

From Institutional Leadership to Value Internalization: Explaining Students' Energy-Conservation Intention in Chinese Higher Education Institutions

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ABSTRACT:

As energy conservation becomes an increasingly important component of sustainable campus development, understanding how universities can foster students' pro-environmental intention has become a critical issue in higher education research. This study aimed to examine the relationships among university leadership, environmental values, and pro-environmental behavioral intention in the context of energy conservation among HEIS students. We targeted on students enrolled in higher education institutions in Shanxi Province, China. Data were collected through online survey and 864 valid responses were retained for the final analysis. Structural equation modeling was employed to test the proposed relationships. The results showed that university leadership did not exert a significant direct effect on pro-environmental behavioral intention, but it had a significant positive effect on environmental values. Environmental values also significantly and positively influenced

COPYRIGHT STATEMENT: Copyright: © 2026 Authors. Open access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (http://creativecommons.org/licenses/by/4.0/).	pro-environmental behavioral intention. In addition, environmental values significantly mediated the relationship between university leadership and pro-environmental behavioral intention, indicating that the effect of leadership on students' energy-conservation intention operates mainly through value internalization rather than through a direct behavioral pathway. These findings enrich current understanding of how institutional support and internal value formation jointly shape students' energy-conservation intention in higher education contexts Keywords: university leadership; environmental values; pro-environmental behavioral intention; energy conservation; higher education institutions
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1.Introduction

Energy conservation has become a central concern in global sustainable development as rising energy demand, resource pressure, and climate change continue to challenge governments, institutions, and communities (Zhang et al., 2025). Responsible consumption, clean energy, and climate action are closely interconnected, which means that sustainability depends not only on technological progress and policy design but also on behavioral change at the institutional and individual levels. Within this broader context, higher education institutions are increasingly expected to contribute to low-carbon transition not only through knowledge production and public engagement but also through the cultivation of environmentally responsible behavior among students (Abo-Khalil, 2024).

This issue is particularly important in universities because they are not merely sites of instruction. They are also formative environments in which students develop values, norms, and long-term patterns of action. In recent years,

green campus construction, sustainability education, and low-carbon governance have become more visible in higher education policy and institutional practice (Pu et al., 2024). In China, education-related policy documents have increasingly stressed green development, resource conservation, and the integration of ecological values into campus life, indicating that universities should play a more active role in fostering students' environmental responsibility. In this setting, students' pro-environmental behavioral intention on energy conservation deserves special attention because it reflects whether sustainability goals can be translated into daily actions in dormitories, classrooms, libraries, and other campus spaces.

The higher education context also gives this issue a distinctive institutional character. University students are still in a crucial stage of value formation, which means that their environmental intentions are likely to be shaped not only by personal beliefs but also by signals from the university environment (Song et al.,

2022). Among these signals, university leadership may be especially important. Leadership in universities does not operate solely through formal administration. It also influences campus priorities, organizational culture, and students' perceptions of what kinds of behavior are encouraged and valued (Jabbar et al., 2024). When university leaders visibly emphasize sustainability, support energy-saving initiatives, and communicate environmental commitment in consistent ways, they may strengthen students' orientation toward environmental responsibility (Irfana et al., 2026). Such influence may become more enduring when it is internalized as environmental values, because values help students understand energy conservation not simply as an institutional requirement but as a personally meaningful and socially desirable commitment.

Despite the growing emphasis on green campus development, important practical challenges remain. Many universities have introduced sustainability campaigns, environmental education activities, and energy-saving initiatives, yet these efforts do not always generate stable student engagement in everyday conservation practices (Benzehaf et al., 2025). In some cases, institutional advocacy remains largely symbolic, while students' actual willingness to conserve energy is still uneven or weak. This suggests that the existence of policies, slogans, or environmental messages is not sufficient in itself. What matters more is whether universities can translate organizational commitment into students' internal value

orientation and, ultimately, into stronger pro-environmental behavioral intention. For this reason, the relationship between university leadership and students' environmental intention requires closer examination, particularly in terms of whether value formation serves as a bridge between the institutional and individual levels (Irfana et al., 2026).

From a theoretical perspective, the existing literature still leaves several important gaps. Studies on pro-environmental behavior have often emphasized attitudes, knowledge, norms, or other general psychological predictors, whereas relatively fewer studies have focused specifically on energy-conservation intention among HEIS students as a distinct behavioral outcome. In addition, although prior research has acknowledged the importance of environmental values (Jiang et al., 2025), it has not sufficiently clarified how institutional factors in higher education settings contribute to the formation of such values. Research on sustainability in universities has also tended to pay more attention to policies, educational programs, and campus operations than to the role of university leadership as a direct antecedent of student environmental intention (Buckner & Zhang, 2024). As a result, the mechanism through which university leadership may shape pro-environmental behavioral intention through environmental values remains insufficiently explained. Accordingly, this study is guided by the following objectives:

- 1) To examine the direct relationships among university leadership, environmental values,

and pro-environmental behavioral intention in the context of energy conservation among HEIS students.

2) To test the mediating role of environmental values in the relationship between university leadership and pro-environmental behavioral intention.

2.Literature Review

2.1 Theoretical foundation

This study is grounded in Value-Belief-Norm theory and social support theory, because these two perspectives jointly explain how institutional influence can be translated into students' environmental intention through value formation. Value-Belief-Norm theory emphasizes that environmentally relevant behavior is rooted in internalized value orientation. Its central logic is that individuals are more likely to support and enact environmentally responsible behavior when ecological concern is embedded in their value system rather than treated as an external obligation (Stern et al., 1999). This perspective is highly relevant to the present study because energy conservation in higher education institutions is not only a managerial issue but also a value-related issue. Students may encounter rules, campaigns, and environmental messages on campus, yet whether they develop a stable pro-environmental behavioral intention depends to a large extent on whether environmental responsibility is recognized as personally important and socially meaningful. In this sense, environmental values provide an appropriate explanatory mechanism for understanding why some students are more willing than others to

engage in energy-saving behavior in everyday campus life (Heib et al., 2023).

At the same time, the present study does not treat students' environmental intention as a purely individual outcome detached from institutional context. Social support theory helps explain how external support environments shape individual orientations by communicating encouragement, legitimacy, and shared expectations. In educational and organizational settings, support is not limited to emotional or instrumental assistance. It also operates through symbolic endorsement, resource allocation, and the visible prioritization of certain goals and practices (Cohen & Wills, 1985). This is particularly suitable for the university context, where students are influenced not only by personal beliefs but also by the broader organizational climate created by campus governance. Within such a setting, university leadership can be understood as a source of institutional support that signals whether sustainability and energy conservation are taken seriously by the university and whether related behaviors are worthy of students' commitment (Fia et al., 2022).

These two theories can be combined in a coherent way for the present study because they address two interconnected levels of explanation. Value-Belief-Norm theory clarifies the internal mechanism through which environmental orientation supports pro-environmental intention, whereas social support theory clarifies how institutional signals and support structures can shape such orientation in the first place. Their integration is therefore especially suitable for a

study that seeks to explain not only whether HEIS students intend to conserve energy, but also how this intention may be shaped by the joint influence of institutional leadership and internalized environmental values. In the present model, university leadership functions as the institutional antecedent, environmental values function as the internal mediating mechanism, and pro-environmental behavioral intention functions as the behavioral outcome.

The use of these theories is also consistent with the parsimony of the current model. Although Value-Belief-Norm theory may include additional components and social support theory may be applied across multiple forms of interpersonal or organizational support, the present study focuses only on those dimensions that are directly aligned with the model diagram. Specifically, it draws on the value-based logic of environmental intention from Value-Belief-Norm theory and the institutional influence logic of social support theory to explain how university leadership may foster environmental values and thereby strengthen pro-environmental behavioral intention among HEIS students in the context of energy conservation.

2.2 Hypotheses development

University leadership in this study refers to students' perception that university leaders visibly support, prioritize, and promote energy conservation and environmental responsibility through institutional commitment, guidance, and resource endorsement (Kyambade et al., 2024). Pro-environmental behavioral intention refers to students' conscious willingness to engage in

energy-saving and environmentally responsible behavior in campus life (Rahmawati et al., 2024). In university sustainability governance, visible commitment from senior leadership has been associated with stronger student participation in environmentally responsible campus activities when institutional priorities are perceived as credible and consistent (Dawodu et al., 2022). In higher education management research, leadership emphasis on sustainability has been linked to stronger student readiness to align personal conduct with institutional environmental expectations (Žalėnienė & Pereira, 2021). In organizational behavior studies, leadership signals have shaped behavioral willingness by clarifying which practices are recognized, supported, and institutionally valued (Dextras-Gauthier et al., 2023). In campus environmental programs, administrative endorsement has increased students' willingness to cooperate with energy-saving initiatives when such endorsement is sustained rather than symbolic (Putri et al., 2025). In educational settings, institutional leadership has also influenced students' action tendency by creating a stronger sense that environmental responsibility forms part of the university's normative climate (Suárez-Perales et al., 2021). Although these findings from related contexts provide meaningful support, the direct effect of university leadership on HEIS students' energy-conservation intention still requires explicit verification in the present research setting. Therefore, the following hypothesis is proposed:

H1: University leadership positively influences pro-environmental behavioral intention

among HEIS students on energy conservation.

Environmental values refer to the extent to which students regard environmental protection and ecological responsibility as important and desirable guiding principles (Ahmat Zainuri et al., 2022). Leadership in educational institutions often affects more than immediate compliance because it shapes the symbolic priorities through which students interpret what is important within campus life. In sustainability-oriented universities, strong leadership commitment has been associated with greater student acceptance of ecological responsibility as part of institutional culture (Mohammadi et al., 2023). In environmental education research, repeated exposure to organizational support for sustainability has strengthened students' valuation of environmental protection beyond short-term campaign participation (Perea et al., 2025). In studies of green school climate, leadership advocacy has contributed to the formation of sustainability-related values by framing environmental responsibility as a shared and legitimate educational goal (Akinsemolu & Onyeaka, 2025). In youth environmental socialization research, institutional endorsement has reinforced pro-environmental value orientation when ecological messages are supported by visible action and consistent policy signals (Krettenauer et al., 2024). In higher education sustainability studies, leadership commitment has also been connected to students' stronger internal acceptance of environmental responsibility as a meaningful principle for decision making (Hua et al., 2025). These findings

suggest that leadership-related influence may extend into the domain of value formation, yet the relationship between university leadership and environmental values remains underexamined in the specific context of HEIS students' energy conservation. Therefore, the following hypothesis is proposed:

H2: University leadership positively influences environmental values among HEIS students.

Environmental values have often shaped environmentally relevant intention because they influence how individuals judge the importance, legitimacy, and moral desirability of ecological action (Tahir et al., 2024). Stronger environmental value orientation has been associated with a greater willingness to choose environmentally responsible options even when such choices require additional effort or restraint (Çam et al., 2025). Ecological values have predicted stronger intention to participate in green campus initiatives and environmentally responsible daily behavior. Value-based commitment has supported a more stable readiness to engage in pro-environmental action across both educational and non-educational contexts (Portus et al., 2024). In research on household and public resource conservation, individuals who attached greater importance to environmental responsibility reported stronger intention to save electricity, reduce waste, and support sustainable practices (Bohdanowicz et al., 2021). Values have served as a proximal basis for behavioral intention because they organize how environmental consequences are interpreted in relation to personal and

collective responsibility. Therefore, the following hypothesis is proposed:

H3: Environmental values positively influence pro-environmental behavioral intention among HEIS students on energy conservation.

Leadership-related sustainability signals do not always produce behavioral intention directly because institutional messages often become effective only when they are translated into personally meaningful evaluative commitments (Hahn et al., 2026). Administrative encouragement has shown stronger behavioral influence when students internalize environmental responsibility as part of their own value orientation. Institutional support has shaped green behavioral willingness more effectively when students come to regard ecological responsibility as a principle worth endorsing rather than a rule to be followed temporarily (Lim & Homer, 2026). External leadership influence has often operated through value-related mechanisms that stabilize

how individuals interpret environmental expectations (Huang et al., 2024). Supportive institutional contexts have strengthened pro-environmental intention indirectly by reinforcing the value significance attached to ecological action (Yang, 2024). The pathway from organizational influence to action tendency has also become stronger when environmental concern is internalized into relatively enduring values. Therefore, the following hypothesis is proposed:

H4: Environmental values mediate the relationship between university leadership and pro-environmental behavioral intention among HEIS students on energy conservation.

Based on the preceding hypotheses, the proposed theoretical relationships among university leadership, environmental values, and pro-environmental behavioral intention are illustrated in Figure 1.

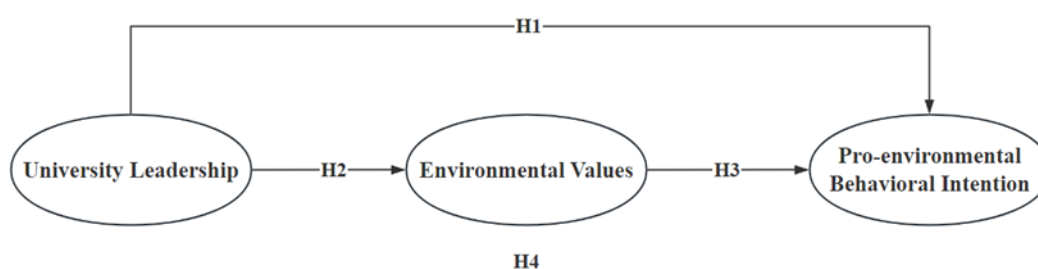


Figure 1. Theoretical framework

3. Methodology

3.1 Research design, sample, and data collection

This study adopts a positivist, deductive, and quantitative research design because its purpose is to test theoretically derived relationships among measurable constructs and to estimate both direct

and indirect effects within a structured model. The target population consists of students enrolled in higher education institutions in Shanxi Province, China. Shanxi was selected because it represents a meaningful empirical context for energy-conservation research due to its long-standing association with energy-intensive development and its importance within China's broader energy transition agenda. In this setting, higher education institutions are expected not only to reduce operational energy use but also to cultivate environmentally responsible attitudes and intentions among students. The present small paper uses the same fieldwork foundation as the larger dissertation project, but it retains only the three variables that are directly relevant to the simplified conceptual model, namely university leadership, environmental values, and pro-environmental behavioral intention.

The study employed an online survey and used proportionate stratified sampling to improve representativeness across institutional and student subgroups. Stratification was based on institutional type, academic major, and year level, after which respondents were selected within each subgroup through random procedures. Following this design, questionnaires were distributed across higher education institutions in Shanxi Province, and the final dataset yielded 864 valid responses after data screening. This sample size was more than adequate for structural equation modeling and provided sufficient variation across students' disciplinary, academic, and institutional backgrounds. Onsite administration also helped verify respondent eligibility, reduce incomplete or

careless responses, and improve the overall quality of the collected data.

3.2 Measurement of variables

The questionnaire used in this study consisted of two sections. The first section collected respondents' demographic information, including gender, academic year, major, age, and place of growth. The second section measured the three constructs included in the conceptual model. All items were evaluated on a seven-point Likert scale, ranging from 1 = strongly disagree to 7 = strongly agree. The present study measured university leadership, environmental values, and pro-environmental behavioral intention, and each construct was adapted from previously established scales to fit the campus energy-conservation context.

University leadership was measured using six items adapted from Aggarwal and Agarwala (2025). These items assessed students' perceptions of leadership commitment, sustainability-oriented guidance, encouragement of student participation, principled support for environmental responsibility, and resource support for energy-saving initiatives. Environmental values were measured using fourteen items adapted from Ahmat Zainuri et al. (2022). These items captured students' value orientations related to environmental protection, ecological responsibility, fairness in resource use, self-discipline in reducing waste, and broader concern for collective and environmental well-being. Pro-environmental behavioral intention was measured using seven items adapted from Lange (2024). These items focused on

students' intended efforts to reduce electricity use, switch off unused facilities and equipment, participate in energy-saving activities, and encourage peers to conserve energy. Variables included in the larger dissertation model but not retained in the present small paper, such as sustainability-oriented education, environmental beliefs, and personal norms, were excluded from the current analysis to ensure consistency with the simplified model. Detailed measurement items for all variables are presented in the Appendix.

3.3 Data analysis procedures and pilot study results

Data analysis was conducted in several sequential stages. First, the questionnaire was subjected to a pilot study to assess item clarity, initial reliability, and suitability for the target student population before the main survey.

A total of 35 pilot questionnaires were distributed to students from several higher education institutions in Shanxi Province. The pilot results indicated satisfactory preliminary measurement quality for the three retained constructs. For university leadership, the six items showed corrected item-total correlation values ranging from 0.64 to 0.72, and the construct achieved a Cronbach's alpha of 0.903, indicating strong internal consistency. For environmental values, the fourteen items showed corrected item-total correlation values ranging from 0.53 to 0.66, with a Cronbach's alpha of 0.928, which reflected excellent reliability. For pro-environmental behavioral intention, the seven items produced corrected item-total correlation values ranging from 0.61 to 0.74, and the

Cronbach's alpha reached 0.894, demonstrating good internal consistency. At the full-instrument level, the pilot dataset produced a Kaiser–Meyer–Olkin value of 0.901 and a significant Bartlett's test of sphericity, indicating that the data were suitable for factor analysis. After the pilot stage, minor wording adjustments were made to improve clarity.

In the formal analysis stage, the main dataset was then processed through descriptive statistics, reliability analysis, validity analysis, and structural equation modeling. SPSS was used for descriptive statistics and reliability checks, while SEM procedures were used to test the direct effects of university leadership on environmental values and pro-environmental behavioral intention, the direct effect of environmental values on pro-environmental behavioral intention, and the mediating effect of environmental values through bootstrapping with 5,000 resamples and a 95% confidence interval.

4. Results

4.1 Sample characteristics

Table 1 presents the demographic and background profile of the respondents. The final sample consists of 864 valid responses, indicating that the dataset is sufficiently large for structural equation modeling. The respondents were drawn from the principal higher education areas in Shanxi Province, with Central Shanxi accounting for the largest proportion of the sample, followed by Northern, Southern, and Southeastern Shanxi. This regional spread indicates that the sample was not concentrated in a single locality and therefore captures substantial geographic variation within

the study setting.

The sample also shows adequate diversity in gender, age, year level, academic major, and place of growth. Female respondents account for 55.0% of the sample, while male respondents account for 45.0%. Most respondents fall within the traditional university age range of 18 to 23 years. The four academic years are relatively balanced, and students from science and engineering, social sciences, arts and humanities, business and economics, and other disciplines are all represented. In addition, the urban–rural composition is reasonably balanced. Taken together, these characteristics support the heterogeneity of the sample and provide a sound empirical basis for examining students' pro-environmental behavioral intention in the higher education context.

Table 1. Sample information

Category	Item	N	%
Region of university	Northern Shanxi	201	23.3
	Central Shanxi	274	31.7
	Southern Shanxi	198	22.9
	Southeastern Shanxi	191	22.1
Gender	Male	389	45
	Female	475	55
Age	Under 18	41	4.7
	18–20	356	41.2
	21–23	362	41.9
	24 or above	105	12.2

Grade level	Freshman	233	27
	Sophomore	194	22.5
	Junior	220	25.5
	Senior	217	25.1
Academic major	Science and Engineering	291	33.7
	Social Sciences	208	24.1
	Arts and Humanities	147	17
	Business and Economics	166	19.2
Place of growth	Others	52	6
	Urban	472	54.6
	Rural	392	45.4

4.2 Descriptive statistics of the retained variables

Table 2 reports the descriptive statistics for the retained items measuring university leadership, environmental values, and pro-environmental behavioral intention. The mean values of the six university leadership items range from 4.09 to 4.25, indicating that respondents generally report a moderately positive perception of leadership support for sustainability and energy conservation. The environmental values items range from 4.06 to 4.33, suggesting that students overall hold relatively favorable value orientations toward environmental responsibility. The items for pro-environmental behavioral intention show slightly higher mean values, ranging from 4.24 to 4.41, which indicates that respondents generally express a strong willingness to engage in campus

energy-saving behavior.

The standard deviations suggest moderate variation in responses across all retained items. In addition, all skewness and kurtosis values fall within commonly accepted ranges, indicating that the item distributions do not show problematic departures from normality. This distributional pattern supports the suitability of the retained data for subsequent measurement and structural analyses.

Table 2. Descriptive statistics of the retained variables

Variable	Item	Mean	Std.	Skewness	Kurtosis
University Leadership	UL1	4.18	1.02	-0.62	-0.38
	UL2	4.12	1.05	-0.59	-0.41
	UL3	4.25	0.98	-0.66	-0.32
	UL4	4.09	1.03	-0.52	-0.45
	UL5	4.22	0.97	-0.69	-0.27
	UL6	4.14	1.01	-0.57	-0.4
Environmental Values	EV1	4.12	0.92	-0.55	-0.28
	EV2	4.15	0.9	-0.58	-0.09
	EV	4.09	0.	-0.47	-0.4
Pro-Environmental Behavioral Intention	3	96			
	EV4	4.06	0.94	-0.43	-0.46
	EV5	4.1	0.98	-0.49	-0.52
	EV6	4.13	0.96	-0.54	-0.38
	EV7	4.28	0.93	-0.72	-0.05
	EV8	4.18	0.91	-0.61	-0.18
	EV9	4.16	0.95	-0.56	-0.27
	EV10	4.11	0.89	-0.58	-0.31
	EV11	4.3	0.92	-0.74	0.16
	EV12	4.22	0.99	-0.66	-0.25
	EV13	4.33	1.01	-0.83	-0.1
	EV14	4.25	0.98	-0.78	-0.07
	PI1	4.32	0.88	-0.6	-0.24
	PI2	4.29	0.86	-0.61	-0.12
	PI3	4.24	0.9	-0.58	-0.2
	PI4	4.27	0.	-0.64	-0.26

			94		
	PI5	4.28	0.96	-0.69	-0.1
	PI6	4.41	0.83	-1.02	0.98
	PI7	4.33	0.85	-0.7	0.2

4.3 Measurement quality of the retained constructs

Measurement quality analysis is necessary before hypothesis testing because it determines whether the observed items represent their intended latent constructs with sufficient accuracy. In the present study, this step focuses on convergent validity and discriminant validity. Convergent validity is used to examine whether items designed to measure the same construct are sufficiently related to one another, whereas discriminant validity is used to assess whether different constructs remain empirically distinct. These tests are essential because structural path estimates can only be interpreted meaningfully when the measurement model is psychometrically adequate.

Table 3 reports the convergent validity results for the three retained constructs. Convergent validity is commonly assessed through standardized factor loadings, composite reliability, and average variance extracted. In SEM research, factor loadings are generally expected to exceed 0.50 and preferably 0.70, composite reliability should be above 0.70, and average variance extracted should be above 0.50. These thresholds indicate that the indicators load

adequately on their respective constructs, that the construct shows internal consistency, and that the latent variable explains a sufficient proportion of item variance.

The results in Table 3 meet these standards across all three constructs. For university leadership, the factor loadings range from 0.699 to 0.828, the composite reliability is 0.898, and the average variance extracted is 0.596. For environmental values, the factor loadings range from 0.693 to 0.848, the composite reliability reaches 0.952, and the average variance extracted is 0.588. For pro-environmental behavioral intention, the factor loadings range from 0.756 to 0.865, the composite reliability is 0.926, and the average variance extracted is 0.640. Taken together, these values indicate that all retained constructs show satisfactory convergent validity and are suitable for subsequent structural analysis.

Table 3. Convergent validity of the retained constructs

Variable	Item	Factor loading	CR	AVE
University Leadership	UL1	0.828	0.898	0.596
	UL2	0.77		
	UL3	0.699		
	UL4	0.75		
	UL5	0.793		
	UL6	0.786		
Environmental Values	EV1	0.848	0.952	0.588
	EV2	0.734		

EV3	0.721			
EV4	0.693			
EV5	0.706			
EV6	0.775			
EV7	0.804			
EV8	0.771			
EV9	0.762			
EV10	0.713			
EV11	0.806			
EV12	0.791			
EV13	0.763			
EV14	0.829			
PI1	0.865			
PI2	0.846			
PI3	0.76	0.92		
PI4	0.77	0.64		
PI5	0.801			
PI6	0.796			
PI7	0.756			

Pro-Environmental Behavioral Intention

Table 4 presents the discriminant validity results based on the Fornell–Larcker criterion. Discriminant validity is used to determine whether each latent construct is empirically distinguishable from the others in the model. This test is important because high overlap among constructs

may indicate that different variables are not actually measuring separate conceptual domains. According to the Fornell–Larcker criterion, discriminant validity is supported when the square root of the average variance extracted for a construct is greater than its correlations with all other constructs in the model.

The values reported in Table 4 satisfy this requirement. The square root of AVE for university leadership is 0.772, which is higher than its correlations with environmental values (0.509) and pro-environmental behavioral intention (0.459). The square root of AVE for environmental values is 0.767, which exceeds its correlation with university leadership and its correlation with pro-environmental behavioral intention (0.569). The square root of AVE for pro-environmental behavioral intention is 0.800, which is also higher than its correlations with the other two constructs. These results indicate that the three retained constructs are empirically distinct and that the measurement model demonstrates satisfactory discriminant validity.

Table 4. Discriminant validity of the retained constructs

Latent variables	UL	EV	PI
UL	0.772		
EV	0.509**	0.767	
PI	0.459**	0.569**	0.8

Note: UL = university leadership; EV = environmental values; PI = pro-environmental behavioral intention. Diagonal elements are the square roots of AVE.

Off-diagonal elements are construct correlations. ** $p < 0.01$.

4.4 Hypothesis testing results

Hypothesis testing is used to examine whether the structural relationships specified in the conceptual model are supported by the empirical data. In SEM, this stage evaluates the magnitude, direction, and statistical significance of the hypothesized paths among latent constructs. The present model includes three direct effects and one mediating effect. The direct effect analysis identifies whether one construct exerts an immediate influence on another, whereas the mediation test assesses whether the effect of an antecedent variable is transmitted through an intervening construct. Total effects are also examined because they combine direct and indirect effects and therefore provide a more complete estimate of overall influence.

Table 5 presents the direct structural effects among the retained constructs. Direct effects are commonly evaluated using standardized path coefficients, standard errors, critical ratios, and p values. In SEM research, a path is generally considered statistically significant when its p value is below 0.05, and stronger critical ratios indicate more stable statistical support. These statistics allow the researcher to determine whether each hypothesized path is empirically supported.

The results show that the path from university leadership to pro-environmental behavioral intention is positive but not statistically significant ($\beta = 0.037$, $SE = 0.024$, $C.R. = 1.254$, $p = 0.210$). This indicates that university leadership does not exert a significant direct effect on

students' behavioral intention in the present model, so H1 is not supported. By contrast, university leadership shows a strong and statistically significant positive effect on environmental values ($\beta = 0.450$, $SE = 0.031$, $C.R. = 11.834$, $p < 0.001$), which supports H2. Environmental values also show a significant positive effect on pro-environmental behavioral intention ($\beta = 0.193$, $SE = 0.030$, $C.R. = 6.522$, $p < 0.001$), which supports H3. These findings indicate that the value-based pathway is empirically meaningful in explaining students' energy-conservation intention.

Table 5. Direct path effects

Hypothesis	Structural path	Effect value (β)	Standard Error	Critical Ratio	p	Result
H1	university leadership → pro-environmental behavioral intention	0.037	0.024	1.254	0.210	Not supported
H2	university leadership → environmental values	0.450	0.031	11.834	**	Supported
H3	environmental values → pro-environmental behavioral intention	0.193	0.030	6.522	**	Supported

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Note: *** $p < 0.001$.

Table 6 presents the bootstrap test of the mediating effect. Mediation analysis is used to determine whether the influence of an independent variable on a dependent variable operates through an intervening construct. In SEM studies, bootstrap confidence intervals are commonly used because they provide a robust test of indirect effects without assuming normality of the sampling distribution. A mediation effect is considered significant when the 95% confidence interval does not include zero.

The results indicate that the indirect effect of university leadership on pro-environmental behavioral intention through environmental values is statistically significant ($\beta = 0.087$, $SE = 0.020$), with a 95% confidence interval ranging from 0.052 to 0.130. Because zero does not fall within this interval, the mediation effect is supported. This result shows that environmental values significantly mediate the relationship between university leadership and pro-environmental behavioral intention, thereby supporting H4. Since the direct path from university leadership to pro-environmental behavioral intention is not significant while the indirect path is significant, the findings suggest an indirect-only mediation pattern in the current

model.

Table 6. Indirect effect bootstrap analysis

Hypothesis	Mediation path	Effect value	SE	Lower 95% CI	Upper 95% CI	Result
H4	university leadership p → environm ental values → pro-envir onmental behaviora l intention	0.087	0.020	0.052	0.130	Supported

Table 7 reports the total effects among the retained constructs. Total effects are useful because they capture the complete magnitude of influence that one construct exerts on another by combining direct and indirect pathways. This is especially important when a variable may show a weak or non-significant direct effect but still exert a meaningful overall influence through mediation.

The results show that university leadership has a strong total effect on environmental values ($\beta = 0.450$, 95% CI [0.389, 0.510]). More importantly, although its direct effect on

pro-environmental behavioral intention is not significant, its total effect on pro-environmental behavioral intention reaches 0.182, with a confidence interval from 0.119 to 0.245. This indicates that university leadership still contributes to students' energy-conservation intention through the mediating mechanism of environmental values. Environmental values also show a meaningful total effect on pro-environmental behavioral intention ($\beta = 0.294$, 95% CI [0.222, 0.366]). These total effects further reinforce the central role of value orientation in shaping students' intention to engage in energy-saving behavior.

Table 7. Total effects

Effect path	Effect size	SE	Lower 95% CI	Upper 95% CI
University leadership → Environmental values	0.45	0.031	0.389	0.51
University leadership → Pro-environmental behavioral intention	0.182	0.032	0.119	0.245
Environmental values → Pro-environmental behavioral intention	0.294	0.037	0.222	0.366

5. Discussion and Implications

5.1 Discussion

The findings reveal that the relationship between university leadership and students' pro-environmental behavioral intention is not a simple direct pathway. Although leadership showed a significant positive effect on environmental values, its direct effect on behavioral intention was not statistically supported, whereas the indirect pathway through environmental values was significant. This pattern suggests that institutional influence in the university context does not automatically translate into students' immediate willingness to conserve energy. Leadership may shape the normative climate of the campus and signal the institutional importance of sustainability, but students' behavioral intention appears to depend less on exposure to these signals alone than on whether such signals are interpreted, accepted, and internalized as meaningful environmental commitments. In other words, the present findings indicate that leadership operates more effectively as a source of value formation than as a direct trigger of behavioral intention. This helps explain why visible institutional commitment may be necessary but still insufficient if students do not transform that external message into an internal environmental orientation.

The significant effect of university leadership on environmental values further suggests that leadership in higher education functions symbolically as well as administratively. In the university setting, leadership is not limited to formal regulation or managerial oversight. It also

shapes the broader meaning structure through which students understand what is considered important, legitimate, and worthy of commitment within campus life. When leadership consistently emphasizes energy conservation, supports related initiatives, and frames sustainability as a serious institutional priority, students are more likely to perceive environmental responsibility as part of the university's shared moral and cultural expectations. This process is especially important in higher education because students are still in a stage of value consolidation, and institutional environments may therefore exert a stronger influence on how environmental concerns are morally interpreted. The results thus imply that university leadership contributes to pro-environmental outcomes not mainly by compelling action, but by cultivating a value environment in which environmentally responsible conduct becomes more intelligible and more personally relevant to students.

The significant positive effect of environmental values on pro-environmental behavioral intention, together with its mediating role, highlights the central psychological mechanism through which students' energy-conservation intention is formed. In this study, environmental values did not merely accompany behavioral intention as a background attitudinal factor. Instead, they served as the internal bridge linking institutional support to students' intended action. This suggests that energy-saving intention in higher education is better understood as a value-based commitment than as a purely reactive response to campus

management. Students are more likely to express intention to reduce electricity use, participate in energy-saving activities, and support conservation practices when they regard environmental protection as a principle that should guide everyday conduct. The findings therefore elevate value internalization to a central explanatory position in the university energy-conservation context. They imply that the effectiveness of institutional leadership depends largely on whether it can move beyond visibility and policy expression to shape students' deeper evaluative orientation toward environmental responsibility.

5.2 Theoretical implications

This study contributes to the literature by refining how the role of university leadership should be understood in research on pro-environmental intention in higher education. Prior studies in organizational settings have often reported that leadership-related support or responsible leadership exerts a direct positive influence on pro-environmental behavior, which has encouraged a relatively straightforward understanding of leadership as an immediate behavioral driver (Afsar et al., 2020). Similar conclusions have also appeared in studies showing that responsible leadership can promote employees' green behavior through organizational commitment and environmental vision, while still preserving a meaningful direct path from leadership to behavior (Zhou et al., 2022). In higher education research, sustainability-oriented leadership and institutional policy have likewise been treated as important predictors of students' environmental engagement, suggesting that once

sustainability is clearly promoted by university authorities, students are more likely to respond with stronger pro-environmental tendencies (Aggarwal & Agarwala, 2025). However, the present study did not support a significant direct effect of university leadership on pro-environmental behavioral intention. This difference is theoretically important because it suggests that the leadership–behavior relationship may be more context-dependent than previous studies have implied. Compared with earlier findings that emphasized direct leadership effects, the present study indicates that, in the university energy-conservation context, leadership may shape behavioral intention less through immediate behavioral activation and more through slower processes of internal value formation. In this sense, the study extends previous research by moving the explanation from a direct-effect logic toward a mediated institutional influence logic.

A second theoretical contribution lies in clarifying the position of environmental values within the explanatory chain. Earlier work has consistently argued that values form one of the most stable foundations of pro-environmental action, because they shape how individuals interpret environmental responsibility, moral obligation, and long-term ecological consequences (Steg, 2016). Integrative reviews have similarly emphasized that environmentally relevant behavior is often grounded in deeper value orientations rather than in isolated situational reactions alone (Steg & Vlek, 2009). Research on university students has also shown that initial environmental values influence later

pro-environmental intention and support environmentally responsible decision making (Song et al., 2022). Related work among young adults further suggests that environmental values are not only associated with green behavior, but also shape the emotional and cognitive routes through which individuals respond to environmental issues (Li et al., 2022). Yet in much of this literature, environmental values are usually treated either as one antecedent among many or as a relatively stable background disposition. The present study advances this line of inquiry by showing that environmental values are not merely supportive attitudinal conditions, but the key mechanism through which university leadership becomes behaviorally relevant. Compared with earlier studies that focused more heavily on awareness, motivation, or general educational exposure, this study places value internalization at the center of the explanation. The theoretical significance of this finding is that it repositions environmental values from a correlational predictor to a mediating structure that translates external institutional signals into internal motivational readiness.

A third theoretical implication is that the study offers a more integrated account of pro-environmental intention in higher education by linking the value-centered logic of environmental behavior research with the contextual logic of institutional support. Previous research in university settings has shown that campus environmental awareness and pro-environmental action are shaped by educational and institutional contexts, indicating

that the university environment matters for student behavior (Fu et al., 2017). More recent studies have also demonstrated that sustainability education and institutional support jointly strengthen pro-environmental behavior among university students, highlighting the importance of organizational context in green behavioral formation (Qi et al., 2025). At the same time, studies based on motivational and psychological models have emphasized that internal values, threat appraisal, and responsibility-related cognition play a key role in explaining why students form pro-environmental intentions (Shafiei & Maleksaeidi, 2020). These two strands of literature, however, are often developed separately. One tends to emphasize institutional or educational context without clearly specifying how contextual influence becomes internalized. The other tends to emphasize internal value-based drivers without clarifying how those values are institutionally cultivated. The present study contributes by connecting these two levels more explicitly. Compared with prior higher education studies that highlighted sustainability practices, policy, or educational exposure more broadly, this study isolates university leadership as an institutional antecedent and demonstrates that its explanatory force depends on its capacity to shape environmental values. The study therefore does not merely apply two perspectives side by side. Instead, it extends existing research by showing how external institutional support and internal value formation can be theoretically linked in explaining students' pro-environmental behavioral intention in the context of campus energy conservation.

5.3 Practical implications

The university leadership scale in this study captures concrete dimensions such as leadership commitment to energy conservation, formal encouragement of student participation, support for volunteering in energy-saving initiatives, principled consistency, and the provision of resources for environmental programs. This means that administrators should not rely only on policy slogans or occasional campaigns. They need to make leadership signals concrete, stable, and actionable. In practice, department heads should embed energy conservation into routine academic governance by publicly communicating energy-saving expectations, linking them to departmental culture, supporting student-led green activities, and allocating visible resources to small-scale sustainability projects. They should also ensure consistency between message and action, because students are more likely to internalize environmental commitments when leadership support is sustained rather than symbolic. For university governance, the implication is that leadership effectiveness in this area depends less on directive control and more on building a credible institutional environment in which environmental responsibility is repeatedly signaled, supported, and normalized.

The results also offer practical guidance for curriculum designers, student affairs units, campus sustainability offices, and student organizations. The environmental values items in this study emphasize responsible resource use, respect for nature, fairness in shared energy consumption, self-discipline, and the treatment of

environmental protection as an important principle of campus life. The pro-environmental behavioral intention items then translate these values into concrete intended actions such as reducing electricity use, switching off lights and air-conditioning, using natural ventilation first, participating in campus energy-saving activities, monitoring one's own energy-use habits, and encouraging peers to save energy. This pattern suggests that universities should design interventions that connect everyday energy-saving behavior with moral meaning and collective responsibility. Teachers can incorporate short value-oriented discussions into classes so that energy conservation is framed as part of responsible citizenship rather than mere cost reduction. Student affairs offices can organize peer-led activities that make shared responsibility visible in dormitories and classrooms. Campus sustainability offices can develop behavioral prompts, public feedback systems, and recognition programs that connect specific actions to wider environmental values. Student leaders and clubs can also play a bridging role by turning energy-saving practices into peer-supported norms. The practical lesson is that stakeholders should move beyond one-way information delivery and instead create repeated opportunities for students to see, discuss, practice, and socially reinforce the values that make energy conservation personally meaningful.

5.4 Limitations and future research

Several limitations should be acknowledged when interpreting the findings of this study. All variables were measured through self-reported

responses, which means that the results may be influenced by common method tendencies and socially desirable responding. This issue is especially relevant for environmentally oriented constructs, because students may overreport value commitment or behavioral intention in ways that align with socially approved norms. Then, the data were collected from higher education institutions in Shanxi Province, which provides a meaningful context for energy-conservation research but also limits the geographic generalizability of the findings. Institutional culture, leadership practice, and students' environmental socialization may differ across provinces, university types, and cultural settings.

These limitations point directly to several promising directions for future research. Future studies could also combine self-reported data with behavioral indicators, such as campus electricity-use records, participation logs, or observational measures, in order to examine the relationship between stated intention and actual energy-saving practice more rigorously. In addition, comparative research across different provinces, institutional types, or national contexts would help determine whether the indirect pattern found in this study is specific to the Shanxi higher education environment or reflects a broader institutional logic. Finally, future research may build on the present parsimonious model by introducing additional psychological or organizational variables and comparing alternative pathways, thereby clarifying whether environmental values remain the dominant explanatory mechanism or operate alongside other

mediating processes in shaping students' energy-conservation intention.

6.Conclusion

This study examined the relationships among university leadership, environmental values, and pro-environmental behavioral intention in the context of energy conservation among HEIs students and reached three main conclusions. First, university leadership did not exert a significant direct effect on students' pro-environmental behavioral intention, indicating that institutional leadership alone is not sufficient to immediately translate sustainability support into behavioral readiness at the student level. Second, university leadership significantly strengthened environmental values, and environmental values significantly enhanced pro-environmental behavioral intention, showing that value formation is a central mechanism in the development of students' energy-conservation intention. Third, environmental values significantly mediated the relationship between university leadership and pro-environmental behavioral intention, suggesting that the influence of leadership operates primarily through internal value internalization rather than through a direct behavioral pathway. Taken together, these findings indicate that energy-conservation intention in higher education is shaped through the interaction between institutional support and students' internalized environmental value orientation, and they highlight the importance of moving beyond symbolic leadership commitment toward value-based cultivation of pro-environmental intention in university settings.

Appendix. Measurement items

Variable	Item
university leadership	UL1. My department heads are committed to promoting energy conservation and environmental protection on campus.
	UL2. Department heads in my university formally encourage students to take part in campus energy-saving and environmental activities.
	UL3. Department heads and teachers in my department encourage students to volunteer in specific energy-conservation initiatives.
	UL4. I believe that the department heads of my university do not compromise on sustainability and energy-saving principles.
	UL5. I believe that my department heads uphold strong values regarding sustainability and responsible energy use.
	UL6. My department heads provide sufficient support and resources for energy-saving programs and environmental initiatives.
environm ental values	EV1. Reducing unnecessary energy use is an important way to protect the environment.
	EV2. Campus energy should be used responsibly because natural

resources are limited.		EV12. Choosing a simple and less wasteful way of using energy is valuable.
EV3. Avoiding energy waste reflects respect for nature and shared resources.		EV13. Contributing to campus energy saving is a meaningful way to support environmental sustainability.
EV4. Saving electricity on campus contributes to the well-being of the wider community.		EV14. Environmental protection should be treated as an important principle in campus life.
EV5. I believe students should care about the environmental consequences of everyday energy use.		PI1. I intend to reduce electricity use whenever I am on campus.
EV6. Responsible energy use is part of living in harmony with the environment.		PI2. I intend to switch off lights and air-conditioning when they are not in use.
EV7. Protecting the campus environment is a value that should guide students' daily choices.		PI3. I plan to use natural ventilation before turning on the air-conditioning whenever possible.
EV8. A supportive campus community should encourage responsible energy use among students.	pro-envir onmental behavioral intention	PI4. I intend to switch off classroom electrical or electronic equipment after use.
EV9. Using shared energy resources responsibly shows consideration for others.		PI5. I intend to participate in campus activities related to energy saving or environmental awareness.
EV10. Students should exercise self-discipline in avoiding unnecessary electricity consumption.		PI6. I plan to pay attention to my own daily electricity-use habits on campus.
EV11. Practicing energy conservation reflects personal responsibility and good character.		PI7. I intend to encourage my classmates to save energy whenever possible.

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