journal homepage: https://journal.pktm.com.my/

International Journal of Technical Vocational and Engineering Technology

e-ISSN2710-7094, Vol. 6, No. 2 (2025)

Environmental Sustainability and Green Campus: Study on Knowledge and Practice of Using Green Environmental Artifacts among TVET Students in Sarawak

Faridah Che In[1], Afham Zulhusmi Ahmad[1] , Noor Afida Omar[1] and Wilson Gustiawan[2]

[1]Politeknik Kuching Sarawak, KM 22, Jalan Matang Petra Jaya, Kuching Sarawak, 93050, Malaysia

[2]Politeknik Negeri Padang, Jl. Kampus, Limau Manis, Kec. Pauh, Kota Padang, Sumatera Barat 25164, Indonesia

*Corresponding Author email: faridahjp@gmail.com

ARTICLE INFO

Article History:
Received 6 July 2025
Revised 11 September 2025
Accepted 21 October 2025
Published 30 October 2025

Keywords:
Green Artifacts;
Environmental;
Green Campus;
TVET Students

ABSTRACT

Environmental education plays an essential role in ensuring environmental sustainability and a green campus among students. The physical components and layouts of an establishment that are intended to preserve environmental sustainability are referred to as "green artifacts." These artifacts consist of infrastructure, materials, and structures that aid in educating the institution's staff about green practices. Sarawak has a growing number of TVET institutions, but empirical studies specifically focusing on students' awareness and practices related to green artifacts remain very limited. Good environmental knowledge and practices serve as key drivers in increasing the use of green artifacts among TVET students. Therefore, this study is to reveal knowledge and practices of using green environmental artifacts among TVET student in Sarawak. The survey employed a quantitative approach using questionnaires involving 401 respondents (n=401). Research findings indicated that TVET students in Kuching had the knowledge and practice of using green environmental artefacts at a high level. This study implementation of green artefact environment among TVET students is important as it can influence their environmental practices and attitudes, which can lead towards the green campus.

1.0 Introduction

Concerns about environmental issues have been a debate since the 1970s (Sakarya et al., 2024). Each country in the world is striving to find the best approach to address this issue (Zurrah et al.2025; Rosli et al., 2025; Rizwan Ullah et al., 2025). The terms sustainability and green environment are one of the approaches used to cultivate a spirit and appreciation for natural resources appropriately among the younger generation (Su & Zhao,2003; Bakarim et.al, 2023; Huong et al.,2021). In the pursuit of environmental sustainability, green artifacts such as rooftop gardens, rainwater harvesting systems, and living walls serve as tangible expressions of commitment to ecological stewardship (Geweely et al.,2024; Yuan et al.,2024). These installations not only beautify the surroundings but also perform essential environmental functions: regulating

temperature, improving air quality, and conserving resources. Integrating such artifacts into a green campus framework magnifies their impact (Petrasz et al., 2024). According to Anthony (2021), Malaysian universities have adopted multiple “green campus paradigms” including green indicators and policies to advance sustainability attainment. This model promotes not only infrastructure changes but also cultural and behavioural transformation within campus communities. According to Anthony (2021), universities in Malaysia have adopted various "green campus paradigms" including green indicators and policies to advance sustainability achievements. This model not only encourages infrastructure changes but also cultural and behavioural transformations within the campus community. Therefore, knowledge and practice of green artifacts are important to achieve this desire. However, among students and educators at the Polytechnic, the willingness to address environmental challenges holistically is still low due to insufficient exposure to green concepts and a lack of guidance in practices related to the physical use of components in this green environment (Nor Syazana et. 2025). Therefore, this study was conducted to examine the level and relationship between this green knowledge and practice from the dimension of Green Environmental Artifacts.

2.0 Literature review

2.1 Environmental Sustainability

Environmental sustainability refers to the responsible interaction with the environment to avoid the depletion or degradation of natural resources and to ensure long-term ecological balance (Gohar, 2020; Tennakoon et al., 2024; Muniz et al.,2023; Malik et al.,2023; awang et al., 2024). It involves practices that protect ecosystems, reduce pollution, and promote the efficient use of energy and raw materials (Ma et al.,2023; Liu et al.,2024; Hermawan et al.,2024) By prioritizing environmental sustainability, societies aim to meet current needs without compromising the ability of future generations to meet theirs (Bodin et al.,2023; Marjernik et al.,2021; Rokicka et al.,2023). This includes actions such as conserving biodiversity, reducing carbon emissions, and encouraging the use of renewable energy sources in daily life, industry, and policymaking (Feng et al.,2024).

2.2 Green Environmental Artifacts

Green environmental artifacts are physical structures or installations designed to promote environmental sustainability and ecological awareness within a space (Reyhani et.al, 2023). These artifacts include elements such as green roofs, rainwater harvesting systems, solar panels, vertical gardens, and recycled material sculptures that serve both functional and educational purposes (Wang et al.2023; Cristiano et al.,2023). They not only enhance the aesthetic and ecological value of an area but also symbolize a commitment to sustainable living (Li et al.,2024; Barnett-Itzhaki et al. 2025; Liao et al., 2022). In educational settings, such as green campuses, these artifacts act as practical tools to engage students and communities in environmental practices, fostering a culture of conservation and responsible resource use (Pacini, et al.,2025). Through green artifacts, institutions can demonstrate real-world applications of sustainability principles, influencing both behaviour and attitudes towards environmental stewardship and not supplied separately (Muhamad Noor and Mohamad, 2024).

2.3 Environmental Knowledge

Environmental knowledge refers to an individual's understanding of environmental issues, natural systems, and the impact of human activities on the ecosystem (Noor et al.,2024). It encompasses awareness of topics such as climate change, pollution, biodiversity loss, renewable energy, and sustainable practices (Galvan-Mendoza et al.,2022). This knowledge forms the foundation for developing pro-environmental attitudes and responsible behaviours (Liu et al.,2022; Janmaimool & Khajohnmanee, 2019; Mandic et al.,2024). When individuals are equipped with accurate and relevant environmental knowledge, they are more likely to make informed decisions that support conservation efforts and reduce ecological footprints (Yildirim et al.2025; Liu et al.2020; Wang & Zhang, 2021). In educational institutions, promoting environmental

knowledge is crucial in nurturing future generations who are environmentally literate and capable of contributing to sustainable development goals (Permanasari, 2021).

3.0 Methodology

A survey including 401 TVET students from different departments within a TVET college in Kuching was used to collect data for this study. Convenience sampling was used to choose the respondents, and participants were picked based on their availability and desire to take part. Due to time and budget limitations, as well as the necessity of contacting a diverse group of students from other departments, this non-random approach was used. Convenience sampling is appropriate for exploratory study that aims to obtain broad insights into students' knowledge and habits linked to environmental sustainability since it made it possible for the researcher to effectively gather data from a sizable and diverse population within the institution. The Likert scale, which has five points, was used to gauge the knowledge and practice of among respondents. Respondents were asked to rate their level of agreement or disagreement with a series of statements using a 5-point Likert scale, with strongly disagree (1) to strongly agree (5). The survey tools were used from previous research and modified (Mark, 2011; Md.Nor, 2017; Kanchanapibul et al. 2014; Janmaimool, P., & Chudech, S. 2020). Cronbach's Alpha was used to assess the instruments' internal consistency, guaranteeing that the Likert-scale items in each construct are accurate at measuring the desired variable. To make sure the survey's questions were straightforward, unambiguous, and not deceptive, a small sample of respondents tested it. The T-test and one-way ANOVA were used as inferential statistics to show how the variables differed between groups.

4.0 Discussion of analysis and findings

A total of 401 respondents participated in the study. The majority were female (61.6%), while male respondents made up 38.4%. Respondents were mostly from the Commerce field (23.9%), followed by Electrical Engineering (17.2%), Civil Engineering (17.0%), Mechanical Engineering (16.0%), Information Technology (13.5%), and Petrochemical Engineering (12.5%).

Table 1. Profile of Respondents

Profile of respondents	Frequency	Percentage (%)
Gender		
Male	154	38.4
Female	247	61.6
Academic field		
Civil Engineering	68	17.0
Electrical Engineering	69	17.2
Mechanical Engineering	64	16.0
Commerce	96	23.9
Information Technology	54	13.5
Petrochemical Engineering	50	12.5

Cronbach's Alpha was used to evaluate the measurement tools' dependability. All of the variables had Cronbach's Alpha values above the cut off, as seen in Table 2, suggesting that the items used to measure each construct had acceptable internal consistency.

Table 2. Reliability Test Result

Variable	Cronbach's Alpha
LK_GE_Water_Artifact Elements	0.978
LK_GE_Electrical_Artifact Elements	0.964
LK_GE_Recycle Bin_Artifact Elements	0.96
LP_GE_Water_Artifact Elements	0.936
LP_GE_Electrical_Artifact Elements	0.959
LP_GE_Recycle Bin_Artifact Elements	0.926

As shown in Table 3, the findings reflect the outcomes of the descriptive research. All constructs indicate that students possess a high level of knowledge and practice concerning the environmental messages conveyed through posters/labels on water, electricity, and recycling. The means are consistently above 4.25, and percentages are above 84%, reflecting strong environmental awareness and responsible behaviour among the respondents. According to Makhtar et al. (2021), most students at UniMAP had high environmental awareness and regularly practiced sustainability, supporting the link between knowledge and green behaviour.

Table 3. Level of knowledge and practices Using Green Environmental Artifacts among TVET Students in Sarawak

No	Construct	Item	Std. Deviation	Mean	Percentage (%)	Mean Interpretation
1	Level of Knowledge poster/Label Water	Save water and to turn off taps	0.76	4.39	87.78	High
		Amount of water used daily	0.78	4.4	88.03	High
		Use water wisely	0.84	4.25	84.99	High
		Shared responsibility	0.82	4.29	85.89	High
		Monitor water pipes	0.73	4.43	88.63	High
	Total mean		**0.73**	**4.25**	**84.99**	**High**
2	Level of Knowledge poster/Label Electrical	Switch off lights and fans	0.83	4.35	86.93	High
		Switch off air conditioners	0.82	4.36	87.23	High
		Shut down computer equipment	0.82	4.37	87.38	High
		Reduce phone battery	0.86	4.32	86.38	High
		Main contributors to carbon dioxide emissions	0.88	4.32	86.33	High
	Total mean		**0.82**	**4.32**	**86.33**	**High**
3	Level of Knowledge poster/Label Recycle bin	Colours of recycling bins	0.84	4.34	86.83	High
		Multi-stream recycling system	0.84	4.34	86.88	High
		Biodegradable waste	0.85	4.3	85.99	High
		Glass waste	0.85	4.31	86.28	High
		Non-biodegradable waste	0.84	4.31	86.28	High
	Total mean		**0.84**	**4.3**	**85.99**	**High**
4	Level of Practice poster/Label Water	Turned off when not in use	0.85	4.4	87.98	High
		Read water conservation posters to save water.	0.8	4.35	86.98	High
		Wisely after reading or viewing water	0.73	4.42	88.33	High
		Rice-washing water	0.87	4.31	86.28	High
		To reuse water	0.87	4.31	86.23	High
	Total mean		**4.12**	**4.31**	**86.23**	**High**
5	Level of Practice poster/Label Electrical	Switch off lights, fans, and all electrical appliances	0.83	4.41	88.28	High
		Help turn off electrical appliances	0.83	4.4	88.03	High
		Unplug electrical appliances when not in use	0.79	4.39	87.73	High
		Using “Night Mode,"	0.83	4.35	86.98	High
		Shut down the computer	0.87	4.36	87.28	High
	Total mean		**0.79**	**4.35**	**86.98**	**High**
6	Level of Practice poster/Label Recycle bin	Reusable water bottle.	0.76	4.39	87.78	High
		Reuse unprinted paper	0.78	4.4	88.03	High
		Refuse to use plastic bags	0.84	4.25	84.99	High
		Separate waste	0.82	4.29	85.89	High
		Dispose of separated waste	0.73	4.43	88.63	High
	Total mean		**0.73**	**4.25**	**84.99**	**High**

The findings from the independent samples t-test, as shown in Table 4, indicate that there are significant differences between male and female TVET students in Sarawak in terms of their level of knowledge and practices related to the use of green environmental artifacts. Across all six variables—knowledge and practice related to water, electricity, and recycling—female students consistently recorded higher mean scores than male students, with all p-values less than 0.05, indicating statistical significance. The highest mean for female students was in the

practice of electrical conservation (M = 4.4664), while the highest mean for male students was in the practice of recycling (M = 4.2494). These results suggest that female students generally demonstrate a greater level of environmental knowledge and engagement in sustainable practices compared to their male peers. The results are in line with the previous study by Setiawan et al., (2025) that female students had significantly higher environmental knowledge and sustainability behaviour compared to male students. The research also reported that females exhibited greater consciousness in all measured domains of sustainability and statistically higher engagement in pro-sustainability actions.

Table 4. Level of knowledge and practices Using Green Environmental Artifacts among TVET Students in Sarawak based on gender

Variable	Gender	No.of Sampel	Mean	Std. Deviation	T-value	Level of Significant
Knowledge Water	Male	154	4.2597	0.97823	-2.959	0.003
	Female	247	4.515	0.55059		
Knowledge Electrical	Male	154	4.1442	1.00937	-3.612	0
	Female	247	4.4664	0.57605		
Knowledge Recycle bin	Male	154	4.1455	1.0049	-3.231	0.001
	Female	247	4.4332	0.5827		
Practice Water	Male	154	4.2039	0.93598	-3.002	0.003
	Female	247	4.4543	0.55916		
Practice Electrical	Male	154	4.1442	1.00937	-3.612	0
	Female	247	4.4664	0.57605		
Practice Recycle bin	Male	154	4.2494	0.85016	-2.179	0.03
	Female	247	4.4178	0.56339		

* Significant at level p <0.05

Table 5 presents the results of a one-way ANOVA analysis to examine the differences in the level of knowledge and practices regarding the use of green environmental artifacts among TVET students in Sarawak based on academic field. The results showed that there were no statistically significant differences across the six variables measured, as all p-values were greater than 0.05. Specifically, no significant differences were found for Knowledge on Water ($F(5, 395) = 1.915$; $p = 0.091$), Knowledge on Electrical ($F(5, 395) = 1.003$; $p = 0.416$), Knowledge on Recycle Bin ($F(5, 395) = 1.634$; $p = 0.150$), Practice on Water ($F(5, 395) = 1.229$; $p = 0.295$),Practice on Electrical ($F(5, 395) = 1.003$; $p = 0.416$), and Practice on Recycle Bin ($F(5, 395) = 1.447$; $p =0.206$). One possible reason for the lack of significance is that the mean scores across the different academic fields were too similar, suggesting that students regardless of their academic background shared relatively uniform levels of knowledge and practice in applying green environmental artifacts. In line with Li et al., (2023) no significant differences in knowledge, attitude, or practice across different courses or education levels towards understanding and behaviour concerning green environmental artifacts.

Table 5. Level of knowledge and practices Using Green Environmental Artifacts among TVET Students in Sarawak based on Academic field

Variable	Gender	Sum of Squares	df	Mean Square	F	Level of Significant
Knowledge Water	Between Group	5.378	5	1.076	1.915	0.091
	Within Group	221.787	395	0.561		
	Group Total	227.165	400			
Knowledge Electrical	Between Group	3.1	5	0.62	1.003	0.416
	Within Group	244.261	395	0.618		
	Group Total	247.361	400			
Knowledge Recycle bin	Between Group	4.982	5	0.996	1.634	0.15
	Within Group	240.902	395	0.61		
	Group Total	245.883	400			
Practice Water	Between Group	3.322	5	0.664	1.229	0.295
	Within Group	213.575	395	0.541		
	Group Total	216.896	400			
Practice Electrical	Between Group	3.1	5	0.62	1.003	0.416
	Within Group	244.261	395	0.618		
	Group Total	247.361	400			
Practice Recycle bin	Between Group	3.443	5	0.689	1.447	0.206
	Within Group	187.916	395	0.476		
	Group Total	191.359	400			

* Significant at level p <0.05

Table 6 presents the results of a Pearson correlation analysis examining the relationship between knowledge and practices related to the use of green environmental artifacts among TVET students. The analysis revealed that all variables are positively and significantly correlated at the 0.01 level (2-tailed), indicating strong relationships between students' knowledge and their environmental practices. The strongest correlation was observed between knowledge and practice related to electrical usage, with a perfect correlation of r = 1.000 (p = 0.000). Other notable strong correlations include knowledge of water and knowledge of electrical (r = 0.830), knowledge of water and practice of electrical (r = 0.830), and knowledge of recycle bin and practice of water (r = 0.814). Additionally, practice of water and practice of recycle bin also showed a strong correlation (r = 0.773). Overall, the correlation coefficients ranged from r = 0.698 to 1.000, suggesting that as students' environmental knowledge increases, so does their engagement in sustainable practices. This demonstrates a consistent and meaningful connection between awareness and environmentally responsible behaviour. According to Yildirim et al., (2025) identified a clear and statistically significant association between environmental literacy and environmentally responsible behaviour among adults, indicating that increased awareness consistently leads to more sustainable actions.

Table 6. Relationship between knowledge and practices

		Knowledge water	Knowledge electric	Knowledge recycle bin	Practice water	Practice electric	Practice Recycle bin
Knowledge water	Pearson Correlation	1	.830**	.771**	.729**	.830**	.721**
	Sig. (2-tailed)		.000	.000	.000	.000	.000
	N	401	401	401	401	401	401
Knowledge electric	Pearson Correlation	.830**	1	.784**	.743**	1.000**	.698**
	Sig. (2-tailed)	.000		.000	.000	0.000	.000
	N	401	401	401	401	401	401
Knowledge Recycle bin	Pearson Correlation	.771**	.784**	1	.814**	.784**	.748**
	Sig. (2-tailed)	.000	.000		.000	.000	.000
	N	401	401	401	401	401	401
Practice water	Pearson Correlation	.729**	.743**	.814**	1	.743**	.773**
	Sig. (2-tailed)	.000	.000	.000		.000	.000
	N	401	401	401	401	401	401
Practice electric	Pearson Correlation	.830**	1.000**	.784**	.743**	1	.698**
	Sig. (2-tailed)	.000	0.000	.000	.000		.000
	N	401	401	401	401	401	401
Practice Recycle bin	Pearson Correlation	.721**	.698**	.748**	.773**	.698**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	
	N	401	401	401	401	401	401

**. Correlation is significant at the 0.01 level (2-tailed).

5.0 Conclusion and Future Research

Overall, the findings highlight that while demographic or academic differences may not influence sustainability practices, enhancing students' environmental awareness remains crucial in promoting green behaviour within TVET institutions. This indicates that higher environmental knowledge is consistently associated with greater engagement in environmentally responsible behaviours.

Acknowledgements

The researchers would like to express their heartfelt appreciation to all parties who contributed to the successful completion of this study titled "Environmental Sustainability and Green Campus: Study on Knowledge and Practice of Using Green Environmental Artifacts among TVET Students in Sarawak." Special thanks are extended to the TVET institutions and students across Sarawak who participated in the survey and provided valuable responses that enabled the analysis of knowledge and practice across various domains such as water, electricity, and recycling. The findings presented in Tables 1 to 6 including descriptive analysis, gender comparison, academic field comparison, and correlation analysis would not have been possible without their cooperation. The researchers also acknowledge the support of institutional administrators and lecturers who facilitated the data collection process. Their involvement has been instrumental in understanding the level of environmental awareness and sustainable practices among future skilled professionals in the TVET sector.

Author Contributions

Che In F.: Conceptualization, Methodology,Data Analysis**; Ahmad A.Z.:** Validation, Supervision**; Omar N.A. :** Writing-Reviewing and Editing: **Gustiawan G.:** Validation**.**

6.0 References

Awang Siman, N. A., Sulaiman, S., Mat Lazim, A., & Eka Nurmala Sari. (2024). Determinants of The Intention To Use E-Wallet Among Polytechnic Hulu Terengganu's Students. International Journal of Technical Vocational And Engineering Technology, 5(2), 95 103.

Al-Kayiem,H. H.,Koh,K.,Riyadi,T. W. B.,&Effendy,M. (2020)."A Comparative Review on Greenery Ecosystems and Their Impacts on Sustainability of Building Environment."Sustainability, 12 (20), 8529.

Anthony Jnr, B. (2021). Green campus paradigms for sustainability attainment in higher education institutions–a comparative study. Journal of Science and Technology Policy Management, 12(1), 117-148.

Bakarim,N. A. A. A.,Rahim,R. A.,&Hamzah,M. I.(2024).“Environmental Transformation: A Systematic Literature Review on Green Innovation and Its Key Elements.” Advances in Social Sciences Research Journal, 11(2.2), 54–65.

Barnett-Itzhaki, Z., Tifferet, S., Berkowic, D., Arviv, T., Daya, A., Carasso Romano, G. H., & Levi, A. (2025). Strategies and challenges for green campuses. Frontiers in Sustainable Cities, 7, 1469274.

Bodin, Ö., & Crona, B. I. (2023). A network perspective on the value of diversity in natural resource governance. Ecology and Society, 28(2), 34.

Cristiano, E., Farris, S., Deidda, R., & Viola, F. (2023). How much green roofs and rainwater harvesting systems can contribute to urban flood mitigation?. Urban Water Journal, 20(2), 140-157.

Feng, K., Yang, Z., Zhuo, Y., Jiao, L., Wang, B., & Liu, Z. (2024). Impact of Carbon Tax on Renewable Energy Development and Environmental–Economic Synergies. Energies, 17(21), 5347.

Galvan-Mendoza, O., González-Rosales, V. M., Leyva-Hernández, S. N., Arango-Ramírez, P. M., & Velasco-Aulcy, L. (2022). Environmental knowledge perceived behavioral control, and employee green behavior in female employees of small and medium enterprises in Ensenada, Baja California. Frontiers in psychology, 13, 1082306.

Geweely, N. S., Abu Taleb, A. M., Grenni, P., Caneva, G., Atwa, D. M., Plaisier, J. R., & Ibrahim, S. (2024). “Eco-Friendly Preservation of Pharaonic Wooden Artifacts using Natural Green Products.” Applied Sciences, 14(12), 5023.

Gohar, S. R., & Indulska, M. (2020). Environmental sustainability through green business process management. Australasian Journal of Information Systems, 24.

Hermawan, A. N., Masudin, I., Zulfikarijah, F., Restuputri, D. P., & Shariff, S. S. R. (2024). The effect of sustainable manufacturing on environmental performance through government regulation and eco-innovation. International Journal of Industrial Engineering and Operations Management, 6(4), 299–325.

Huong,P. T.,Cherian,J.,Hien,N. T.,Sial,M. S.,Samad,S.,&Tuan,B. A.(2021).“EnvironmentalManagement, Green Innovation, and Social–Open Innovation.” Journal of Open Innovation: Technology, Market, and Complexity, 7(1), 89.

Janmaimool, P., & Chudech, S. (2020). Effect of domestic and global environmental events on environmental concern and environmental responsibility among university students. Sustainability, 12(4), 1610.

Janmaimool, P., & Khajohnmanee, S. (2019). Roles of environmental system knowledge in promoting university students’ environmental attitudes and pro-environmental behaviors. Sustainability, 11(16), 4270.

Kanchanapibul, M., Lacka, E., Wang, X., & Chan, H. K. (2014). An empirical investigation of green purchase behaviour among the young generation. Journal of cleaner production, 66, 528-536.

Li, Y., Wu, Y., Luo, Y., Fu, Z., & Zhang, S. (2024). The Influence of Smart Green Spaces on Environmental Awareness, Social Cohesion, and Life Satisfaction in High-Rise Residential Communities. Buildings (2075-5309), 14(9).

Liao, C. W., Lin, J. H., & Chen, T. W. (2022). Research on a framework for sustainable campus eco-architecture selection: taking a Taiwan high school as an example. Sustainability, 14(10), 6265.

Liu, D., Yousaf, Z., & Rosak-Szyrocka, J. (2024). Environmental performance through green supply chain management practices, green innovation, and zero waste management. Sustainability, 16(24), 11173.

Liu, P., Teng, M., & Han, C. (2020). How does environmental knowledge translate into pro-environmental behaviors?: The mediating role of environmental attitudes and behavioral intentions. Science of the total environment, 728, 138126.

Liu, P., Teng, M., & Han, C. (2020). How does environmental knowledge translate into pro-environmental behaviors?: The mediating role of environmental attitudes and behavioral intentions. Science of the total environment, 728, 138126.

Ma, L., & Liu, X. (2023). Strategies for environmental protection and optimization of ecological business economic growth from the perspective of sustainable development. Sustainability, 15(3), 2758.

Majerník, M., & Malindžáková, M. (2021). Evolution of the concept of sustainability—from Brundtland Report to Sustainable Development Goals. In Sustainable Resource Management (pp. 1–24).

Makhtar, S. Z., Amirah, A. S. N., Ab Wahab, M., Hassan, Z., & Hamid, S. (2021). Study of environmental awareness, practices and behaviours among UniMAP students. In IOP Conference Series: Earth and Environmental Science (Vol. 646, No. 1, p. 012061). IOP Publishing.

Malik, A. H., Jais, M. b., & Rahim, S. (2023). Significance of environmental sustainability to maintain financial stability: Mediating roles of financial inclusion. Asia-Pacific Journal of Regional Science, 7, 1307–1328.

Mandić, A., Knight, D. W., Vuković, M., & Thomsen, B. (2024). Place Attachment, Awareness of Environmental Responsibility and Pro-Environmental Behaviour of Visitors in Protected Natural Areas. Tourism Planning & Development, 1-26.

Md Nor, N. H., & Othman, A. A. (2017). Tahap pengetahuan dan amalan berkaitan alam sekitar di kalangan pelajar Inasis Bsn, UUM.

Muhamad Noor, M. F., Mamat, M. Z., & Mohamad, Z. F. (2024). Impact of engagement in campus sustainability activities to competency development: Change agents' experiences and perspectives. Sustainability, 16(5), 1780.

Muniz, R. N., da Costa Júnior, C. T., Buratto, W. G., Nied, A., & González, G. V. (2023). The sustainability concept: A review focusing on energy. Sustainability, 15(19), 14049. https://doi.org/10.3390/su151914049

Noor, N. H. M., Zaini, S. M., Pudin, S., & Sidek, M. S. J. (2024). Environmental Sustainability: Mediating Effect of Environmental Knowledge for Pro-Environmental Behaviour. Indonesian Journal of Sustainability Accounting and Management, 8(1), 230-248.

Nor Syazana Nahwah Mohd Zamri, Nur Adibah Raihan Affendy, & Muhamad Sufyan Safwan Mohamad Basir. (2025). Exploring Green Economy Awareness Among Tvet Institution Students. International Journal Of Modern Education (Ijmoe), 7(24).

Pacini, A., Brüggemann, M., Flottmann, M., Grobschedl, J., & Schlüter, K. (2025). Sustainability Education Through Green Facades: Effects of a Short-Term Intervention on Environmental Knowledge, Attitude, and Practices. Sustainability, 17(6), 2609.

Permanasari, G. H., Suherman, S., & Budiati, L. (2021). The implementation of environmental education to achieve sustainable development: literature review. In E3S Web of Conferences (Vol. 317, p. 01069). EDP Sciences.

Petrasz, P., Zhioua, S., James, S., Bindschedler, S., Junier, P., & Joseph, E. (2024). "Green Alternatives for Archaeological Iron Stabilization." Studies in Conservation, 1–11.

Reyhani, M., Santolini, E., Tassinari, P., & Torreggiani, D. (2023). Environmental assessment of design choices of green walls based for materials combination and plants. The International Journal of Life Cycle Assessment, 28(9), 1078-1091.

Rizwanullah, M. et al. (2025). The Role of Agricultural Development and Climate Change Mitigation in the Sustainable Environment of G20 Countries. Journal of Water and Climate Change, 16(5): 1746–1764 (May 1, 2025).

Rosli, A., Rohaini, A. S., Yusri, N., & Rani, M. H. A. (2025). The Extent of Environmental Protection Regulations and Impacts of Hydropower Activities in Malaysia and China. International Journal of Research and Innovation in Social Science, IJRISS 9(1).

Sakarya, S., Güney, M., Akıncı Demirbaş, E., & Çakmak, A. (2025). University students' awareness profile on environmental sensitivity and global climate change. Environment, Development and Sustainability, 27(2), 3103-3123.

Setiawan, H., Kusnadi, K., Surtikanti, H. K., & Riandi, R. (2023). Gender differences and the correlation of environmental knowledge with sustainability awareness after ESD-PjBL implementation. JPBI (Jurnal Pendidikan Biologi Indonesia), 9(3), 371-386.

Su, Y., & Zhao, H. (2023). Infiltration Approach of Green Environmental Protection Education in the View of Sustainable Development. Sustainability, 15(6), 5287.

Tennakoon, W. D. N. M. S., Janadari, M. P. N., & Wattuhewa, I. D. (2024). Environmental sustainability practices: A systematic literature review. European Journal of Sustainable Development Research, 8(3), Article em0259. https://doi.org/10.29333/ejosdr/14604

Wang, K., & Zhang, L. (2021). The impact of ecological civilization theory on university students' pro-environmental behavior: an application of knowledge-attitude-practice theoretical model. Frontiers in Psychology, 12, 681409.

Wang, W., Yang, H., & Xiang, C. (2023). Green roofs and facades with integrated photovoltaic system for zero energy eco-friendly building–A review. Sustainable Energy Technologies and Assessments, 60, 103426.

Yildirim, M. S., Elkoca, A., Gökçay, G., Yilmaz, D. A., & Yıldız, M. (2025). The relationship between environmental literacy, ecological footprint awareness, and environmental behavior in adults. BMC Public Health, 25(1), 551.

Yildirim, M.S., Elkoca, A., Gökçay, G. et al. The relationship between environmental literacy, ecological footprint awareness, and environmental behavior in adults. BMC Public Health 25, 551 (2025).

Yuan, Y., & Ren, H. (2024). "Application of Green Design Concept in Environmental Art Design." Dalam Proceedings of the International Conference on Industrial Design and Environmental Engineering, IDEE 2023 (2024).

Zurrah, Z., Suriani, S., & Abrar, M. (2025, April). Impact of natural resources rents and human capital on ecological footprint in Indonesia: Technological innovation as moderation. In IOP Conference Series: Earth and Environmental Science (Vol. 1479, No. 1, p. 012010). IOP Publishing.