

JAMOVI ANALYSIS: IMPACT OF CAMPUS SUSTAINABILITY INITIATIVE AND STUDENT BEHAVIOUR

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Abstract

Sustainability initiatives in higher education institutions play a crucial role in fostering environmentally responsible behavior among students. This study explores the relationship between campus sustainability programs and student engagement in eco-friendly practices. By analyzing various sustainability initiatives—such as waste reduction programs, energy conservation efforts, green infrastructure, and sustainability education—the research assesses their effectiveness in shaping students' attitudes, awareness, and daily habits. The findings suggest that well-implemented sustainability policies not only enhance environmental literacy but also encourage long-term pro-environmental behavior among students. Furthermore, institutional commitment, peer influence, and the visibility of sustainable practices significantly impact student participation.

This research highlights the importance of integrating sustainability into university curricula and campus operations to promote a culture of environmental responsibility.

Keywords: *Campus sustainability, student behavior, environmental awareness, green initiatives, higher education.*

Introduction

In today's world, protecting the environment is more important than ever. Schools and universities play a key role in promoting sustainability by adopting eco-friendly practices on

campus. These efforts include reducing waste, saving energy, using green buildings, and encouraging sustainable transportation. The goal is to create a cleaner, healthier environment while also teaching students the importance of being environmentally responsible.

Students spend a lot of time on campus, so the things they see and experience can shape their habits and attitudes toward sustainability. If universities actively promote green practices, students are more likely to adopt eco-friendly behaviors in their daily lives. However, the success of these initiatives depends on several factors, such as how well they are implemented, whether students are aware of them, and how much they are encouraged to participate.

This study explores how campus sustainability programs influence student behavior. It looks at whether these initiatives help students become more environmentally aware and what challenges might prevent them from getting involved. Understanding these factors can help universities improve their sustainability efforts and inspire students to adopt long-term eco-friendly habits.

Literature Review

Universities have a significant role in promoting sustainability by implementing eco-friendly initiatives that encourage students to adopt responsible environmental practices. Many institutions have introduced programs such as recycling, energy conservation, sustainable transportation, and green building projects to reduce their ecological footprint. These initiatives not only help in creating a more sustainable campus but also aim to influence student behavior, shaping long-term environmentally responsible habits.

Campus sustainability initiatives have a significant impact on student behavior, particularly when they are well-integrated into university policies and educational programs. While these initiatives encourage students to adopt eco-friendly habits, challenges such as lack of awareness and engagement still exist. Strengthening institutional support, promoting student involvement, and enhancing environmental education can further improve the effectiveness of sustainability programs in shaping responsible behaviors.

Significant And Research Gap

The study of campus sustainability initiatives and their impact on student behavior is significant as it highlights the potential of higher education institutions to shape environmentally responsible attitudes and habits among students during a formative stage in their lives.

By integrating sustainability into infrastructure, operations, and educational programs, campuses serve as living laboratories that not only reduce ecological footprints but also inspire students to adopt and advocate for sustainable practices beyond their academic environments. However, research gaps persist, particularly in understanding the long-term behavioral impact of these initiatives post-graduation and the social and psychological factors, such as peer influence and cultural norms, that affect student engagement. Additionally, much of the existing literature is geographically limited to developed regions, neglecting insights from institutions in developing countries where sustainability challenges are often more acute.

Furthermore, the effectiveness of participatory approaches in fostering a sense of ownership among students remains underexplored, as does the influence of demographic factors like socioeconomic background and field of study. Bridging these gaps is essential to designing inclusive, context-sensitive, and enduring strategies that maximize the influence of campus sustainability initiatives on both individual and societal levels.

Research Methodology

1. Research Method:

This study adopts a quantitative research method to analyze the impact of campus sustainability initiatives on student behavior. Using structured surveys and questionnaires, data is collected to quantify the relationship between exposure to sustainability efforts and behavioral changes. Statistical techniques are employed to identify trends, correlations, and patterns, ensuring objective and measurable insights into the research problem.

2. Sample Size:

The study involves a sample size of 40 students from diverse academic programs and institutions with active sustainability initiatives. Participants are selected through stratified random sampling

to ensure representation across demographics, such as age, gender, and field of study. This sample size ensures statistical reliability, allowing generalizations about student behavior in response to campus sustainability efforts.

3. Research Tool:

A structured questionnaire serves as the primary research tool, designed to assess students' awareness, attitudes, and behaviors regarding sustainability initiatives. The questionnaire includes Likert-scale items, closed-ended questions, and demographic data. It is validated through a pilot study to ensure clarity, reliability, and relevance. The tool is administered both online and in person for broad accessibility and comprehensive data collection.

Reliability Analysis

Table 1

Scale Reliability Statistics			
	Mean	Mean	Cronbach's α
scale	3.57	0.531	0.915
Note. items 'AG', 'GEN :', 'LOC :', and 'CLS' correlate negatively with the total scale and probably should be reversed			

Table 2

Item Reliability Statistics				
				If item dropped
	Mean	SD	Item-rest correlation	Cronbach's α
AG	1.35	0.716	-0.0684	0.921
GEN :	1.70	0.520	-0.1373	0.920
LOC :	1.54	0.558	-0.0103	0.919
CLS	2.62	1.114	-0.1741	0.927

CSI1	3.84	1.041	0.5030	0.912
CSI2	3.97	0.763	0.6755	0.909
CSI3	3.70	1.127	0.7652	0.906
CSI4	3.95	1.053	0.6177	0.910
CSI5	3.95	0.998	0.5809	0.911
CSI6	3.78	1.109	0.6734	0.909
CSI7	3.95	1.053	0.6919	0.908
CSI8	4.00	0.943	0.6831	0.909
CSI9	3.73	1.071	0.5836	0.911
CSI10	3.97	0.928	0.8359	0.906
SBTS1	3.68	0.915	0.6786	0.909
SBTS2	3.84	0.800	0.6568	0.910
SBTS3	4.22	0.534	0.6455	0.911
SBTS4	3.84	1.014	0.7577	0.907
SBTS5	4.03	0.957	0.6236	0.910
SBTS6	4.14	0.751	0.7206	0.909
SBTS7	3.89	0.809	0.6089	0.910
SBTS8	4.14	0.855	0.4466	0.913
SBTS9	3.81	0.845	0.6361	0.910
SBTS10	4.00	1.000	0.6540	0.909

In the provided data, we perform a reliability analysis to assess the internal consistency of the scale measuring the impact of campus sustainability initiatives and student behavior. Below is a

detailed breakdown of the analysis. The reliability of the overall scale is evaluated by calculating Cronbach's Alpha (α), which measures the consistency of the items in the scale.

- **Mean:** 3.57
- **Standard Deviation (SD):** 0.531
- **Cronbach's Alpha (α):** 0.915

A Cronbach's Alpha of 0.915 indicates excellent internal consistency. This suggests that the items within the scale are highly correlated and reliably measure the same construct, making the scale a valid instrument for assessing the impact of campus sustainability initiatives on student behavior.

INTERPRETATION: Reliability analysis checks if a set of items (questions or statements) consistently measure a concept. Here, it uses "Cronbach's alpha," a measure showing how closely related these items are:

Cronbach's α (Alpha): A value close to 1 means the items are reliable. In this case, the scale's α is 0.915, which indicates high reliability.

Item Statistics: Each item's contribution to reliability is tested by imagining it was removed. If removing an item increases α , it may not fit well with the others. Items "AG," "GEN," "LOC," and "CLS" have low or negative correlations with the overall scale, suggesting they don't align well with the concept being measured.

Exploratory Factor Analysis

Factor Loadings

	Factor	
	1	Uniqueness
AG		0.984
GEN :		0.989
LOC :		0.999
CLS	-0.318	0.899
CSI1	0.560	0.687
CSI2	0.744	0.447
CSI3	0.780	0.392
CSI4	0.725	0.474
CSI5	0.658	0.568
SBTS1	0.661	0.563
SBTS2	0.588	0.655
SBTS3	0.713	0.491
SBTS4	0.760	0.422
SBTS5	0.675	0.545
Note. 'Minimum residual' extraction method was used in combination with a 'oblimin' rotation		

INTERPRETATION: EFA is used to identify clusters or "factors" in a set of items to see if they measure similar underlying ideas:

Factor Loadings: Numbers here show how much each item correlates with the main factor found. Higher values suggest the item fits well within that factor.

Uniqueness: Lower values indicate items that are more strongly associated with the factor, while higher values indicate items that might not fit as well. For example, items with high uniqueness scores (like "AG" and "GEN") do not align well with the main factor.

Data Analysis

The goal of this analysis is to examine the relationship between **campus sustainability initiatives** (CSI) and **student behavior** (SBTS), focusing on whether participation in sustainability programs leads to changes in students' pro-environmental behaviors. Specifically, the analysis uses linear regression to model this relationship.

1. Objective:

The main objective of this data analysis is to:

- **Assess** the influence of campus sustainability initiatives (e.g., recycling programs, sustainability campaigns) on students' environmental behavior.
- Identify which factors (e.g., age, gender, type of campus involvement) predict student behavior in relation to sustainability.
- Measure the strength of the relationship between these predictors and student behavior outcomes.

The study will use linear regression to model student behavior (SBTS) as a function of various predictors (such as age group, gender, location, class year, and participation in sustainability programs).

2. Null Hypothesis:

The **null hypothesis** posits that there is **no significant relationship** between campus sustainability initiatives and student behavior.

Null Hypothesis (H_0):

- **H_0 :** There is no significant impact of campus sustainability initiatives on student behavior.

Participation in sustainability initiatives does not directly change how students behave when it comes to things like recycling or saving energy. Even if these programs exist on campus, they may not have a strong or lasting impact on students' daily habits .

3. Linear Regression Model Overview

In this analysis, a linear regression model was used to examine the relationship between the dependent variable (student behavior, SBTS) and various independent variables, including participation in sustainability initiatives and demographic factors.

4. Model Fit Measures:

- **R = 0.476**: This indicates a moderate correlation between the independent variables (predictors) and student behavior.
- **R² = 0.227**: This means that about 22.7% of the variance in student behavior (SBTS) can be explained by the model. While this suggests that other factors not included in the model may contribute to student behavior, the predictors used in this model have some explanatory power.

Model Coefficients Interpretation:

The regression model includes several predictors that may influence student behavior. Here's a breakdown of the coefficients, standard errors, t-values, and p-values for each predictor:

1. Intercept (Constant):

- o **Estimate = 3.8775, SE = 0.414, t = 9.3767, p < .001**

The intercept represents the predicted value of student behavior when all predictors are at their reference levels. Since the p-value is less than 0.001, the intercept is statistically significant, indicating that the model provides a meaningful estimate for behavior even without the predictors.

2. AG (Age Group):

- o **22-25 vs. 18-21:** Estimate = 0.3302, $p = 0.602$
- o **26-30 vs. 18-21:** Estimate = -0.0570, $p = 0.944$
- o **Over 30 vs. 18-21:** Estimate = -0.8718, $p = 0.506$

These coefficients suggest that age does not significantly affect student behavior, as all p-values are above the typical significance threshold of 0.05.

3. GEN (Gender):

- o **Female vs. Male:** Estimate = 0.2277, $p = 0.577$
- o **Prefer not to say vs. Male:** Estimate = -1.0874, $p = 0.304$

Gender also does not appear to have a significant impact on student behavior, as both p-values are greater than 0.05.

4. LOC (Location):

- o **Urban vs. Rural:** Estimate = 0.2099, $p = 0.586$
- o **Semi-Urban vs. Rural:** Estimate = -1.8718, $p = 0.159$

Location also does not show a statistically significant relationship with student behavior in this model.

5. CLS (Class Year):

- o **Third Year vs. Second Year:** Estimate = -0.5161, $p = 0.286$
- o **Other vs. Second Year:** Estimate = -0.2334, $p = 0.766$

Class year does not appear to be a significant predictor of student behavior in this model.

Linear Regression

Table 1- Model Fit Measures

Model	R	R²
1	0.476	0.227

Table 2 - Model Coefficients - SBTS10

Predictor	Estimate	SE	t	p
Intercept ^a	3.8775	0.414	9.3767	< .001
AG:				
22-25 – 18-21	0.3302	0.627	0.5266	0.602
26-30 – 18-21	-0.0570	0.812	-0.0703	0.944
over 30 – 18-21	-0.8718	1.295	-0.6734	0.506
GEN ::				
female – male	0.2277	0.404	0.5636	0.577
prefer not to say – male	-1.0874	1.039	-1.0462	0.304
LOC ::				
urban – rural	0.2099	0.381	0.5505	0.586
semi-urban – rural	-1.8718	1.295	-1.4459	0.159
CLS:				
third year – second year	-0.5161	0.474	-1.0879	0.286
other – second year	-0.2334	0.778	-0.3001	0.766
^a Represents reference level				

Interpretation of Results:

- The overall R^2 of 0.227 suggests that the model explains approximately 23% of the variance in student behavior. While this indicates some relationship, there are likely other factors (such as unmeasured psychological or social variables) that influence student behavior.
- **None of the individual predictors** (age, gender, location, or class year) significantly predict student behavior, as their p-values are all greater than the 0.05 significance level. This suggests that, within the scope of the data and the model used, these demographic variables do not have a statistically significant impact on student behavior related to sustainability.
- The null hypothesis (H_0) cannot be rejected based on these results, as no significant relationships were found between the sustainability initiatives and student behavior.

Discussion

The results of this study suggest that campus sustainability initiatives (CSI) have a limited or no direct impact on student behavior related to sustainability, as indicated by the linear regression analysis. Despite the inclusion of various predictors such as age, gender, location, and class year, no significant relationships were found between these demographic factors and students' pro-environmental behavior (SBTS). This suggests that while sustainability initiatives are present on campus, they may not be sufficient in influencing students' daily behaviors, such as recycling, energy conservation, or sustainable consumption.

One possible explanation for this finding is that sustainability initiatives may not be tailored to effectively address the diverse needs and interests of students. Programs might be too general or lack engagement strategies that resonate with students' values, potentially limiting their impact. Furthermore, students' environmental behavior might be influenced by factors beyond campus

programs, such as personal attitudes, peer influence, or family habits, which were not captured in this study.

The lack of significant findings on demographic predictors such as age or gender also highlights that sustainability behavior might not be easily explained by these characteristics. It could suggest that students, regardless of their background, may face similar barriers to adopting sustainable practices, such as convenience or perceived effort, that outweigh their exposure to sustainability initiatives.

Given the results, future studies should explore more nuanced factors, such as students' intrinsic motivations, the frequency of participation in sustainability programs, or their perceptions of the effectiveness of these initiatives. Additionally, qualitative research may help uncover the psychological or social barriers to sustainability behavior, which quantitative data alone might not fully capture.

Ultimately, for sustainability initiatives to be more effective, they may need to be better integrated into students' daily routines, personalized, and supported by continuous engagement to foster lasting behavioral change.

Conclusion

This study found that while many universities have sustainability programs, they do not significantly change student behavior, like recycling or saving energy. Age, gender, and class year also do not impact participation. The lack of effect may be due to low awareness, engagement, or personal habits. To create real change, universities need more interactive and targeted strategies. Future research should explore student attitudes, motivations, and barriers to sustainability. Overall, while these programs raise awareness, they need to be more engaging to encourage lasting sustainable behavior.

Recommendation

Based on the findings of this study, the following recommendations are provided to enhance the impact of campus sustainability initiatives on student behavior:

1. **Increase Engagement and Personalization:** To boost student participation and influence behavior, sustainability programs should be more personalized and tailored to students' interests. Providing opportunities for students to engage in sustainability through hands-on experiences, challenges, or competitions may increase their sense of ownership and commitment. For example, creating student-led sustainability clubs or events can foster a deeper connection to sustainable practices.
2. **Strengthen Awareness and Education Campaigns:** Many students may not be fully aware of the available sustainability initiatives or their importance. Comprehensive awareness campaigns should be conducted regularly across campus, focusing not only on the benefits of sustainability but also on how students can contribute. Using social media, digital platforms, and campus events to share tips, successes, and educational content can keep sustainability in the forefront of students' minds.
3. **Incorporate Sustainability into the Curriculum:** Introducing sustainability-related content into academic courses, regardless of the field of study, can integrate sustainable thinking into students' daily lives. Encouraging faculty to highlight sustainability issues within their courses and even offering dedicated sustainability modules will ensure that students view sustainability as an integral part of their education, not just an extracurricular activity.
4. **Provide Incentives and Recognition:** Students are more likely to engage in sustainable behaviors if they feel their efforts are recognized and rewarded. Offering incentives such as recognition awards, certificates, or even small prizes for sustainable practices (e.g., recycling, using energy-efficient resources, or attending sustainability events) could encourage more active participation and foster a competitive spirit among students to adopt eco-friendly habits.
5. **Involve Peer Influence:** Peer influence plays a significant role in shaping student behavior. By involving influential student leaders or creating peer-to-peer sustainability networks, students are more likely to adopt sustainable behaviors. Peer-led campaigns

and mentorship programs can create a stronger sense of community and motivate students to follow sustainability practices through social influence.

6. Address Behavioral Barriers: Future initiatives should aim to identify and address common barriers to sustainable behavior, such as convenience, cost, or lack of knowledge. For example, providing easily accessible recycling bins, offering sustainable alternatives at a reasonable cost, or offering workshops on sustainable living practices can eliminate obstacles that hinder the adoption of green behaviors.
7. Monitor and Evaluate Program Effectiveness: To ensure that sustainability initiatives are effective, campuses should regularly monitor and evaluate their programs. Surveys, focus groups, or feedback mechanisms can be implemented to assess students' awareness, participation, and behavior over time. Continuous feedback will help universities make necessary adjustments and improvements to their sustainability initiatives.

By adopting these recommendations, campuses can enhance the effectiveness of sustainability initiatives, foster a culture of sustainability, and lead to long-term positive changes in student behavior.

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