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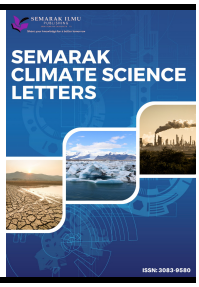

The Mediating Role of Environmental Knowledge on Energy Conserving Behaviour

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ABSTRACT

The rapid increase in energy consumption and the limited availability of resources in developing countries highlight the pressing need for energy conservation strategies. Despite this, there is limited research on what drives energy-conserving behaviours among university students. This study examines the mediating role of environmental knowledge in fostering energy conservation behaviours among Malaysian university students. A sample of 400 students, selected randomly from various faculties, was analysed using Structural Equation Modelling (SEM) to evaluate the relationships between attitude, environmental knowledge, and energy conservation behaviours. The findings revealed that environmental knowledge not only had a significant direct effect on energy conservation behaviour but also fully mediated the relationship between attitude and behaviour. Model fit indices (RMSEA = 0.072, CFI = 0.953, TLI = 0.943, ChiSq/df = 2.585) indicated a good fit to the data, supporting the hypothesized relationships. These results highlight the importance of integrating environmental knowledge into university curricula to cultivate sustainable practices among students. Future research should investigate these dynamics across different contexts to develop effective interventions for promoting energy conservation.

1. Introduction

As global energy consumption continues to rise, understanding the factors that influence energy-conserving behaviour (ECB) among young consumers has become increasingly vital. The urgency of addressing climate change and promoting sustainable practices necessitates a closer examination of how attitudes and knowledge interact to shape behaviour. Previous studies have shown that while attitudes towards energy conservation are generally positive, their direct impact on actual behaviour often remains ambiguous. For instance, research by Chen *et al.,* [1] shows that positive attitudes can significantly influence environmental knowledge, which plays a crucial role in driving energy-saving

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behaviours. However, despite the recognizing favourable attitudes, many individuals fail to translate these feelings into actionable behaviours. This gap suggests that while individuals may express concern for environmental issues, other factors may inhibit their ability to engage in energy conservation practices. Kahneman and Tversky [2] highlight psychological barriers such as present bias where immediate rewards are prioritized over long-term benefits can prevent individuals from acting on their positive attitudes. Additionally, Cialdini *et al*., [3] emphasize that social norms and peer influences can significantly shape behaviour, sometimes overshadowing individual attitudes.

The Knowledge-Attitude-Behaviour (KAB) theory provides a valuable framework for understanding these dynamics. According to this model, knowledge serves as the foundation for developing attitudes, which subsequently influence behaviours. In the context of energy conservation, increased environmental knowledge can lead to more positive attitudes towards sustainable practices. This relationship is critical as it highlights the importance of educational initiatives aimed at enhancing knowledge about energy conservation strategies. Moreover, limited attention has been paid to how these attitudes translate into actionable behaviours, particularly in relation to environmental knowledge. While previous studies have explored various factors influencing energy conservation behaviours, such as psychological barriers identified by Kabadayı *et al.,* [4] and awareness development processes discussed by Andor *et al*., [5], there is a notable lack of research specifically examining the mediating role of environmental knowledge in this context, as highlighted by Belaïd and Haitham [6]. Recent advancements in sustainable energy-efficient technologies have been shown to significantly impact consumer behaviour towards energy conservation, as demonstrated by Hossain *et al*., [7]. This finding underscores the need for further exploration into how technological knowledge influences young consumers' energy-saving behaviours. Thus, this study aims to fill this gap by investigating how environmental knowledge mediates the relationship between positive attitudes towards energy conservation and actual energy-saving behaviours among young consumers in Malaysia. This aligns with recent literature emphasizing the importance of enhancing knowledge to promote sustainable practices.

2. Literature Review

2.1 Energy Conservation Behavior

Energy conservation behavior (ECB) refers to the actions taken by individuals or households aimed at reducing energy consumption and minimizing environmental impact. As global energy demands rise, promoting ECB has become crucial for mitigating climate change and achieving sustainability goals. Hafner *et al.,* [8] and Ru *et al*., [9] indicate that individual participation in energy-saving behaviors can significantly lower energy demand and reduce greenhouse gas emissions. The Theory of Planned Behavior (TPB) proposed by Ajzen [10], is commonly employed to understand the factors influencing ECB. This theory posits that an individual's intention to engage in a behavior is shaped by three key components: attitudes towards the behavior, subjective norms, and perceived behavioral control. For instance, a study by Qalati *et al*., [11] found that positive attitudes and perceived behavioral control significantly influenced households' intentions to save energy, demonstrating that enhancing these factors could lead to more effective energy-saving behaviors.

Moreover, environmental knowledge plays a critical role in shaping attitudes and intentions. Qalati *et al*., [11] found that individuals with higher levels of environmental awareness are more likely to adopt energy-saving practices. This relationship underscores the importance of educational initiatives aimed at increasing knowledge about energy conservation strategies. For example, De Groot *et al*., [12] emphasize that educating consumers about the benefits of energy-efficient appliances can lead to significant reductions in household energy consumption. In addition to

psychological factors, social influences also impact ECB. Cialdini *et al*., [3] argue that normative beliefs such as peer pressure and community expectations can motivate individuals to engage in energy conserving behaviors. Therefore, fostering a supportive social environment is essential for encouraging widespread adoption of energy-saving practices. In conclusion, understanding the dynamics of energy conservation behavior through frameworks like TPB and considering the roles of knowledge and social influences are vital for developing effective strategies to promote sustainable energy use.

2.2 The Role of Attitudes in Energy Conservation

Attitudes play a critical role in shaping energy conservation behavior (ECB) among individuals and households. Ajzen [10] defined attitude as an individual's evaluation of a specific behavior; these attitudes can be either positive or negative and significantly influence intentions to engage in energy-saving practices. Research by Tang and Wu [13] as well as Qalati *et al.,* [11] has consistently demonstrated that favorable attitudes towards energy conservation correlate with a higher likelihood of adopting energy-saving behaviors. Similarly, a study by Hafner *et al.,* [8] found that individuals who perceive energy conservation positively are more likely to engage in practices such as using energy-efficient appliances and implementing energy-saving measures at home.

The Theory of Planned Behavior (TPB) provides a framework for understanding how attitudes influence intentions and behaviors. According to TPB, attitudes towards a behavior, along with subjective norms and perceived behavioral control, shape an individual's intention to perform that behavior. In the context of energy conservation, individuals with positive attitudes are more likely to intend to save energy, which subsequently leads to actual energy-saving actions. For example, Ali *et al*., [12] indicates that students with favorable attitudes towards energy conservation demonstrate stronger intentions to engage in energy-saving behaviors.

Although attitudes are important, evidence from Cialdini *et al.,* [3] suggests they do not always lead directly to action, as social norms and perceived barriers can moderate this relationship. Similarly, Ru *et al.,* [9] note that while individuals may hold positive attitudes toward energy conservation, social pressures or practical obstacles often hinder their ability to act on those intentions. This highlights the need for comprehensive educational programs that not only foster positive attitudes but also address external factors influencing ECB.

In conclusion, understanding the role of attitudes in energy conservation is essential for promoting sustainable practices. By enhancing positive attitudes through targeted educational initiatives and addressing barriers to action, stakeholders can effectively encourage individuals to adopt energy-saving behaviors. It is hypothesized that attitudes towards energy conservation significantly influence the actual behaviors of young consumers in adopting energy-saving practices. This hypothesis suggests that positive attitudes will lead to greater engagement in energy-saving behaviors among this demographic.

2.3 Environmental Knowledge as a Mediator of Behavior

Environmental Knowledge (EnvK) serves as a crucial mediator in fostering pro-environmental behaviors, particularly in the context of energy conservation. By enhancing individuals' knowledge and awareness about environmental issues, EnvK can significantly influence attitudes and subsequently drive behavioral change. McGuire [14] emphasizes that effective environmental education (EE) programs not only impart knowledge but also shape self-identity, a strong predictor of environmentally responsible behaviour. This identity-based approach highlights the importance of

developing a "pro-environmental identity" that aligns individual actions with environmental values, thereby facilitating long-term behavioral change.

The Theory of Planned Behavior (TPB) provides a theoretical framework for understanding how EE influences behavior through attitudes and intentions. According to TPB, an individual's intention to perform a behavior is influenced by their attitudes towards that behavior, subjective norms, and perceived behavioral control. Belaïd and Haitham [6] suggest that EnvK enhances positive behaviour towards energy conservation, thereby increasing the likelihood of engaging in energy-saving behaviors. For instance, Yee *et al*., [15] conducted a research among students revealed that those with a strong environmental knowledge background exhibited more favorable behaviour and intentions to conserve energy.

Moreover, EnvK can address psychological barriers that hinder pro-environmental behaviors. For example, individuals may struggle with *present bias*, prioritizing immediate rewards over long-term benefits when making decisions about energy use. Kahneman & Tversky [2] argue that by providing knowledge and highlighting the long-term benefits of energy conservation can help individuals overcome barriers and align their behaviors with their environmental values.

In conclusion, environmental knowledge plays a vital role in mediating behavior by enhancing knowledge, shaping attitudes, and addressing psychological barriers. Thus, it is hypothesized that environmental knowledge mediates the relationship between attitudes towards energy conservation and actual energy-saving behaviors among young consumers.

3. Methodology

In this study, a cross-sectional causal research design was utilized to investigate how variations in independent variables are anticipated to result in corresponding changes in the dependent variable. Maier *et al.,* [16] noted that this design allows for data collection at a single point in time, facilitating the evaluation of relationships and potential causal links between variables within the constraints of a single data collection period. The choice of this design aligns with the research objectives, as it allows for an examination of the effects of independent variables specifically attitude and environmental knowledge as a mediator on the dependent variable, students' energy-conserving behaviour. Hypotheses were formulated to guide the research process focusing on the causal relationships between the independent and dependent variables as recommended by Singh [17]. These hypotheses are tested through statistical analyses, with the findings providing insights into the nature and strength of the relationships under investigation.

3.1 Sampling and Data Collection

The data for this study were collected from 400 students enrolled in higher education institutions in Malaysia. A multistage sampling method was employed to ensure both practicality and feasibility in participant selection, as recommended by Guest [18]. A closed-ended standardized questionnaire served as the primary data collection tool, as it facilitated structured and quantifiable responses suitable for statistical analysis. Table 1 presents the number of items included for each construct along with the corresponding scale intervals. Furthermore, the final section of the questionnaire collected demographic information to provide a comprehensive profile of the respondents.

Table 1
Research instruments utilized

Construct	No of items	Scale
Attitude	5	
Environment Knowledge	6	1-10
ECB	4	

3.2 Respondents Demographic

The sample for this study comprised 400 individuals, with male participants accounting for 46.2% (N=140) and female participants making up 53.8% (N=163). In terms of academic disciplines, the majority of respondents, 66.0% (n=200), were pursuing degrees in science-related fields, while 34.0% (n=103) were enrolled in non-science areas. Regarding age demographics, 17.2% (n=52) of the participants were between the ages of 18 and 19, 24.8% (n=67) fell within the 20 to 21 age group, 37.0% (n=93) were aged 22 to 23, and 30.0% (n=91) were in the 24 to 25 age range.

4. Results

4.1 Descriptive Analysis

Table 2 presents the average mean scores and standard deviations for the constructs measured in the study. The construct of attitude recorded the highest average mean score of 8.64 with a standard deviation of 1.06, indicating a very high level of positive attitudes among participants. Environmental knowledge followed with an average mean of 6.77 and a standard deviation of 1.99, reflecting a high level of perceived environmental knowledge among respondents. Lastly, the construct of Energy-Conserving Behavior (ECB) showed an average mean of 7.27 and a standard deviation of 1.57, indicating a high level of engagement in energy-saving behaviors among participants.

Table 2
The average mean of the constructs

Construct	Average Mean	Std. Dev	Indicator
Attitude	8.64	1.06	Very high
Environment Knowledge	6.77	1.99	High
ECB	7.27	1.57	High

4.2 Confirmatory Factor Analysis

Figure 1 illustrates the measurement model utilized in this study, which achieved favorable fitness indices, including RMSEA (<0.1), CFI (>0.90), TLI (>0.90), and ChiSq/df (<3.0), all meeting established criteria for construct validity. Detailed values for these indices are presented in Table 3. Table 4 summarizes the factor loadings, Average Variance Extracted (AVE), and Composite Reliability (CR) for the measurement model. The results confirm that the unidimensionality requirement is met, as all factor loadings exceed the threshold of 0.5. Additionally, the model demonstrates convergent validity and reliability, with CR values exceeding 0.6 and AVE values above 0.5. The correlations among the three constructs, while related remain distinct indicating varied relationships. The absence of multicollinearity is confirmed, as no correlation coefficient exceeds 0.90. This further supports discriminant validity as detailed in Table 5.

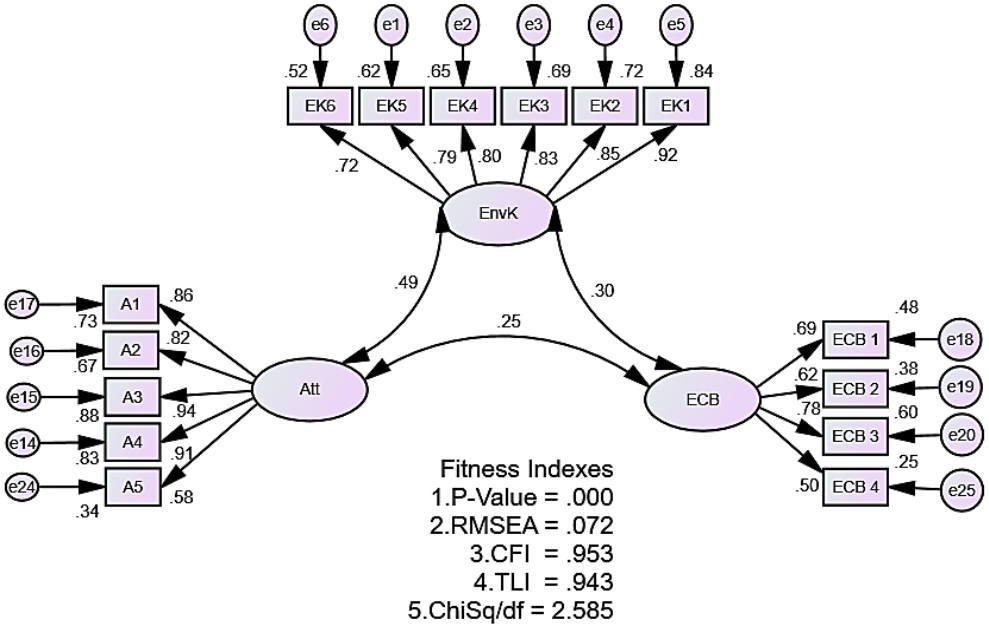

Fig. 1. The CFA results to validate three constructs simultaneously

Table 3
The assessment of fit for the measurement model

Category	Name of Index	Fit Criteria	Present model	Comment
Parsimonious Fit	Chisq/df	1.0≤ χ2 / df ≤5	2.585	Min requirement < 3.0
Incremental fit	CFI	> 0.90	0.953	Min requirement > 0.9
	TLI	> 0.90	0.943	Min requirement > 0.9
Absolute fit	RMSEA	≤0.10	0.072	Min requirement < 0.1

Table 4
Validity and reliability test of the measurement model

Construct	Item	Factor Loading	CR (> 0.6)	AVE (> 0.5)
Attitude	A1	0.86	0.85	0.66
	A2	0.82		
	A3	0.94		
	A4	0.91		
	A5	0.58		
Environment Knowledge	EK1	0.92	0.89	0.68
	EK2	0.85		
	EK3	0.83		
	EK4	0.80		
	EK5	0.79		
	EK6	0.72		
ECB	ECB1	0.69	0.66	0.53
	ECB2	0.62		
	ECB3	0.78		
	ECB4	0.50		

Table 5
Summary of discriminant validity indexes for the CFA

Construct	ECB	ATT	EnvK
ECB	***0.65***		
ATT	0.25	***0.83***	
EnvK	0.30	0.49	***0.82***

4.3 Model Testing

Figure 2 depicts the results of the hypothesized structural model developed to investigate the relationship between the three constructs. The findings (Table 6, Figure 2) clearly showed that firstly, attitude was significantly related to EnvK. This implied that positive attitude did enhances knowledge regarding conserving of energy. Next, the findings also showed that environment knowledge was significantly related to energy conserving behavior, suggesting that greater knowledge promotes energy-saving actions. Since the indirect effect of attitude on ECB through environment knowledge was stronger than the direct effect of attitude on ECB, confirming the presence of mediation.

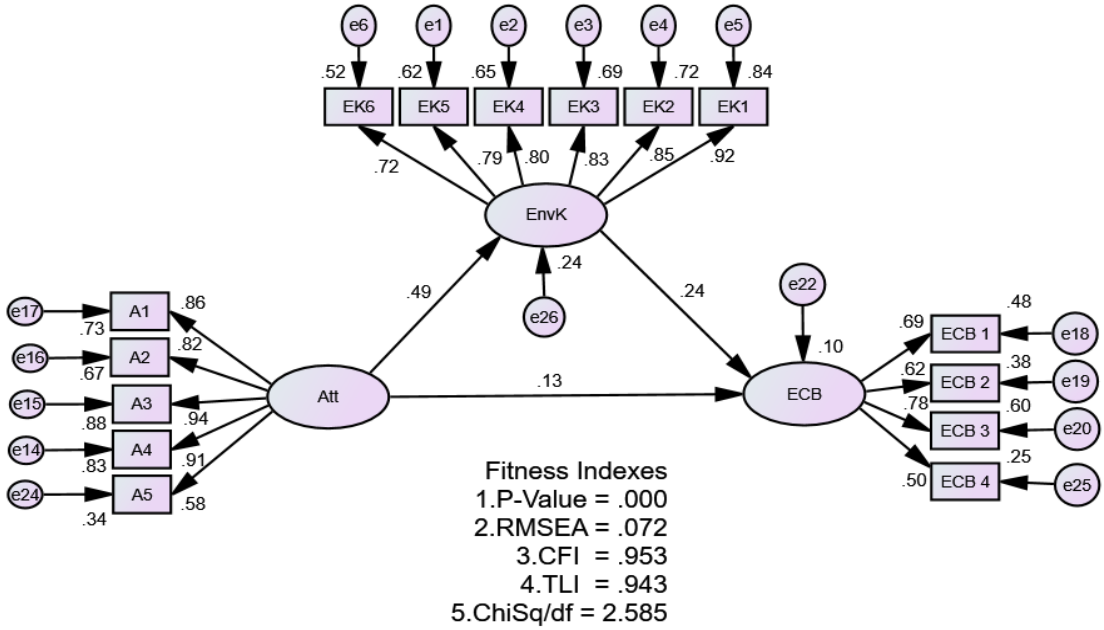

Fig. 2. The Standardized Regression Path Coefficient among constructs in the model

Table 6
The regression coefficient and its significance

Construct	Path	Construct	Std est.	*p*-value	Result
Attitude	<---	EK	0.49	0.001	Significant
ECB	<---	EK	0.24	0.003	Significant
ECB	<---	Attitude	0.13	0.084	Non-Significant

The hypothesis testing results in Table 6 were confirmed using the Maximum Likelihood bootstrapping method with 2000 samples, employing 95% percentile and bias-corrected confidence intervals. Table 7 shows that attitude has no significant direct effect on students' energy-conserving behavior (β = 0.103, p = 0.202). However, attitude significantly affects students' knowledge as a mediator (β = 0.358, p = 0.001). These findings confirm that knowledge fully mediates the relationship

between attitude and energy-conserving behavior, highlighting the critical role of knowledge in influencing behavior.

Table 7
The bootstrapping results to confirm mediation test

	Indirect effect	Direct
Bootstrapping value	0.358	0.103
Probability value	0.001	0.202
Results on mediation	Significant	Non-significant

5. Discussion

The Structural Equation Modeling (SEM) analysis examined the relationships among Attitude (Att), Environmental Knowledge (EnvK), and Energy-Conserving Behavior (ECB). The model demonstrated a good fit based on fitness indices: P-Value = 0.000 (statistically significant), RMSEA = 0.072 (within the acceptable range), CFI = 0.953 (excellent fit), and TLI = 0.943 (good fit) and ChiSq/df = 2.585, which is below the recommended threshold of 3.0 as suggested by Kline [19].

The path analysis results showed that Attitude (Att) had a moderate positive influence on Environmental Knowledge (EnvK), with a standardized coefficient of 0.49. This indicates that as attitudes improve, environmental knowledge outcomes are positively impacted. Environmental Knowledge (EnvK), in turn, had a small but significant positive effect on Energy-Conserving Behavior (ECB), with a standardized coefficient of 0.24. Additionally, the direct effect of Attitude (Att) on ECB was weaker, with a standardized coefficient of 0.13, suggesting that attitudes primarily influence energy-conserving behaviour indirectly through environmental knowledge.

The measurement model revealed that the observed variables were strong indicators of their respective latent constructs. For Attitude (Att), items A3 (0.94) and A4 (0.91) had the highest factor loadings indicating their strong contribution. For Environmental Knowledge (EnvK), EK1 (0.92) and EK2 (0.85) were the most significant contributors. Lastly, for energy conserving behaviour, ECB3 (0.78) and ECB1 (0.69) were the key indicators.

The results emphasize the critical mediating role of environmental knowledge in the relationship between attitude and ECB. While the direct influence of attitude on behavior was limited, its indirect effect through EnvK was more substantial. This underscores the importance of educational initiatives in fostering energy-conserving behavior. The findings also have relevance beyond the specific demographic of young Malaysian consumers, offering insights for various contexts

i. **Demographic Variability**: Future research could explore whether similar relationships hold across age groups. For instance, younger individuals may respond more to social media campaigns promoting environmental knowledge, while older adults might rely on traditional media. Abzari *et al.,* [20] found that younger consumers are more engaged with social media for green product information, whereas older demographics tend to trust traditional sources.
ii. **Cultural Contexts**: Cultural background significantly influences attitudes toward energy conservation. In collectivist societies, community norms may play a larger role compared to individualistic societies. Stamkou *et al.,* [21] observed that collectivist cultures prioritize obligations and harmony, which strongly affect individual behavior. Exploring these dynamics in diverse cultural settings could reveal additional insights.
iii. **Geographical Differences**: Geographical contexts also shape energy behaviours, particularly in regions with differing energy policies or renewable resource availability. Farghali *et al.,* [22] highlighted how the integration of renewable energy into local electricity sectors influences

consumer behaviour. Comparative studies across regions with distinct environmental policies could further enhance understanding of these interactions.

6. Conclusion

The results of the Structural Equation Modelling (SEM) analysis confirm that attitudes influence energy-conserving behaviour indirectly through environmental knowledge, underscoring the mediator's critical role. This finding highlights that fostering positive attitudes alone is insufficient, thus structured environmental knowledge programs are essential to translate awareness into sustainable actions. Key variables, such as A3 and A4 (attitude) and EK1 and EK2 (environmental knowledge) played a significant role in strengthening the model, which demonstrated strong fit and reliability.

However, several limitations of this study should be acknowledged. First, the sample size may limit the generalizability of the findings. A larger and more diverse sample could provide a more comprehensive understanding of the relationships examined. Second, potential biases in self-reported data may affect the accuracy of the results, as participants might overestimate their attitudes or behaviours related to energy conservation. Finally, the cross-sectional nature of the study restricts the ability to assess changes over time. Future research should consider longitudinal designs to explore how attitudes and environmental knowledge evolve and influence energy-saving behaviours over time.

In conclusion, this study emphasizes the pivotal role of environmental knowledge in shaping energy-conserving behaviours. Future interventions should prioritize comprehensive educational initiatives that integrate positive attitudes with actionable knowledge tailored to specific cultural and regional contexts to promote sustainable behaviours.

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References

[1] Chen, S.-L., Su, Y.-S., Diep, G.L., et al. "The Impact of Environmental Knowledge and Green Supply Chain Practices in Improving Sustainable Energy Production: The Moderating Role of Green Behavior and Green Leadership." *Environmental Science and Pollution Research* 30, no. 57 (2023): 57017–57031. https://doi.org/10.1007/s11356-023-26340-7

[2] Kahneman, Daniel, and Amos Tversky. "Prospect Theory: An Analysis of Decision Under Risk." *Econometrica* 47, no. 2 (1979): 263-291. https://doi.org/10.2307/1914185

[3] Cialdini, Robert B., Reno, R.R., and Kallgren, C.A. "A Focus Theory of Normative Conduct: Recycling the Concept of Norms to Reduce Littering in Public Places." *Journal of Personality and Social Psychology* 58, no. 6 (1990): 1015-1026. https://doi.org/10.1037//0022-3514.58.6.1015

[4] Kabadayı, D. İ. T., E. Tuğer, and A. Tuğrul. "Overcoming the Psychological Barriers to Energy Conservation Behaviour: The Influence of Objective and Subjective Environmental Knowledge." *International Journal of Consumer Studies* 43, no. 4 (2019): 388-396. https://doi.org/10.1111/ijcs.12519

[5] Andor, Mark A., Andreas Gerster, and Jörg Peters. "Information campaigns for residential energy conservation." *European Economic Review* 144 (2022): 104094. https://doi.org/10.1016/j.euroecorev.2022.104094

[6] Belaïd, Fateh, and Haitham Joumni. "The Role of Environmental Knowledge in Energy-Saving Behavior: A Case Study of University Students in Malaysia." *Sustainability* 12, no. 3 (2020): 955-973.

[7] Hossain, K. J. M. A., Uddin, M. S., & Rahman, N. A. "Recent advancements in sustainable energy-efficient technologies and their environmental impacts." *Progress in Energy and Environment* (2023).

[8] Hafner, A., W. H. K. L. H. M. J., and A. A. M. K. "Behavioral Interventions for Residential Energy Conservation: A Systematic Review." *Energy Efficiency* 13, no. 1 (2020): 1-24.
[9] Ru, X., Liu, Y., et al. "How Do Beliefs and Attitudes of People Influence Energy Conservation Behavior in Pakistan?" *PMC* (2018).
[10] Ajzen, Icek. "The Theory of planned behavior." *Organizational Behavior and Human Decision Processes* (1991).
[11] Qalati, Sikandar Ali, Naveed Akhtar Qureshi, Dragana Ostic, and Mohammed Ali Bait Ali Sulaiman. "An extension of the theory of planned behavior to understand factors influencing Pakistani households' energy-saving intentions and behavior: A mediated–moderated model." *Energy Efficiency* 15, no. 6 (2022): 40. https://doi.org/10.1007/s12053-022-10050-z
[12] De Groot, Judith IM. "Environmental psychology: An introduction." (2019).
[13] Tang, Zhenya, and Le Wu. "Investing the impact of person-environment fit and normative factors on employees' energy-saving behavior in the workplace." *International Journal of Energy Sector Management* (2024). https://doi.org/10.1108/IJESM-03-2024-0009
[14] McGuire, Nicholas M. "Environmental education and behavioral change: An identity-based environmental education model." *International Journal of Environmental and Science Education* 10, no. 5 (2015): 695-715.
[15] Shafie, Shafini Mohd, Su Yee Khua, and A. Harits Nu'man. "STUDENT PERSPECTIVE TOWARD ENERGY CONSERVATION IN UNIVERSITI UTARA MALAYSIA." *Journal of Technology and Operations Management* 19, no. 1 (2024). https://doi.org/10.32890/jtom2024.19.1.6
[16] Maier, Christian, Jason Bennett Thatcher, Varun Grover, and Yogesh K. Dwivedi. "Cross-sectional research: A critical perspective, use cases, and recommendations for IS research." *International Journal of Information Management* 70 (2023): 102625. https://doi.org/10.1007/s10796-023-10209-6
[17] Singh, Shiv Shankar. "Significance of Hypothesis in Legal Research." *International Journal of Advanced Research* (2024): 823–828. https://doi.org/10.21474/IJAR01/18945
[18] Guest, Greg. "Sampling and selecting participants in field research." *Handbook of methods in cultural anthropology* 2, no. 1 (2014): 215-250.
[19] Kline, Rex B. *Principles and practice of structural equation modeling*. Guilford publications, 2023.
[20] Abzari, M., Ghassemi, A., and Vosta, L. "Effectiveness of Traditional Media and Social Media Sustainability Communication on Consumers' Intention to Purchase Green Products." *Journal of Media and Information Warfare* 16, no. 1 (2023): 14-27.
[21] Stamkou, Eftychia, Gerben A. van Kleef, Astrid C. Homan, Michele J. Gelfand, Fons JR van de Vijver, Marieke C. van Egmond, Diana Boer et al. "Cultural collectivism and tightness moderate responses to norm violators: Effects on power perception, moral emotions, and leader support." *Personality and Social Psychology Bulletin* 45, no. 6 (2019): 947-964.
[22] Farghali, Mohamed, Ahmed I. Osman, Zhonghao Chen, Amal Abdelhaleem, Ikko Ihara, Israa MA Mohamed, Pow-Seng Yap, and David W. Rooney. "Social, environmental, and economic consequences of integrating renewable energies in the electricity sector: a review." *Environmental Chemistry Letters* 21, no. 3 (2023): 1381-1418. https://doi.org/10.1007/s10311-023-01587-1