loadings								
	EA	**EK**	**GUI**	**PEB**		**EA**	**EK**	**GUI**	**PEB**
GUI13			0.727		PEB8				0.784
GUI14			0.734		PEB9				0.685
GUI15			0.720						
GUI16			0.749						
GUI17			0.616						

Sources : Author

Evaluation of Validity and Reliability

The validity and reliability of the measurement model were assessed using composite reliability. According to Hair and Alamer (2022), the required threshold on composite reliability should yield a value of >0.7 and the threshold of average variance extracted should be >0.50. The composite reliability and AVE values within this study were conducted using the SmartPLS 4 application. The composite reliability values exceeded the recommended threshold of 0.70 for all constructs: GUI (0.954), EA (0.943), EK (0.810), and PEB (0.909). Average variance extracted (AVE) values met the minimum criterion of 0.50, with acceptable levels of GUI (0.521), EA (0.604), EK (0.587), and PEB (0.500).

Table 4. AVE and reliability results

	Composite Reliability	**Average variance extracted**
GUI (X)	0.954	0.521
EA (M)	0.943	0.604
EK (M)	0.810	0.587
PEB (Y)	0.909	0.500

Sources: Author

Discriminant validity assessment through HTMT analysis confirmed that all construct pairs demonstrated values below the conservative threshold of 0.90, with the highest correlation observed between PEB and GUI (0.625). These findings substantiate each construct's distinctiveness within the theoretical framework.

Table 5. HTMT Ratio

	Heterotrait-Monotrait ratio (HTMT)
EK <-> EA	0.137
GUI <-> EA	0.452
GUI <-> EK	0.201
PEB <-> EA	0.423
PEB <-> EK	0.170
PEB <-> GUI	0.625

Sources: Author

Hypothesis testing results

The structural model evaluation revealed significant variations in hypothesised relationships. Direct effect analysis demonstrated that Green University Initiatives exerted a

statistically significant positive influence on Environmental Attitude (β = 0.505, p < 0.001), supporting H_2. Similarly, EA significantly predicted Pro-Environmental Behaviour (β = 0.444, p < 0.001), confirming H_4. Conversely, the relationship between GUIs and environmental knowledge was statistically insignificant (β = 0.060, p = 0.256), failing to support H_1. The hypothesised influence of environmental knowledge on PEB also demonstrated statistical insignificance (β = 0.273, p = 0.280), resulting in rejection of H_3. Mediation analysis revealed that EA successfully mediated the relationship between Green University Initiatives and Pro-Environmental Behaviour (β = 0.224, p < 0.001), supporting H_6. However, environmental knowledge failed to demonstrate significant mediation effects (β = 0.017, p = 0.507), leading to rejection of H_5.

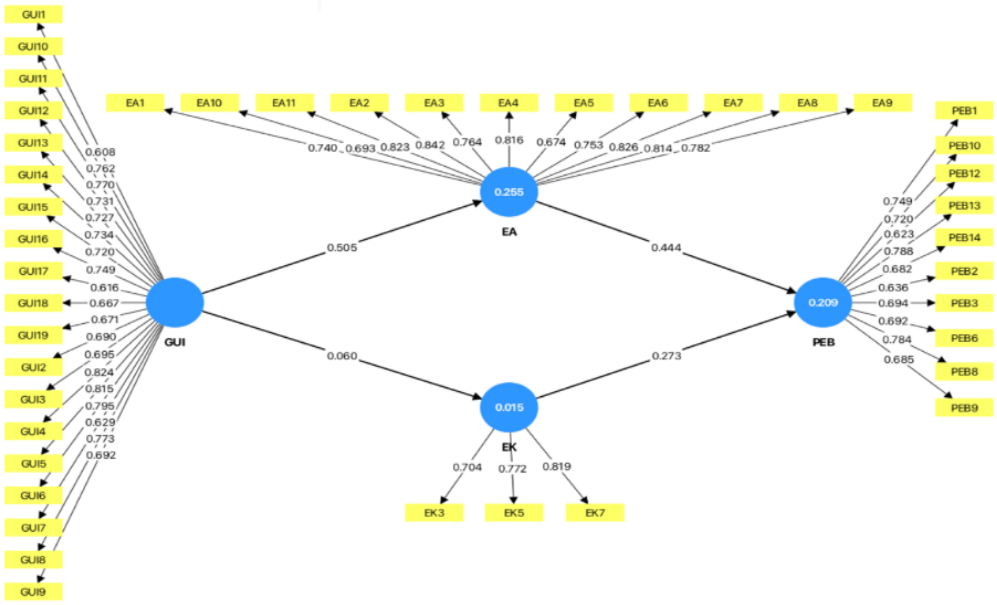

Figure 7. SmartPLS Graph
Source: Authors

Table 6. Path coefficient analysis

Direct Effect

	Path	Coefficient	P-value	Description	Hypothesis
H_1	GUI (X) -> EK (M1)	0.060	0.256	Insignificant	Unsupported
H_2	GUI (X) -> EA (M2)	0.505	0.000	Significant	Supported
H_3	EK (M1) -> PEB (Y)	0.273	0.280	Insignificant	Unsupported
H_4	EA (M2) -> PEB (Y)	0.444	0.000	Significant	Supported

Indirect Effect

	Path	Coefficient	P-value	Description	Hypothesis
H_5	GUI (X) -> EK (M1) -> PEB (Y)	0.017	0.507	Insignificant	Unsupported
H_6	GUI (X) -> EA (M2) -> PEB (Y)	0.224	0.000	Significant	Supported

Sources: Author

Explanatory Power Model

The coefficient of determination (R^2) analysis revealed varying explanatory power across endogenous constructs. Environmental Attitude demonstrated moderate explanatory variance (R^2

= 0.255), indicating that Green University Initiatives accounted for 25.5% of the variance in students' environmental attitudes. Pro-Environmental Behaviour showed acceptable explanatory power (R^2 = 0.209), with Environmental Attitude and Environmental Knowledge collectively explaining 20.9% of behavioural variance. Environmental Knowledge exhibited minimal explanatory variance (R^2 = 0.015), suggesting that Green University Initiatives had a limited influence.

Table 7. R^2 Results

	R^2	P values
EA	0.255	0.000
PEB	0.209	0.000
EK	0.015	0.611

Sources: Author

The effect size analysis corroborated these findings, revealing that Green University Initiatives demonstrated a large effect on Environmental Attitude (f^2 = 0.342, p = 0.010), while EA exhibited a medium effect on Pro-Environmental Behaviour (f^2 = 0.248, p = 0.007). The remaining relationships demonstrated small or negligible effect sizes with statistically insignificant differences.

Descriptive Analysis

Perception of Green University Initiatives

Student perceptions of Green University Initiatives demonstrated predominantly positive evaluations across multiple dimensions. The highest-rated aspect was the recognition of the importance of universities in promoting environmental sustainability (M = 4.01, SD = 0.96), categorised as "High." Educational integration components, including classroom activities (M = 3.53, SD = 1.04) and teacher engagement (M = 3.58, SD = 1.06), also received high ratings. Infrastructure-related initiatives demonstrated moderate to high perceptions, with campus adherence to ESG scoring 3.53 (SD = 0.97). However, communication effectiveness (M = 3.08, SD = 1.06) and doubt clarification mechanisms (M = 2.82, SD = 1.09) exhibited lower ratings, indicating areas of potential improvement.

Assessment of environmental knowledge

The evaluation of environmental knowledge employed an objective assessment methodology, measuring actual knowledge rather than perceived competence. The three retained items demonstrated varying success rates: understanding of the carbon footprint (96 correct responses), identification of hazardous waste (89 correct responses), and recognition of energy conservation (90 correct responses). The overall sample mean of 1.91 (SD = 1.06) indicated moderate knowledge levels among the participants.

Evaluation of Environmental Attitude

The EA assessment revealed consistently high scores across all measured dimensions (M = 3.97, SD = 0.67). The highest-rated items included access to clean water as a universal human right (M = 4.13, SD = 0.81) and clean air as essential for quality of life (M = 4.13, SD = 0.93). These findings suggest a well-developed environmental consciousness among ITB students.

Pro-Environmental Behaviour Analysis

Pro-Environmental Behaviour demonstrated high implementation levels (M = 3.66, SD =

0.63), with reusable container usage receiving the highest score (M = 4.22, SD = 0.72). Energy conservation behaviours (M = 3.81, SD = 0.84) and environmentally-friendly purchasing decisions (M = 3.83, SD = 0.81) also demonstrated high implementation rates. Paper reduction practices showed moderate implementation (M = 3.23, SD = 0.99), suggesting that the study identified targeted intervention opportunities.

Demographic Variations in Environmental Behaviour

Comprehensive analysis of demographic influences on PEB revealed no statistically significant differences across examined variables. Gender comparison showed virtually identical mean scores between female (M = 3.66) and male (M = 3.65) participants ($F(1, 126) = 0.00484$, $p = 0.945$). Campus location analysis across three sites demonstrated non-significant variations ($F(2, 79.0) = 2.67$, $p = 0.076$), despite numerical differences between locations. Generational analysis among participants from Generation X (M = 3.95), Millennials (M = 3.80), and Generation Z (M = 3.62) showed no significant differences ($p = 0.172$). Similarly, academic tenure, income levels, and programme affiliations demonstrated no significant behavioural variations, suggesting environmental behaviour consistency across demographic segments.

Discussion

Theoretical Implications

The findings of this study substantially advance the theoretical understanding of environmental behaviour formation within higher education contexts. The statistically significant relationship between Green University Initiatives and Environmental Attitude ($\beta = 0.505$, $p < 0.001$), coupled with the subsequent influence on Pro-Environmental Behaviour ($\beta = 0.444$, $p < 0.001$), validates the attitudinal pathway in environmental behaviour models as proposed by Gifford and Sussman (2012), where Environmental Attitude acts as an influential aspect in individual behaviour towards their environment. The statistically insignificant relationship between Green University Initiatives and Environmental Knowledge ($\beta = 0.060$, $p = 0.256$) suggests that institutional initiatives may not effectively enhance the acquisition of factual environmental knowledge. This finding diverges from conventional assumptions about educational impact mechanisms and highlights the complexity of knowledge acquisition processes as documented by Chicco et al. (2021).

The unsupported hypotheses in this study may be attributed to several interrelated factors. First, the behavioural constructs examined, namely, environmental knowledge, attitude, and behaviour are influenced by a wide range of personal, social, and contextual variables that may not have been fully captured in the model. Second, the construct of environmental knowledge was measured using only three questionnaire items after the removal of items due to an outer loading result lower than 0.60, which may have limited its ability to fully represent the complexity of students' environmental understanding. A limited number of items can reduce both the construct's reliability and explanatory power, which could contribute to the lack of significant relationships on hypotheses involving environmental knowledge. Third, the specific institutional context of SBM ITB, where green initiatives are still evolving and not yet fully embedded in the student experience, may create a different level of exposure and educational sustainability experiences among students, which could also affect the strength of the observed relationships surrounding environmental knowledge within this study.

Practical Implications

The research provides actionable insights for educational institutions seeking to enhance

environmental behaviour among students. The large effect size of Green University Initiatives on Environmental Attitude (f^2 = 0.342), as established through the criteria of Hair (2017), suggests that institutional efforts should prioritise affective engagement over purely cognitive approaches. Programmes emphasising emotional connection to environmental issues may be more effective than information-intensive interventions. The medium effect size of Environmental Attitude on Pro-Environmental Behaviour (f^2 = 0.248) indicates that attitudinal development represents a viable pathway for behavioural change. However, the moderate explanatory power (R^2 = 0.209) suggests that additional factors merit consideration in comprehensive intervention design, as recommended by Henseler et al. (2015) for holistic model development.

Comparative Analysis with Previous Research

The findings of this research partially contradict those of previous studies, which emphasise the knowledge-behaviour relationship in environmental psychology. Previous research in the student context found that environmental knowledge has a positive influence on environmentally responsible behaviour (Lestari, 2023; Ekadyasa & Krypton, 2025). However, this study found that the effect of environmental knowledge is not statistically significant. This research provides a different perspective from the traditional information deficit model, which states that understanding environmental issues would automatically result in higher PEB (Kollmuss & Agyeman, 2002). This research found that the connection between environmental knowledge and PEB is statistically insignificant.

One-Way ANOVA analysis of Pro-Environmental Behaviour score among demographic groups, which includes gender, academic programme, campus location, income, years in campus, and generation, shows insignificant results on Pro-Environmental Behaviour difference. These findings differ from previous studies, particularly in terms of gender and income level differences. Previous research found that women had a significantly stronger PEB than their male counterparts. A study on income level found that the current income of individuals significantly influences PEB (Kirsten & Biyase, 2025), while the difference in income within this study does not show a significant difference.

CONCLUSIONS

This investigation provides empirical evidence regarding the influence of Green University Initiatives on students' environmental behaviour within SBM ITB. The structural equation modelling analysis revealed significant pathways through which ISPs affect student conduct. More specifically, the influence of GUIs on environmental attitude [$\beta = 0.505$, $p < 0.001$] was significant and positively impactful as a mediator of Pro-Environmental Behaviour ($\beta = 0.444$, $p < .001$). Mediation analysis showed that institutional green initiatives influence student behavioural outcomes via environmental attitude ($\beta = 0.224$, $p < 0.001$). Environmental knowledge did not turn out to predict Pro-Environmental Behaviour significantly ($\beta = 0.273$, $p = 0.280$) and was not an intermediary in the green initiatives-behaviour.

These findings challenge the conventional wisdom that knowledge acquisition directly translates to behavioural change. The results indicate that attitudinal transformation is a more influential pathway than cognitive enhancement in promoting sustainable student behaviours. This study advances the understanding of environmental behaviour formation in higher education contexts by demonstrating that institutional sustainability initiatives primarily operate through affective mechanisms rather than cognitive mechanisms. These findings provide actionable insights for educational administrators seeking to enhance environmental stewardship among business students through strategically designed green campus programmes focused on attitude development rather than solely knowledge dissemination.

To create a stronger impact on Pro-Environmental Behaviour among students, universities can implement the following approach in their effort to create a sustainable community:

1. Prioritising initiatives which targets environmental attitudes over knowledge will help create the attitudinal drive needed to support Pro-Environmental Behaviour, Environmental Attitude within the university can be strengthened through campus-wide sustainability training, creating campaigns that target the emotional aspects of students, and integrating outreach activities related to environmental sustainability to create an emotional connection between students and the environment.
2. Develop targeted communication strategies to clarify and communicate GUI goals to both internal and external stakeholders, including creating a strong communication base with students to create a culture of open communication on sustainability targets, accomplishments, and challenges faced in its implementation.
3. The university can establish a feedback and monitoring centre for students regarding their views on sustainability practices and enforcement within the campus. The university can do this digitally using social media as an addition to the campus communication platform, creating new accounts or channels that are specifically used for sustainability-related student communications. This approach will help policymakers within educational institutions look further into the perspective of students to adjust programmes and policies as needed to ensure an effective implementation of sustainability programmes.

LIMITATION & FURTHER RESEARCH

Several methodological constraints limit the generalizability and scope of the findings. The cross-sectional design precludes the establishment of causal inference, necessitating longitudinal investigations to examine temporal relationships between variables. The sample exclusively comprised SBM ITB students, potentially limiting its applicability to diverse academic disciplines and institutional contexts. Additionally, the reduced reliability of the environmental knowledge scale (three items post-validation) may have contributed to non-significant relationships, suggesting measurement refinement requirements. Self-reported behavioural measures introduce potential social desirability bias, which warrants future studies incorporating objective behavioural indicators or observational methodologies.

While the R^2 values in this study are relatively low, this is not uncommon in social sciences exploratory research, particularly when investigating complex aspects such as individuals' engagement within environmentally focused areas of attitude and behaviour. The model captures key attitudinal and behavioural constructs; however, several potentially influential variables were not included in this study. Environmental values (Zheng et al., 2024), peer influence (Lin & Liu, 2023), perceived institutional support (Chen et al., 2024), and socio-cultural norms (Tam, 2024) have all been shown in recent studies to significantly influence PEB among individuals. Future research should consider integrating these additional variables to improve explanatory power and provide a more comprehensive understanding of the factors influencing student participation in sustainability initiatives.

The geographic limitation of the study to Indonesian higher education contexts restricts its international generalizability, particularly across varying cultural and regulatory environments. Furthermore, the exclusion of moderating variables, such as personality traits, socioeconomic factors, or prior environmental exposure, represents an analytical limitation. Future research should employ mixed-methods approaches that combine quantitative assessments with qualitative explorations of the mechanisms of attitude formation. Longitudinal studies tracking behavioural changes following green initiative implementation would strengthen causal understanding.

Theoretical development would be enhanced by cross-cultural comparative analyses examining the effectiveness of initiatives across across diverse educational systems. The differential impacts of specific green initiative components could inform targeted intervention strategies. Additionally, exploring the role of peer influence, social norms, and institutional climate as mediating or moderating factors would provide a comprehensive understanding of environmental behaviour development in academic settings.

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