



Drivers of Green Behavior among Students of Online Flexible Distance Learning Higher Education Institutions

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Abstract

This study explores the pivotal role of green behavior among students in open online flexible distance learning higher education institutions. Recognizing the growing significance of sustainability in education, the study aims to investigate the impact of higher education institutions' support, family support, and social support on fostering green behavior, with awareness as a key mediator. Data was collected through surveys distributed via email to selected participants, with a total of 469 clean responses analyzed. Structural equation modeling (SEM) was employed for data analysis, with Smartpls4 software utilized to test the hypotheses. The results reveal significant relationships between the predictors (higher education institutions' support, family support, and social support) and green behavior, mediated by awareness. Hypotheses testing confirms the positive influence of these factors on green behavior, highlighting the importance of both individual and environmental factors in shaping sustainable practices among students in online learning environments. The study suggests several avenues for future research, including the exploration of specific

interventions to promote sustainability, the use of technology in sustainability education, and comparative studies across different online learning contexts. Theoretical implications align with Social Cognitive Theory, emphasizing the reciprocal interaction between individual factors, environmental influences, and behavioral outcomes. Practical implications suggest actionable strategies for higher education institutions, families, and society to enhance green behavior among students.

Keywords: Higher Education Institutions' Support, Family Support, Social Support, Awareness, Green Behavior

Introduction

Green behavior among students in Online Flexible Distance Learning Higher Education Institutions (OFDLEHIs) is pivotal globally, amid increasing environmental sustainability concerns (Simiyu et al., 2022). In this online educational landscape, students face unique opportunities and challenges in practicing sustainability. Notably, remote learning significantly reduces carbon emissions from daily commuting and lessens the need for extensive campus infrastructure, potentially cutting energy consumption and waste production (Gottlieb & Green, 1984). However, fostering green behavior requires joint efforts from institutions and students. Universities must integrate sustainability principles into online curricula and provide resources for environmental education (Mana et al., 2022). Encouraging collaborative projects and discussions on virtual platforms enhances student engagement and promotes eco-friendly practices (Hellfeldt et al., 2020). Students contribute by conserving energy, minimizing paper usage, and adopting sustainable study habits (Li et al., 2023). Active involvement in virtual environmental initiatives strengthens green behavior. Overall, students in OFDLEHIs are vital in advancing global sustainability goals. By embracing eco-conscious attitudes and actions in their online education, they become agents of positive change worldwide. Fostering green behavior among students in Online Flexible Distance Learning Higher Education Institutions (OFDLEHIs) faces challenges due to the virtual learning environment. While online education reduces carbon emissions and campus infrastructure, it lacks tangible reminders of environmental responsibility (Al Amin et al., 2023). Students may struggle to prioritize green behavior without face-to-face discussions and access to eco-friendly facilities. Additionally, the virtual nature of OFDLEHIs can detach students from environmental issues, hindering their motivation for sustainability (Khan et al., 2024). The absence of institutional structures integrating sustainability into online curricula limits students' knowledge and motivation for eco-friendly practices (Yichen & Chuntian, 2024). To address these challenges, collaboration between institutions and students is necessary. Universities should integrate sustainability education into online courses, provide platforms for environmental discussions, and offer resources promoting green behavior. Simultaneously, students should actively engage in sustainable practices, advocate for environmental initiatives, and participate in virtual activism. Through combined efforts, OFDLEHIs can effectively promote green behavior and contribute to broader environmental sustainability goals (Cui et al., 2023). The study on fostering green behavior among students in Online Flexible Distance Learning Higher Education Institutions (OFDLEHIs) is crucial for policymakers, institutions, and students. It informs policymakers about the environmental impact of online education, urging the integration of sustainability into policies. Institutions must prioritize green initiatives in curricula and provide platforms for environmental discussions. This fosters students' environmental literacy and cultivates a sustainable culture. For students, the study offers opportunities for personal growth and engagement in

environmental activism, making them agents of change. Overall, the study's significance lies in its potential to drive collective efforts toward a more sustainable future in online education. This study aims to assess the direct and indirect relationship between higher education institution support, family support, and social support with green behavior with self-awareness as a mediator among students in Online Flexible Distance Learning Higher Education Institutions.

Literature Review

Underpinning Theory

Social Cognitive Theory (SCT), proposed by Bandura (1986), serves as a comprehensive theoretical framework to underpin the study examining the direct and indirect relationships between university support, family support, and social support with green behavior, with self-awareness as a mediator, among students in Online Flexible Distance Learning Higher Education Institutions. SCT posits that individuals learn through observation, imitation, and modeling of others' behaviors, which are influenced by social support systems such as family, peers, and institutions like universities. In the context of the study, SCT suggests that students' green behavior may be influenced by the social support they receive from various sources. For instance, university support in the form of environmental education programs, resources, and policies may shape students' attitudes and behaviors toward sustainability. Similarly, family support and social support from peers may also play significant roles in encouraging or discouraging green behavior. Moreover, SCT emphasizes the importance of self-awareness in guiding behavior. Self-awareness allows individuals to reflect on their values, beliefs, and goals, influencing their decisions and actions. In the study, self-awareness may act as a mediator in the relationship between social support and green behavior. Students who possess higher levels of self-awareness may be more likely to internalize environmental values and engage in eco-friendly practices, regardless of the level of social support they receive. SCT provides a nuanced understanding of how social factors, cognitive processes, and self-regulatory mechanisms interact to shape individuals' behaviors, making it a suitable theoretical framework for exploring the complex dynamics of green behavior among students in Online Flexible Distance Learning Higher Education Institutions.

Relationship between Family support, self-awareness & Green Behavior

The relationship between family support and green behavior with self-awareness as a mediator is intricate and multifaceted. Family support, including encouragement, role modeling, and shared environmental values, can significantly influence individuals' attitudes and behaviors toward sustainability (Naz et al., 2020). When individuals perceive strong support from their families for eco-friendly practices, they are more likely to internalize these values and exhibit green behavior (Lai & Cheng, 2016). Family members who actively engage in sustainable actions serve as powerful role models, shaping the environmental consciousness of their children or relatives (Panjaitan & Sutapa, 2010). Self-awareness acts as a crucial mediator in this relationship. Individuals who possess high levels of self-awareness are more attuned to their values, beliefs, and goals, including those related to environmental conservation (Dalvi-Esfahani et al., 2020). Self-awareness enables individuals to reflect on the environmental impact of their actions and align their behaviors with their values. Therefore, self-aware individuals may be more likely to adopt green behavior, regardless of the level of family support they receive. Moreover, self-awareness can strengthen the impact of family

support on green behavior (Ercantan & Eyupoglu, 2022). Thus, the following hypotheses were proposed for this study:

- H1: There is a relationship between family support and green behavior among online open flexible distance learning higher education institutions*
- H2: There is a relationship between family support and awareness of green behavior among online open flexible distance learning higher education*
- H3: There is a mediating effect of awareness on the relationship between family support and green behavior among online open flexible distance learning higher education institutions*

Relationship between Higher Institution Support, self-awareness & Green Behavior

The relationship between higher education institution (HEI) support and green behavior with self-awareness as a mediator is fundamental to understanding sustainable practices within educational settings. HEI support encompasses various initiatives, policies, and resources aimed at promoting environmental awareness and encouraging eco-friendly behaviors among students and staff (Anghel & Anghel, 2022). When HEIs prioritize sustainability through programs such as environmental education, campus recycling initiatives, and green infrastructure development, they create an environment conducive to fostering green behavior among their constituents (Roy, 2023). Self-awareness serves as a crucial mediator in this relationship. Individuals who possess high levels of self-awareness are more cognizant of their environmental impact and the importance of sustainable practices (Jahari et al., 2022). Self-awareness enables individuals to reflect on their values, beliefs, and goals, including those related to environmental conservation. As a result, self-aware individuals may be more inclined to engage in green behavior, regardless of the level of support provided by their HEI. Moreover, self-awareness can strengthen the impact of HEI support on green behavior. When individuals are self-aware, they are more receptive to the influence of institutional initiatives promoting sustainability (Moon et al., 2021). They internalize environmental values and incorporate them into their daily actions, thus amplifying the effects of HEI support on their green behavior. Self-awareness plays a pivotal role in mediating the relationship between HEI support and green behavior, enhancing the effectiveness of institutional efforts to promote sustainability within higher education settings (Hamilton, 2021). Therefore, the following hypotheses were proposed for this study:

- H4: There is a relationship between higher education institutions' support and green behavior among online open flexible distance learning higher education institutions*
- H5: There is a relationship between higher education institutions' support and awareness of green behavior among online open flexible distance learning higher education*
- H6: There is a mediating effect of awareness on the relationship between higher education institutions' support and green behavior among online open flexible distance learning higher education institutions*

Relationship between Social Support, self-awareness & Green Behavior

The relationship between social support and green behavior with self-awareness as a mediator is a dynamic interplay of interpersonal influences and individual cognition within

the context of sustainability (Piyapong, 2020). Social support refers to the encouragement, validation, and reinforcement individuals receive from their social networks, including family, friends, peers, and communities, in adopting and maintaining eco-friendly practices (Anghel & Anghel, 2022). When individuals perceive strong social support for sustainable behaviors, they are more likely to internalize these norms and engage in green behavior (Moon et al., 2021). Positive reinforcement from social networks can motivate individuals to prioritize environmental concerns and make environmentally conscious choices in their daily lives (Lestari & Siskandar, 2020). Self-awareness serves as a crucial mediator in this relationship. Individuals who possess high levels of self-awareness are more attuned to their values, beliefs, and goals, including those related to environmental conservation (Jahari et al., 2022). Self-awareness enables individuals to reflect on their environmental impact and align their behaviors with their values. As a result, self-aware individuals may be more likely to adopt green behavior, regardless of the level of social support they receive. Moreover, self-awareness can strengthen the impact of social support on green behavior. Self-aware individuals may be more receptive to the influence of social networks promoting sustainability (Roy, 2023). They internalize environmental values and incorporate them into their daily actions, thus amplifying the effects of social support on their green behavior. Self-awareness plays a pivotal role in mediating the relationship between social support and green behavior, enhancing the effectiveness of social influences on individuals' eco-friendly actions (Tang et al., 2020). Hence, the following hypotheses were proposed for this study:

- H7: There is a relationship between social support and green behavior among online open flexible distance learning higher education institutions*
- H8: There is a relationship between social support and awareness of green behavior among online open flexible distance learning higher education*
- H9: There is a relationship between awareness and green behavior among online open flexible distance learning higher education institutions*
- H10: There is a mediating effect of awareness on the relationship between social support and green behavior among online open flexible distance learning higher education institutions*

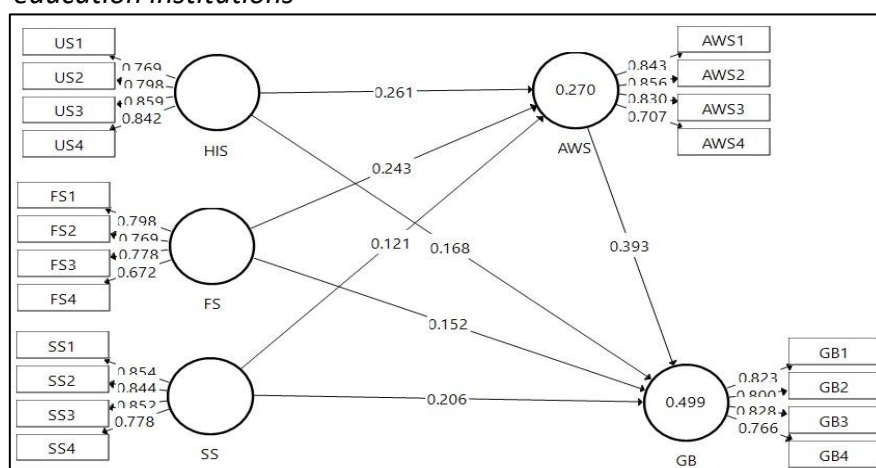


Figure 1: Research Model

Notes: HIS=Higher Education Institutions’ Support FS=Family Support SS=Social Support AWS=Awareness GB=Green Behavior

Methodology

This study aimed to conduct a thorough examination of the direct and indirect influence of higher education institutions' support, family support, and social support on green behavior, with awareness serving as a mediator among students in open online flexible distance learning higher education institutions. To achieve this objective, researchers meticulously curated primary data, ensuring the selection of reliable and valid measurements through an exhaustive review of existing literature. Survey questionnaires were then distributed via email to chosen participants, employing purposive sampling due to the absence of a comprehensive population list. The analysis scrutinized 20 observed variables, encompassing independent variables such as higher education institutions' support (4 items), family support (4 items), social support (4 items), the mediating variable of awareness (4 items), and the dependent variable of green behavior (4 items). Utilizing a Likert scale with five response options, respondents evaluated elements within each construct, contributing to a comprehensive data set. Out of 635 surveys distributed, 498 were collected, yielding a satisfactory response rate of 78.4%, conducive for employing structural equation modeling (SEM) in data analysis. Subsequently, 469 surveys were deemed suitable for analysis. Researchers opted for Smartpls4 software, renowned for its proficiency in SEM techniques, to conduct data analysis and hypothesis testing. This choice was driven by the software's robust assessment capabilities and expertise in managing multivariate data analysis, aligning with the study's objectives and adhering to the recommendations of (Ringle et al., 2022). Smartpls4 facilitated a meticulous evaluation of proposed hypotheses and conducted extensive multivariate data analysis, enabling a comprehensive assessment of both measurement and structural models.

Data Analysis

Respondents Profiles

The examination of respondents' profiles, delving into frequency and percentage data, illuminates the diverse composition of the study's participant pool. Notably, the gender distribution showcases a near-equal split between male and female respondents, with 48.8% male and 51.2% female representation, signaling a balanced demographic spectrum and enriching the study's potential for capturing a wide array of perspectives. This gender parity underscores the inclusivity of the research and enhances its validity. In exploring age groups, a substantial proportion of respondents, accounting for 43.3%, belong to the 31-40 years category, closely followed by individuals under 30 years old, constituting 39.2% of the sample. This demographic diversity ensures a comprehensive understanding of the research topic across various life stages, fostering nuanced insights. Additionally, the distribution across academic years reflects a mosaic of academic journeys, with the highest representation in the third year (24.9%) and the lowest in the fifth year (11.9%), signifying a rich tapestry of experiences that enriches the study's depth and breadth. The predominance of bachelor's degree seekers (62.0%) underscores the significance of undergraduate perspectives in shaping the study's outcomes, while the positive inclination of an overwhelming majority of respondents (98.7%) to recommend green behavior to others underscores a strong willingness to advocate for environmental consciousness, highlighting the study's relevance and potential impact in promoting sustainable practices.

Common Method Bias

Kock (2015); Kock & Lynn (2012) introduced an inclusive methodology known as the collinearity test, which addresses both vertical and horizontal collinearity aspects. This

method identifies pathological collinearity by examining variance inflation factors (VIFs), with values exceeding 3.3 indicating a notable concern for common method bias within the model (Kock & Lynn, 2012). Conversely, if VIFs resulting from the comprehensive collinearity assessment fall below 3.3, it can be deduced that the model remains unaffected by common method bias (Kock, 2015). As illustrated in Table 1, the VIFs derived from the overall collinearity assessment were found to be below 3.3, confirming the absence of any common method bias issue within the model.

Table 1
Full Collinearity Test

	GB	HIS	FS	SS	AWS
GB		1.896	1.906	1.652	1.583
HIS	1.779		1.464	1.822	1.799
FS	1.766	1.445		1.805	1.783
SS	1.250	1.319	1.314		1.337
AWS	1.342	1.625	1.631	1.652	

Measurement Model

In this investigation, we adopted the methodology recommended by Hair et al. (2017) to assess each measurement in both the first and second order, facilitating the identification of items with loadings below the 0.7 threshold. The analyses of construct reliability and validity unveiled that the Average Variance Extracted (AVE) for all constructs ranged from 0.571 to 0.693, surpassing the 0.5 benchmark, thereby indicating well-established convergent validity Hair et al (2017) (Table 2). Furthermore, the composite reliability for all constructs exceeded 0.7, falling within the range of 0.842 to 0.900. Additionally, Cronbach's alpha values for all constructs were greater than 0.7, varying from 0.751 to 0.852 (Table 2). To ensure discriminant validity, the initial step involved the evaluation of cross-loadings, ensuring appropriate representation and measurement of respective constructs (Table 3). Subsequently, the Heterotrait-Monotrait (HTMT) ratio was employed for further assessment, adhering to the recommended criterion for examining discriminant validity in Variance-Based Structural Equation Modeling (VB-SEM) (Henseler, Ringle & Sarstedt, 2015). Table 4 presented the HTMT ratios, original sample, and 95% confidence intervals, affirming compliance with the HTMT threshold of 0.85.

Table 2
Construct Reliability & Validity

Constructs	CA	CR	AVE
AWS	0.825(0.792, 0.858)	0.885(0.865, 0.904)	0.658(0.617, 0.703)
FS	0.751(0.700, 0.794)	0.842(0.815, 0.866)	0.571(0.524, 0.619)
GB	0.819(0.787, 0.843)	0.880(0.862, 0.894)	0.648(0.610, 0.679)
SS	0.852(0.821, 0.874)	0.900(0.882, 0.914)	0.693(0.651, 0.726)
HIS	0.837(0.802, 0.860)	0.890(0.869, 0.904)	0.669(0.624, 0.703)

Note: CA=Cronbach Alpha CR=Composite Reliability AVE=Average Variance Extracted

Table 3

Cross Loadings

	AWS	FS	GB	SS	HIS
AWS1	0.843	0.446	0.543	0.308	0.424
AWS2	0.856	0.395	0.510	0.243	0.409
AWS3	0.830	0.321	0.463	0.263	0.327
AWS4	0.707	0.297	0.438	0.211	0.326
FS1	0.306	0.798	0.356	0.295	0.510
FS2	0.351	0.769	0.401	0.279	0.464
FS3	0.286	0.778	0.301	0.304	0.423
FS4	0.397	0.672	0.461	0.304	0.493
GB1	0.554	0.506	0.823	0.397	0.503
GB2	0.417	0.373	0.800	0.370	0.436
GB3	0.489	0.397	0.828	0.358	0.434
GB4	0.475	0.376	0.766	0.343	0.303
SS1	0.234	0.377	0.422	0.854	0.369
SS2	0.238	0.321	0.389	0.844	0.369
SS3	0.265	0.299	0.336	0.852	0.268
SS4	0.322	0.312	0.370	0.778	0.295
HIS1	0.307	0.419	0.331	0.283	0.769
HIS2	0.340	0.525	0.390	0.288	0.798
HIS3	0.463	0.576	0.521	0.373	0.859
HIS4	0.374	0.534	0.446	0.326	0.842

Table 4

Hetrotrait-Monotrait (HTMT) Ratios

	Ratio	2.50%	97.50%
FS -> AWS	0.556	0.450	0.649
GB -> AWS	0.728	0.648	0.797
GB -> FS	0.633	0.546	0.719
SS -> AWS	0.376	0.264	0.478
SS -> FS	0.486	0.381	0.594
SS -> GB	0.543	0.443	0.632
HIS -> AWS	0.541	0.424	0.635
HIS -> FS	0.779	0.690	0.842
HIS -> GB	0.615	0.537	0.689
HIS -> SS	0.457	0.343	0.544

Note: A two-tail percentile bootstrap test at 5% confidence interval (2.5%, 97.5%) with 5,000 sub-samples was performed

Structural Model

In this study, the evaluation of the structural model adhered to the methodology outlined by Hair et al (2017), involving a meticulous examination of pathway coefficients (β) and coefficients of determination (R^2). The Partial Least Squares (PLS) method was utilized, harnessing 5000 sub-samples to determine the significance level of path coefficients. The findings from hypothesis testing for confidence intervals, covering path coefficients (beta), corresponding t-statistics, and p-values, are meticulously presented in Table 5. This rigorous

analysis provides invaluable insights into the significance and robustness of the relationships among the variables within the structural model. The comprehensive presentation of hypothesis testing results in Table 5 offers a nuanced analysis of each hypothesis, highlighting Beta coefficients, T-statistics, P-values, and the ultimate decisions regarding hypothesis support. Consequently, this enhances the depth and clarity of the study's findings, enabling a more profound understanding of the interplay between the variables under investigation.

Hypothesis 1 investigated the direct impact of family support on green behavior. The Beta coefficient of 0.152 ($t = 3.018$, $p = 0.003$) indicates a significant positive relationship, leading to its acceptance. *Hypothesis 2* explored the relationship between family support and awareness of social support. The Beta coefficient of 0.243 ($t = 4.631$, $p < 0.001$) suggests a significant positive relationship, supporting its acceptance. Moreover, *Hypothesis 3* examined the mediating effect of awareness of social support on the relationship between family support and green behavior. The Beta coefficient of 0.095 ($t = 4.186$, $p < 0.001$) indicates a significant positive relationship, leading to its acceptance. Moving on to *Hypothesis 4*, it focused on the direct influence of higher education institutions' support on green behavior. The significant Beta coefficient of 0.168 ($t = 3.149$, $p = 0.002$) supports its acceptance. Similarly, *Hypothesis 5* explored the link between higher education institutions' support and awareness of social support. The Beta coefficient of 0.261 ($t = 4.325$, $p < 0.001$) suggests a significant positive relationship, leading to its acceptance. Additionally, *Hypothesis 6* examined the mediating role of awareness of social support in the relationship between higher education institutions' support and green behavior. The significant Beta coefficient of 0.103 ($t = 3.833$, $p < 0.001$) supports its acceptance. Furthermore, *Hypothesis 7* investigated the direct association between social support and green behavior. The Beta coefficient of 0.206 ($t = 4.684$, $p < 0.001$) suggests a significant positive relationship, resulting in its acceptance. *Hypothesis 8* investigated the mediating effect of awareness of social support on the relationship between social support and green behavior. The Beta coefficient of 0.121 ($t = 2.811$, $p = 0.005$) suggests a significant positive relationship, indicating that awareness of social support partially mediates the link between social support and green behavior, leading to its acceptance. *Hypothesis 9* investigated the direct influence of awareness of social support on green behavior. The significant Beta coefficient of 0.393 ($t = 9.664$, $p < 0.001$) supports its acceptance. *Hypothesis 10* examined the mediating effect of awareness of social support on the relationship between social support and green behavior. The Beta coefficient of 0.047 ($t = 2.700$, $p = 0.007$) suggests a significant positive relationship, indicating that awareness of social support partially mediates the relationship between social support and green behavior, thus supporting its acceptance.

Table 5

Hypotheses Testing Results

Hypotheses	Beta	T-Statistics	P-Values	2.50%	97.50%	Decision
H1: FS -> GB	0.152	3.018	0.003	0.060	0.242	Accepted
H2: FS -> AWS	0.243	4.631	0.000	0.140	0.341	Accepted
H3: FS -> AWS -> GB	0.095	4.186	0.000	0.056	0.145	Accepted
H4: HIS -> GB	0.168	3.149	0.002	0.064	0.269	Accepted
H5: HIS -> AWS	0.261	4.325	0.000	0.146	0.397	Accepted
H6: HIS -> AWS -> GB	0.103	3.833	0.000	0.056	0.165	Accepted
H7: SS -> GB	0.206	4.684	0.000	0.119	0.285	Accepted
H8: SS -> AWS	0.121	2.811	0.005	0.035	0.205	Accepted
H9: AWS -> GB	0.393	9.664	0.000	0.305	0.470	Accepted
H10: SS -> AWS -> GB	0.047	2.700	0.007	0.015	0.087	Accepted

Table 6 furnishes a comprehensive overview of effect sizes (f^2), meticulously evaluated following Cohen's criteria (1992), categorizing them as small (0.020 to 0.150), medium (0.150 to 0.350), or large (0.350 or greater). The observed effect sizes spanned from small (0.016) to large (0.225), underscoring the diverse impact of the variables under scrutiny. Moreover, the Intrinsic Value Inflation Factor (VIF) values, detailed in Table 6, consistently remained below the more lenient threshold of 5, with the highest value registering at 1.836. This level of collinearity ensures robustness in comparisons of sizes and interpretation of coefficients within the structural model. Notably, a substantial degree of explained variance for the endogenous construct is evident, elucidated by an R^2 value of 0.499 (Figure 1). In terms of the mediator, the model adeptly elucidates approximately 27.0% of the variance in the structure, as reflected by an R^2 value of 0.270, emphasizing the model's efficacy in capturing the underlying dynamics of the mediation process.

Table 6

Effect Sizes(f^2) & Variance Inflation Factor (VIF)

	f^2		VIF	
	AWS	GB	AWS	GB
AWS		0.225		1.370
FS	0.046	0.025	1.746	1.827
SS	0.016	0.068	1.234	1.254
HIS	0.053	0.031	1.743	1.836

The assessment of the model's inference and managerial implications underwent rigorous out-of-sample predictive analysis utilizing the PLSpredict method, as advocated by (Shmueli et al., 2016, 2019). As depicted in Table 7, the application of PLS-SEM yielded notably superior Q^2 predictions (>0) in comparison to naive mean predictions, consistently showcasing lower Root Mean Square Error (RMSE) values than linear model (LM) benchmarks, thereby highlighting its robust predictive capabilities. Notably, across six out of eight instances, the RMSE values for PLS-SEM predictions consistently outperformed those of the linear model (LM) prediction benchmark, emphasizing the predictive strength of the proposed model as delineated in Table 7. The introduction of the Cross-Validated Predictive Ability Test (CVPAT) by Hair et al (2022), coupled with its integration with PLSpredict analysis by Liengard et al (2021), underscores significant advancements in predictive modeling methodologies.

Furthermore, Table 8 reaffirms the superior predictive capacities of PLS-SEM, as evidenced by lower average loss values compared to indicator averages and LM benchmarks, thereby providing robust evidence of its enhanced predictive performance.

Table 7

PLSpredict

Items	PLS-RMSE	LM-RMSE	PLS-LM	Q ² _predict
AWS1	0.606	0.608	-0.002	0.230
AWS2	0.619	0.623	-0.004	0.189
AWS3	0.671	0.679	-0.008	0.128
AWS4	0.694	0.706	-0.012	0.115
GB1	0.616	0.607	0.009	0.325
GB2	0.603	0.607	-0.004	0.229
GB3	0.676	0.683	-0.007	0.232
GB4	0.706	0.698	0.008	0.165

Table 8

Cross Validated Predictive Ability Test (CVPAT)

	Average loss difference	t value	p-value
GB	-0.135	6.017	0.000
AWS	-0.061	4.656	0.000
Overall	-0.107	6.067	0.000

Ringle and Sarstedt (2016) along with Hair et al (2018) introduced Importance Performance Map Analysis (IPMA) to evaluate the significance and effectiveness of latent variables in explaining acceptance, as elaborated in Table 9. The overall impact on green behavior was most pronounced for awareness (0.393), followed by higher education institutions' support (0.270), social support (0.254), and family support (0.247), highlighting their relative importance in green behavior. Family support scored the highest (68.017), while leader awareness had the lowest score (61.142) on a 0-100 scale, indicating better performance for family support and lower achievement for awareness. Despite ranking first in leader green behavior importance, awareness displayed the lowest performance. These findings suggest prioritizing strategies to enhance awareness among students, potentially improving the overall green behavior of students in open online flexible distance learning higher education institutions.

Table 9

Importance-Performance Map Analysis (IPMA)

Constructs	Total Effect	Performance
AWS	0.393	61.142
FS	0.247	68.017
SS	0.254	66.522
HIS	0.270	66.933

Discussion

The study's outcomes underscore the multifaceted involvement of key stakeholders, delineating higher education institutions, families, and society, in nurturing a culture of green

behavior within students engaged in open online flexible distance learning higher education institutions. Recognition of awareness as a pivotal mediator highlights the significance of informed consciousness in driving sustainable practices. Higher education institutions possess a prime platform to enact change, deploying a range of initiatives. Primarily, the integration of sustainability tenets into the academic curriculum across diverse disciplines stands paramount, offering students a holistic understanding of environmental concerns and their individual roles in mitigation efforts. Supplementing this, targeted courses or workshops dedicated to sustainability can furnish students with practical insights and competencies. Facilitating hands-on experiences through involvement in eco-friendly endeavors or projects further solidifies the importance of sustainable behavior. Families emerge as influential agents in shaping students' eco-consciousness, imparting lasting habits through the encouragement of sustainable practices within the household, such as recycling and energy conservation. Encouraging open dialogues surrounding environmental issues within family settings amplifies awareness and fosters responsible conduct. On a societal scale, the establishment of supportive norms that prioritize sustainability fosters positive shifts in student attitudes and actions. Providing avenues for community engagement in environmental ventures empowers students to partake in collective endeavors toward conservation. Ultimately, collaborative endeavors among higher education institutions, families, and society, underpinned by awareness-building efforts, serve as the linchpin for effectively cultivating green behavior among students in the realm of open online flexible distance learning higher education institutions.

Theoretical Implications

The findings of this study hold significant theoretical implications within the framework of Social Cognitive Theory (SCT), as proposed by (Bandura, 1986). SCT emphasizes the reciprocal interaction between individuals' behaviors, cognitive processes, and environmental influences in shaping human functioning and achievement. In the context of fostering green behavior among students in open online flexible distance learning higher education institutions, the observed relationships among higher education institutions, families, society, awareness, and green behavior align with SCT principles. Bandura's theory posits that individuals' beliefs in their capabilities, known as self-efficacy, significantly influence their motivation, behaviors, and outcomes. The integration of sustainability principles into the curriculum, participation in eco-friendly initiatives, and encouragement of sustainable practices within families and society can enhance students' self-efficacy beliefs in their ability to enact environmentally responsible behaviors. Moreover, SCT emphasizes the role of observational learning and social modeling in shaping individuals' beliefs and behaviors. Experiencing and witnessing sustainable practices within educational institutions, families, and society can serve as powerful sources of observational learning, reinforcing the importance of green behavior and enhancing self-efficacy beliefs. Additionally, SCT highlights the importance of environmental influences, such as social norms and support systems, in shaping individuals' beliefs and behaviors. Creating supportive social norms and providing platforms for community engagement in environmental initiatives can further strengthen students' self-efficacy beliefs and promote sustained green behavior. Overall, the findings of this study contribute to our understanding of how SCT principles can inform strategies for fostering green behavior among students in the context of open online flexible distance learning higher education institutions.

Practical Implications

The practical implications of this study extend to various stakeholders involved in promoting green behavior among students in open online flexible distance learning higher education institutions. For higher education institutions, the findings suggest the importance of integrating sustainability principles into the curriculum and offering dedicated courses or workshops focused on environmental awareness and green practices. Providing opportunities for hands-on experiences and participation in eco-friendly initiatives can further reinforce the importance of sustainability among students. Additionally, institutions can collaborate with families to encourage sustainable practices at home and foster open discussions about environmental issues. Society at large can support these efforts by creating supportive social norms that value sustainability and providing platforms for community engagement in environmental initiatives. By implementing these strategies, higher education institutions, families, and society can collectively contribute to cultivating a culture of environmental consciousness and promoting green behavior among students in open online flexible distance learning environments. Ultimately, these practical implications aim to empower students to become responsible stewards of the environment and to make positive contributions to sustainability efforts on a broader scale.

Contextual Implications

The contextual implications of this study are significant in the context of the growing emphasis on sustainability and environmental stewardship in higher education. With the increasing popularity of open online flexible distance learning, there is a pressing need to address environmental concerns within this educational landscape. By highlighting the importance of fostering green behavior among students in such institutions, this study sheds light on a critical aspect of sustainable education delivery. The findings underscore the importance of integrating environmental awareness and practices into online curricula, as well as the role of families and society in promoting sustainable behaviors among students. Additionally, the study emphasizes the need for collaborative efforts among various stakeholders to create a supportive environment for green behavior. In the broader context of environmental sustainability, the study contributes to ongoing discussions about the role of education in shaping attitudes and behaviors towards the environment. It underscores the importance of incorporating sustainability principles into educational practices and promoting a culture of environmental responsibility within higher education institutions. Ultimately, the contextual implications of this study highlight the need for holistic approaches to sustainability in education, particularly in the context of online flexible distance learning.

Suggestions for Future Study

Future studies could further explore the effectiveness of specific interventions aimed at promoting green behavior among students in open online flexible distance learning higher education institutions. This could involve implementing and evaluating sustainability-focused curriculum enhancements, such as incorporating interactive modules, virtual simulations, or gamified learning experiences. Additionally, longitudinal studies could be conducted to assess the long-term impact of sustainability education on students' attitudes, behaviors, and academic performance. Furthermore, research could investigate the role of technology in facilitating environmental education and promoting green behavior among online learners. This could include exploring the use of innovative digital tools, social media platforms, or virtual reality environments to engage students in sustainability initiatives and foster a sense

of environmental responsibility. Moreover, comparative studies could be undertaken to examine variations in green behavior among students across different types of online learning environments, such as synchronous versus asynchronous platforms or fully online versus hybrid models. By examining these factors, future research can provide valuable insights into the most effective strategies for promoting sustainability in online higher education and advancing environmental stewardship among students.

Conclusion

This study sheds light on the significant influence of various factors, including higher education institutions' support, family support, and social support, on promoting green behavior among students in open online flexible distance learning higher education institutions. The findings highlight the importance of integrating sustainability principles into the curriculum, fostering open discussions about environmental issues, and providing opportunities for hands-on experiences to cultivate environmental consciousness among students. Moreover, the role of families and society in shaping students' attitudes and behaviors towards the environment is underscored, emphasizing the need for collaborative efforts to promote environmentally responsible behaviors. The theoretical implications of this study align with Social Cognitive Theory, emphasizing the interplay between individual factors, environmental influences, and behavioral outcomes. The practical implications suggest actionable strategies for higher education institutions, families, and society to enhance green behavior among students. Furthermore, the study offers valuable insights for future research, including the exploration of specific interventions, the use of technology in sustainability education, and comparative studies across different online learning environments. Overall, this study contributes to our understanding of how to effectively promote sustainability in online higher education and advance environmental stewardship among students.

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