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Abstract: The transition to sustainability requires major behavioural changes. This requires a complete rethinking of ecosystems and their interconnections, reassessing environmental issues, and a behavior change manifesting. Thus, understanding how sustainability Knowledge, Attitudes, and Practices (KAP) change is essential to sustainability as they shape human behaviour. The main aim of this study was to investigate the constructs of sustainability KAP among university and non-university populations. Data were collected using a structured questionnaire of items measured on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The questionnaire was distributed to diverse participants, ensuring a broad representation of views on sustainability. There are ten sociodemographic variables, 344 respondents in UAE where the female (28.5%) and male (13.7%), (58.1%) participants did not belong to the UAE university and their age fall into the 18-24 years old. The mean scores indicate a positive orientation towards sustainability, with Knowledge (M = 4.2272), Attitudes (M = 4.2650), and Practices (M = 3.8198) all above the midpoint and the UAE university students showed more knowledge, attitude and practices scores than others population. Associations between KAP were significant at a significant level of $p < 0.05$. This indicates that the next generation will have more environmentally KAP.

Keywords: Sustainability; Environmental knowledge; Environmental attitude; Environmental practices; UAE; university

1. Introduction

The Environmental sustainability is increasingly challenging as a result of shifts in the environment. Human activity negatively impacts ecological processes and exhausts global resources. The current situation is leading to worldwide alterations in the environment that have the potential to be permanent and negatively impact both humans and ecosystems [1,2]. Climate change is a significant worldwide environmental concern in the 21st century [3]. Although natural climate variations occur, the Intergovernmental Panel on Climate Change (IPCC) has identified compelling evidence that human activities are responsible for global warming [4,5]. According to the Intergovernmental Panel on Climate Change (IPCC), in 2007, there was a 70% increase in human-caused greenhouse gas emissions between 1970 and 2004. The climate has already been impacted by elevated levels of greenhouse gases [6]. As per the IPCC (2007), climate change has the potential to adversely affect a significant number of individuals globally.

To achieve sustainable policy, it is necessary to implement strategies that effectively modify people's behaviour, considering their level of awareness and understanding of global environmental

change [5]. Government actions are crucial in reducing greenhouse gas emissions, but voluntary behaviour modification is also significant [6]. The extent to which individuals are willing to decrease their energy consumption is contingent upon their comprehension and embrace of global environmental phenomena such as climate change and global warming. The presence of comprehension and acknowledgement will encourage the general population to take action and alter their behaviors [6]. Given the fact that the United Arab Emirates (UAE) is a member of the Gulf Cooperation Council (GCC), which possesses some of the largest oil reserves globally, it is crucial to comprehend Knowledge, Attitudes, and Practises (KAP). Energy generation in the area contributes to the release of carbon dioxide (CO2).

Nevertheless, the United Arab Emirates (UAE) ranks as the tenth-largest global oil producer and boasts a substantial Gross Domestic Product (GDP)   per capita. The country's energy consumption has risen due to its economic growth in the past few decades. According to the data, the country's power consumption in 2010 amounted to 85.2 billion kWh, representing an increase of 8.5% compared to the previous year [7], an economic evaluation of the solar energy policies implemented in the United Arab Emirates (UAE). The energy consumption and CO2 emissions rate has increased twofold over 30 years. Multiple studies have established a robust correlation between energy consumption and economic growth in developed countries. Mahadevan and Adjaye (2007) and Balcilar et al. (2010) analysed the content of this link in the Group of Seven countries (Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States, as well as the European Union). The UAE has adopted a proactive stance towards environmental conservation to attain sustainable economic development [8–11].

In order to foster enduring modifications in behaviour within the UAE, it is crucial to comprehend the populace's perceptions and actions regarding worldwide environmental transformation. Human activity modifies ecosystems, oceans, atmosphere, freshwater systems, and land surfaces. Environmental changes encompass various phenomena such as the scarcity of freshwater, climate change, the loss of biodiversity, the depletion of fisheries, changes in land use, and alterations in ecosystem services [1]. Specifically, human activities have caused global environmental changes. These activities encompass the utilisation of 50% of the global freshwater resources, the transformation of 40% of the Earth's land surface into agricultural land, the concerning exhaustion of 7-11 million square kilometres of forests as a result of deforestation, the excessive exploitation of 75% of monitored fisheries through overfishing, and the unsustainable establishment of over 45,000 large dams that disrupt the natural flow pattern. According to Myers and Patz (2009), the aforementioned alterations have resulted in a 1000-fold rise in species extinction rates.

Gaining insight into the attitudes, perceptions, and actions of UAE citizens regarding environmental transformation is crucial for fostering sustainable behaviour change. The utilisation of the KAP (knowledge, attitudes, and practises) approach is beneficial for this research due to the following rationale. KAP research methods elucidate individuals' cognition, convictions, and actions pertaining to a particular subject [12].

The KAP research on environmental change holds significance in both developing and developed nations [13–15]. In addition to parents, teachers are the primary educators of environmental habits. Carlsen et al. (2001) evaluated 198 tourist and hospitality businesses in Western Australia to determine their environmental goals and strategies for sustainable management and conservation. They used a Knowledge, Attitudes, and Practises (KAP) methodology. Research in industrialised countries is essential for studying KAP. Many developed countries have insufficient research on the correlation between knowledge, attitudes, practises, and the environment. Multiple studies have investigated the way the public views environmental changes [16–21]. However, these studies have not employed the KAP research methodology. Stedman (2004) quantitatively assessed the knowledge, attitudes, and practises (KAP) of 356 key informants in the agriculture, forestry, and water policy sectors in the Prairie Provinces. In Stedman's (2004) study, it was discovered that 57.8% of the participants believed that climate change posed a significant concern. Participants did not give climate change precedence over other environmental issues. This study employed Canadian key

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informants; however, there is a dearth of national environmental knowledge, attitudes, and practises (KAP) studies that specifically target the general public in the UAE [22].

2. Materials and Methods

2.1. Introduction

This section outlines the methodology used in this study to investigate the constructs of Sustainability Knowledge, Attitudes, and Practices among respondents. It details the tools and statistical techniques employed to collect and analyze the data, providing a comprehensive understanding of the research process.

2.2. Research Design

A quantitative research design was utilized, focusing on collecting numerical data to investigate relationships between various constructs related to sustainability. This approach facilitated objective measurement and analysis of the variables in question.

2.3. Data Collection

Data were collected using a structured questionnaire, consisting of items measured on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The questionnaire was distributed to a diverse group of participants, ensuring a broad representation of views on sustainability.

2.4. Sample and Population

The study sample comprised 344 respondents, selected to represent a wide range of demographics and backgrounds. The sample size was deemed sufficient to ensure the statistical validity of the results.

2.5. Research Hypotheses

The current study aims to test the following research hypotheses:
H1: The population from the university have more knowledge, attitude and practices scores than population from outside the university.
H2: Attitudes and knowledge are positively correlated with practices.
H3: Attitudes and knowledge have a positive impact on sustainability practices.

2.6. Data Analysis Tools

The data were analyzed using SPSS 29 and Microsoft Office Excel 365. These tools were chosen for their robust statistical capabilities and user-friendly interfaces, facilitating efficient and accurate data analysis.

2.7. Statistical Techniques

Several statistical techniques were employed in the analysis. Descriptive Statistics are used to summarize the data and provide an understanding of the central tendency, dispersion, and distribution of responses. Independent Samples T-Test is conducted to compare the scores of different groups, particularly focusing on the differences between UAE university students and others. Pearson Correlation Analysis is employed to examine the relationships between Knowledge, Attitudes, and Practices. Regression analysis is utilized to understand the impact of Knowledge and Attitudes on Practices. Reliability was tested using Cronbach Alpha test, and validity was assured by adopting the scales from already validated scales in addition to content and face validity that were ensured during the pilot phase of the survey.

2.8. Ethical Considerations

The research adhered to ethical standards, ensuring the confidentiality and anonymity of the participants. Informed consent was obtained from all respondents, and they were assured of their right to withdraw from the study at any point. Before conducting the research, ethical approval by UAEU Social Sciences Ethics Committee Research Number: ERSC_2023_2950 were obtained on 12/06/2023.

2.9. Limitations

While efforts were made to ensure the robustness of the methodology, certain limitations existed, including the potential for response bias, data normality and the generalizability of the findings to other populations.

2.10. Summary

This chapter has presented the research methodology, detailing the approach, data collection, analysis tools, and statistical techniques used in the study. The methodology was designed to ensure a rigorous and ethical investigation into the constructs of Sustainability Knowledge, Attitudes, and Practices.

3. Results

3.1. Introduction

The results section presents the findings from the study on Sustainability Knowledge, Attitudes, and Practices. The data were collected from a diverse group of respondents and analyzed using various statistical methods to understand the relationships and differences within the variables in compliance with the research hypotheses.

3.2. Sociodemographic variables

There are ten sociodemographic variables 344 respondents in UAE.

Table 1. Sociodemographic variables (n=344).

		F	%
Gender	Male	47	13.7%
	Female	98	28.5%
	Prefer not to say	199	57.8%
Belonging to the UAE university	No	200	58.1%
	Yes	144	41.9%
Position in UAEU	Student	152	83.1%
	Faculty	15	8.2%
	Staff	16	8.7%
Age	12-17 years old	40	11.6%
	18-24 years old	200	58.1%
	25-34 years old	37	10.8%
	35-44 years old	32	9.3%
	45-54 years old	29	8.4%
	55-64 years old	6	1.7%
	65 and over	0	0.0%
Living in UAE	No	31	9.0%
	Yes	313	91.0%
The highest level/degree of education	Less than high school	17	4.9%
	High school degree or equivalent	166	48.3%

	Bachelor's degree (e.g. BA, BS)	129	37.5%
	Master's degree (e.g. MA, MS, MEd)	20	5.8%
	Doctorate (e.g. PhD, EdD)	10	2.9%
	Other	2	0.6%
	Less than high school	102	29.7%
	High school degree or equivalent	98	28.5%
Mother's education level	Bachelor's degree (e.g. BA, BS)	112	32.6%
	Master's degree (e.g. MA, MS, MEd)	13	3.8%
	Doctorate (e.g. PhD, EdD)	5	1.5%
	Other	14	4.1%
	Less than high school	75	21.8%
	High school degree or equivalent	122	35.5%
Father's education level	Bachelor's degree (e.g. BA, BS)	76	22.1%
	Master's degree (e.g. MA, MS, MEd)	43	12.5%
	Doctorate (e.g. PhD, EdD)	20	5.8%
	Other	8	2.3%
	Student	205	59.6%
Current employment status	Employed	94	27.3%
	Unemployed	42	12.2%
	Retired	3	0.9%
	Student	12	3.5%
Mother's current employment status	Employed	81	23.5%
	Unemployed	204	59.3%
	Retired	47	13.7%
	Student	9	2.6%
Father's current employment status	Employed	184	53.5%
	Unemployed	33	9.6%
	Retired	118	34.3%

A notable majority (57.8%) of the participants preferred not to disclose their gender. This is an unusually high percentage for non-disclosure in gender categories and might suggest sensitivity around gender identity or cultural factors influencing the willingness to disclose this information. The remaining participants were more frequently female (28.5%) than male (13.7%).

The sample includes a significant number of participants not belonging to the UAE university (58.1%), suggesting the study may have wider applicability beyond university-affiliated individuals. Among those affiliated with the university, students constitute the largest group (83.1%), followed by staff (8.7%) and faculty (8.2%).

The majority of the participants (58.1%) fall into the 18-24 years old age group, indicating a young demographic, likely reflective of the university student population. The representation decreases steadily in older age groups, with no participants over 65 years old.

A vast majority (91%) of the participants currently live in the UAE, which is expected given the study's location-specific nature.

The highest level of education most commonly reported is a high school degree or equivalent (48.3%), followed by a bachelor's degree (37.5%). Only a small percentage have completed a master's (5.8%) or doctorate (2.9%). This distribution suggests a generally educated sample, but with a limited representation of postgraduate degrees.

The educational levels of the parents show a relatively high level of education, with more than half having at least a high school degree or higher. Interestingly, the mother's educational level is slightly higher on average than the father's, which is not always common in all regions.

A majority of participants are students (59.6%), with a significant portion being employed (27.3%). Unemployment is reported at 12.2%, which is noteworthy and may have implications for understanding the socio-economic context of the participants.

The employment status of parents shows a high percentage of unemployed mothers (59.3%) compared to fathers (9.6%), which may reflect cultural or societal norms related to gender roles in the workforce. A significant proportion of fathers are retired (34.3%), which is consistent with the age distribution of the sample.
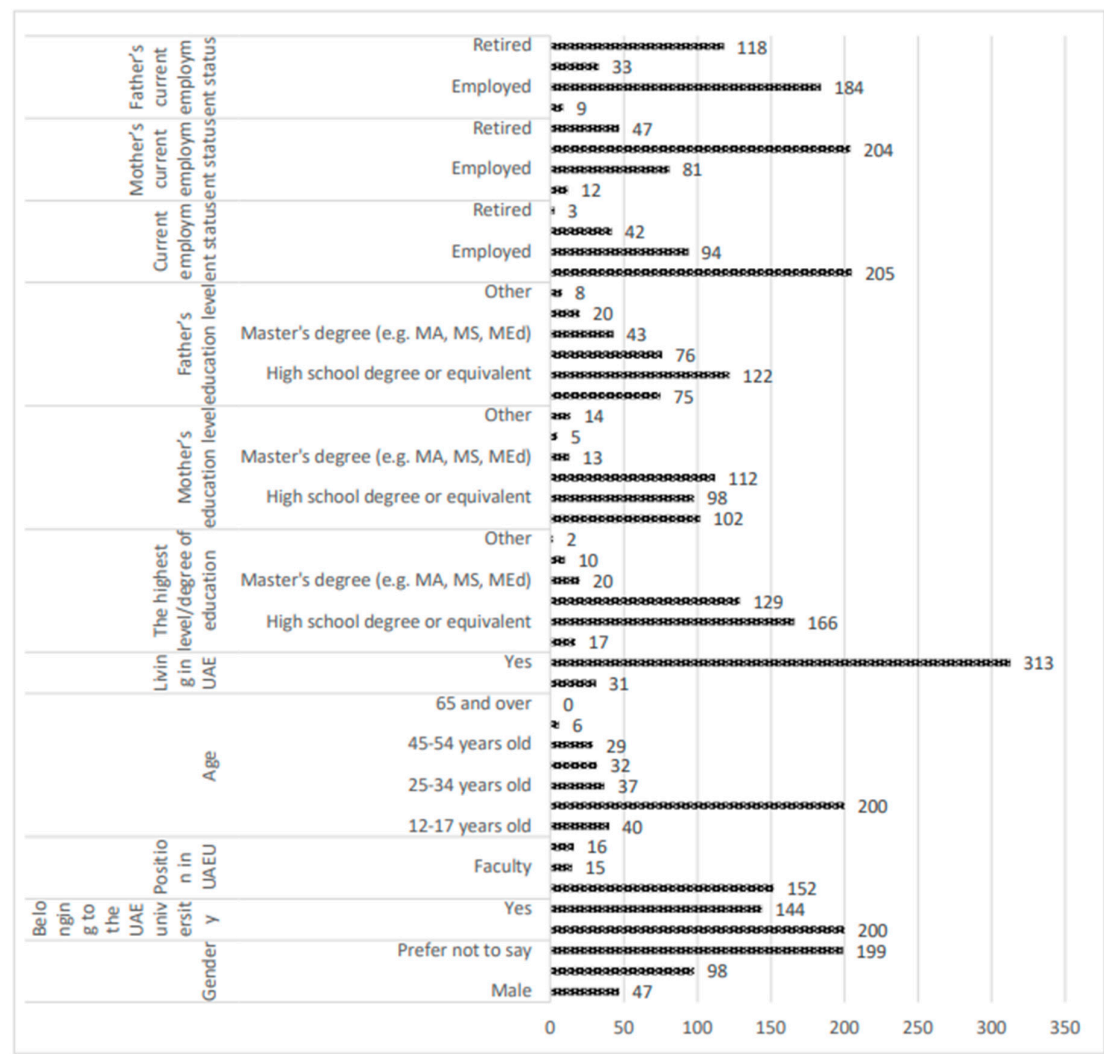

Figure 1. Sociodemographic variables.

3.3. Instrument internal reliability

The Cronbach's alpha reliability coefficients for the scales Knowledge (7 items), Attitudes (6 items), and Practices (11 items) are .825, .812, and .818 respectively, indicating high internal consistency within each scale.

Table 2. Reliability analysis.

ID	Scales	Number of items	Cronbach alpha reliability
1	Knowledge	07	.825
2	Attitudes	06	.812
3	Practices	11	.818
	Total	25	.818

The overall reliability for the combined 25 items is also high at .818. These results suggest that the scales are reliable tools for measuring the constructs of knowledge, attitudes, and practices, offering credibility to any findings derived from their use. This high level of consistency across all scales underscores their suitability for further research and practical applications where these constructs are essential.

3.4. Normality

In Table 3, the tests of normality using the Kolmogorov-Smirnov and Shapiro-Wilk tests reveal significant results for the constructs of Knowledge, Attitudes, and Practices.

Table 3. Tests of Normality.

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Knowledge	.092	344	.000	.949	344	.000
Attitudes	.114	344	.000	.938	344	.000
Practices	.057	344	.009	.984	344	.001

a. Lilliefors Significance Correction.

The Kolmogorov-Smirnov test revealed significant deviations from normality for the constructs of Knowledge (D(344) = .092, p < .001), Attitudes (D(344) = .114, p < .001), and Practices (D(344) = .057, p = .009). Consistently, the Shapiro-Wilk test also indicated significant departures from normality for Knowledge (W(344) = .949, p < .001), Attitudes (W(344) = .938, p < .001), and Practices (W(344) = .984, p = .001). These findings suggest that the distributions of responses for Knowledge, Attitudes, and Practices significantly differ from a normal distribution, underscoring the importance of selecting appropriate statistical methods for further analysis of these data.

3.5. Descriptive statistics of the constructs

The respondents were asked to rate their agreement following a five-point Likert scale ranging from 1 strongly disagree to 5 strongly agree.

Table 5. Descriptive Statistics of Sustainability Knowledge, Attitudes and Practices.

		Knowledge	Attitudes	Practices
N	Valid	344	344	344
	Missing	0	0	0
Mean		4.2272	4.2650	3.8198
Median		4.1429	4.3333	3.8182
Mode		4.00	5.00	4.00
Std. Deviation		.55491	.56953	.61821
Minimum		2.14	2.50	2.00
Maximum		5.00	5.00	5.00

The descriptive statistics of Sustainability Knowledge, Attitudes, and Practices among 344 respondents show that participants generally rated high on a five-point Likert scale. The mean scores indicate a positive orientation towards sustainability, with Knowledge (M = 4.2272), Attitudes (M = 4.2650), and Practices (M = 3.8198) all above the midpoint. The median and mode values are closely aligned with the means, especially in Knowledge and Practices. Attitudes stand out with a higher median (4.3333) and a mode at the maximum (5.00), indicating particularly strong agreement in this area. The standard deviations (Knowledge: SD = .55491; Attitudes: SD = .56953; Practices: SD = .61821) suggest a moderate spread of responses, clustered around the mean. The range of scores, with the maximum at 5.00 for all constructs and minimum scores lowest for Practices (2.00), indicates some variability, particularly in the practical application of sustainability knowledge and attitudes.

3.6. Independent Samples T Test (belonging to UAE University)

UAE university students have more knowledge, attitude and practices scores than others from outside the university.

Table 6. Independent Samples Test of UAE University Belong Differences in Knowledge, Attitudes and Practices.

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	95% Confidence Interval of the Difference	
							Lower	Upper
Knowledge	Equal variances assumed	.566	.452	.449	342	.654	-.09216	.14669
	Equal variances not assumed			.453	317.588	.651	-.09115	.14567
Attitudes	Equal variances assumed	1.550	.214	.766	342	.444	-.07477	.17023
	Equal variances not assumed			.760	298.930	.448	-.07583	.17129
Practices	Equal variances assumed	2.239	.136	.169	342	.866	-.12167	.14450
	Equal variances not assumed			.166	288.849	.868	-.12397	.14680

The Independent Samples T-Test examined differences in Knowledge, Attitudes, and Practices between students belonging to the UAE University and those not affiliated with the university. The results indicated no significant differences across all three constructs. Specifically, for Knowledge, the t-test yielded non-significant results both when equal variances were assumed (t(342) = .449, p = .654) and when they were not (t(317.588) = .453, p = .651). Similarly, for Attitudes, there were no significant differences with equal variances assumed (t(342) = .766, p = .444) and not assumed (t(298.930) = .760, p = .448). The pattern was consistent for Practices, showing no significant differences under the assumption of equal variances (t(342) = .169, p = .866) and without it (t(288.849) = .166, p = .868).

Table 7. Group Statistics of Sustainability Knowledge, Attitudes and Practices.

	Belonging to the UAE university	N	Mean	Std. Deviation	Std. Error Mean
Knowledge	No	200	4.2386	.56785	.04015
	Yes	144	4.2113	.53797	.04483
Attitudes	No	200	4.2850	.55782	.03944
	Yes	144	4.2373	.58622	.04885
Practices	No	200	3.8245	.59194	.04186
	Yes	144	3.8131	.65501	.05458

Group statistics revealed that the mean scores for Knowledge, Attitudes, and Practices were marginally higher for participants not affiliated with the UAE University, but these differences were not statistically significant. This suggests that university affiliation does not significantly influence knowledge, attitudes, and practices scores among the participants in this study.

3.7. Correlation Tests of Sustainability Knowledge, Attitudes and Practices

The Pearson correlations among Sustainability Knowledge, Attitudes, and Practices for 344 respondents reveal significant relationships.

Table 8. Correlations of Sustainability Knowledge, Attitudes and Practices.

		Knowledge	Attitudes	Practices
Knowledge	Pearson Correlation	--		
	N	344		
Attitudes	Pearson Correlation	.728**	--	
	Sig. (2-tailed)	.000		
	N	344	344	
Practices	Pearson Correlation	.657**	.705**	--
	Sig. (2-tailed)	.000	.000	
	N	344	344	344

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

Knowledge and Attitudes are positively correlated (r = .728, p < .001), indicating a strong association where higher knowledge levels are linked with more positive attitudes towards sustainability. Similarly, Knowledge and Practices are significantly correlated (r = .657, p < .001), suggesting that increased knowledge about sustainability is associated with more sustainable practices. The correlation between Attitudes and Practices is also strong (r = .705, p < .001), indicating that more favorable attitudes towards sustainability are associated with more sustainable practices. These significant correlations at the 0.01 level (2-tailed) suggest a robust interrelationship among knowledge, attitudes, and practices related to sustainability, highlighting the interconnectedness of these constructs in the context of sustainability.

3.8. Regression of Sustainability Practice on Attitudes and Knowledge

The regression analysis demonstrates a significant and impactful relationship between Knowledge and Attitudes with Practices in sustainability. The results highlight the importance of both knowledge and attitudes in influencing sustainable practices, with attitudes having a slightly more pronounced effect.

In the model summary (Table 9), the predictors, Knowledge and Attitudes, show a strong correlation with Practices (R = .735), indicating a substantial relationship. The R Square value of .540 suggests that 54% of the variance in Practices is explained by the model, a substantial proportion. The Adjusted R Square, at .538, adjusts this value slightly for the number of predictors but still indicates a significant explanatory power. The Durbin-Watson statistic of 1.830 points to a moderate level of autocorrelation in the residuals, which is within acceptable limits and does not detract from the model's validity.

Table 9. Sustainability Practice Model Summary[b.]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.735[a]	.540	.538	.42031	.540	200.529	2	341	.000	1.830

a. Predictors: (Constant), Attitudes, Knowledge. b. Dependent Variable: Practices.

The ANOVA results (Table 10) further confirm the model's effectiveness. The regression model is statistically significant (F(2, 341) = 200.529, p < .001), demonstrating a strong relationship between the independent variables (Knowledge and Attitudes) and the dependent variable (Practices). The division of total variance into regression (70.850) and residual (60.240) parts underlines the model's capacity to account for a significant portion of variability in Practices.

Table 10. Sustainability Practice ANOVA[a.]

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	70.850	2	35.425	200.529	.000[b]
1	Residual	60.240	341	.177		
	Total	131.090	343			

a. Dependent Variable: Practices. b. Predictors: (Constant), Attitudes, Knowledge.

The coefficients table (Table 11) provides detailed insights into the individual predictors. Both Knowledge and Attitudes are significant predictors of Practices, with Knowledge having a positive effect (B = .341, t = 5.721, p < .001) and a moderate influence (standardized Beta = .306). Attitudes show a stronger positive effect on Practices (B = .523, t = 9.005, p < .001) with a higher Beta value of .482, indicating a more substantial impact on Practices. The collinearity statistics for both predictors are within acceptable ranges, suggesting that multicollinearity is not a concern in this model.

Table 11. Sustainability Practice Coefficients[a.]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
	(Constant)	.147	.186		.793	.428		
1	Knowledge	.341	.060	.306	5.721	.000	.471	2.124
	Attitudes	.523	.058	.482	9.005	.000	.471	2.124

a. Dependent Variable: Practices.

4. Discussion

4.1. Introduction

The current study found that the university population did not significantly differ in Knowledge, Attitudes, and Practices scores compared to those outside the university. There were positive correlations between Attitudes and Knowledge with Practices, suggesting that these constructs are interconnected. The regression analysis confirmed that both Attitudes and Knowledge positively impact sustainability practices, highlighting their importance in promoting sustainable behaviors.

4.2. Comparative Knowledge, Attitudes, and Practices in University vs. Non-University Populations

The study found no statistically significant difference between people who belong to and those who do not belong to UAE University. The university population had slight scores in knowledge, attitudes, and practices related to sustainability compared to those outside the university. This paper considers the first paper comparing these two populations.

The students at UAEU are achieving higher scores when compared to a study that examined the levels of environmental knowledge among 500 students pursuing a career in health. Their study revealed that 45.8% of all students displayed inadequate levels of environmental awareness, [23]. The UAEU population score is also better than among university students in northwestern Mexico [24] and 50 students of classes VIIA and VII C [25], and students at the Budapest Metropolitan University were score almost the same regarding the concept of environmental knowledge [26].

While the sociodemographic for this study didn't have a strong relationship with the KAP, Another research was conducted in Indonesia to investigate the community's knowledge, attitudes,

and management practices where the objective of the study was to identify the knowledge systems and community management practises that contribute to the effective conservation of marine resources in Jor Bay and identify the factors that influence KAP in the management of Jor Bay through the use of a questionnaire. The study identified disparities between community KAP. The community's knowledge and attitudes fall within the medium category, whereas their practices are rated as low. The KAP status impacted socio-economic factors, namely education, age, and occupation. The community knowledge system plays a crucial role in determining the success of bay management [27]. Another study investigates the correlation between the socio-economic status of school students and its impact on sustainable lifestyle. The study focused on a convenience sample of 303 households, which were selected in a way that reflects the proportional distribution between urban and semi-urban areas. The analysis revealed distinct categories of socio-economic status that impact sustainable lifestyle, environmental sustainability, and economic sustainability, while having no effect on social sustainability [28].

On the other hand, This study showed better scores regarding KAP compared to the previous study and another study where a questionnaire was administered to 390 students, and the results revealed significant correlations between KAP behaviour and sustainable consumption patterns. The results also demonstrated that the students possess considerable knowledge, but their attitude and practice levels are only moderate [29].

Another interesting study analysed KAP for sustainability for two populations of university students. The KAP levels were found to be related in the studied population, with higher levels of knowledge and attitudes than those of practice. Knowledge was related to educational cycle and age, attitudes with sex, and practices with age [30].

A systematic review was carried out to identify and analyze KAP sustainability studies documented in the scientific literature between 1990 and 2016. A total of ten studies were identified, with half focusing on populations within educational settings, specifically teachers, students, and graduates. The KAP findings exhibit variability across different studies; nevertheless, there is a prevailing inclination to examine facets of ecosystems, natural resources, environmental protection, and conservation [30].

The gender gap in sustainable behaviour findings in this paper was not found, it is generally corroborated by the results of the smaller number of studies that have examined energy-saving behaviours in depth. The social-cognitive approach put forth by Thøgersen and Grønhøj (2010) posits that while women exhibit a greater inclination towards domestic energy conservation, men consider the virtuous conduct of other members in the household to be a substantial motivating factor, in contrast to women [31]. Du and Pan (2021) identified a distinction between male and female regarding the psychological antecedents of saving behaviour. Research has shown that while attitudes and personal moral standards can accurately forecast the intention to engage in sustainable behaviours, this relationship does not hold true for men [32]. Furthermore, there was a significantly stronger correlation between intention and behaviour among males compared to females. In a similar vein, Lee et al. (2013) discovered that females exhibited a greater propensity to engage in energy-saving practises and obtained higher scores on subjective norms pertaining to energy-efficient lighting [33]. The authors further assert that when considering household-oriented behaviours, energy conservation is more pronounced among females than males. However, this disparity disappears when considering community-oriented behaviours, such as endorsing public policy and purchasing energy-efficient lighting. These results align with prior research (Hunter et al., 2004; Xiao and Hong, 2010) and the gender socialization theory, which posits that women's roles are predominantly limited to the domestic and private spheres in many cultures. In this regard, Shrestha et al. (2020) noted that women are primarily responsible for housekeeping, particularly in Asia, where they manage the electricity on a daily basis [34]. Although men are the primary consumers, most purchasing decisions regarding electrical appliances are delegated to them. Other study aims to investigate the correlation between gender, self-efficacy, and energy-saving behaviours within households in the Lombardy region of Italy. The findings indicate that the impact of gender on energy-saving behaviours is not evenly distributed, but rather influenced by the local and national

culture, exhibiting distinct patterns. Furthermore, the data indicate that domain-specific self-efficacy is influenced by gender. The study suggests that incorporating a gender perspective is crucial in formulating sustainability policies at the individual, family, and community levels [35].

Although there is no consensus and the issue is still being debated, the majority of studies on this topic have converged on the existence of consistent cross-cultural gender differences in the adoption of sustainable behaviours. The classic review by Zelezny et al. (2000), which considered 13 behavioural studies from various countries published between 1988 and 1998, concluded that in 9 of them, women had a greater tendency than men to engage in pro-environmental behaviour, with only one study finding the opposite. An original study conducted on 14 European, South, and North American countries confirmed the gender difference in the same article [36]. According to a review done by Gifford and Nilsson, 2014, this gender divide is becoming more apparent in the current literature when compared to previous results. A study of 22 countries found that this gender difference was confirmed in 14 countries (Asia, Europe, North America, and Oceania) when environmentally oriented private behaviours were addressed [37,38]. When the public sphere is considered, the number of countries with a significant gap is reduced to five. A similar pattern was found in the Chinese context [39], where women were found to be more active in domestic sustainability behaviours, whereas no differences between men and women were found in public engagement on these issues (e.g., activism). Other studies found no significant differences based on gender, which is consistent with our findings [40,41].

In a research paper examining the environmental behaviours of university students in three countries which is Spain, Brazil, and the United Arab Emirates (UAE). The findings indicated a significant correlation between the academic discipline and the individual's perceived level of environmental dedication with regards to the sustainability practises of students. However, the academic year of environmental students did not demonstrate any significant impact on these habits. There was no significant association found between students' self-perceived consumerism and any of the three explanatory factors: field of study, year of study, or environmental concern. There were no significant differences between countries. However, when it came to gender differences, females in Brazil and Spain showed higher sustainability values in 2 out of the 3 indicators. This gender difference was not significant for Emirati students. The negligible impact of the year of study on students in environment-related disciplines raises a thought-provoking discussion on whether current environmental university education should not only impart knowledge but also foster a sustainable mindset and practical behaviour among students [42]. Another UAE study examines the level of KAP adoption among 200 male and female University of Sharjah students towards sustainability efforts. Eight items were created to assess student knowledge of the university's sustainability projects and activities. Six assessment items were created to measure agreement or disagreement on sustainability issues. Ten items were created to assess sustainable behaviour frequency. The survey revealed that university students have advanced knowledge and a positive attitude towards university programmes and activities, as well as the importance of supporting sustainable practices. Most students also care about university sustainability behaviors [43].

4.3. Correlation Between Attitudes and Knowledge with Practices

The positive correlation between attitudes and knowledge with practices observed in this study is supported supports the argument that when individuals understand the impact of their actions on the environment, they are more likely to adopt sustainable practices that align with their knowledge and attitudes.

4.4. Impact of Attitudes and Knowledge on Sustainability Practices

The positive impact of attitudes and knowledge on sustainability practices highlighted in this research is consistent with the argument that knowledge about environmental issues is crucial for developing positive attitudes, which then act as a catalyst for sustainable practices.

This research demonstrates a significant high score in KAP. This is likely due to the widespread inclusion of sustainability education in educational institutions and its integration into workplace

practices. Research has established that providing information that is tailored to a specific audience has a significant impact on the level of public involvement.

Although previous studies have examined people's attitudes towards global environmental change, this particular study discovered that participants viewed climate change as a daily risk and believed its impacts would be immediate. This indicates that there is public apprehension regarding global environmental change. This is advantageous because the absence of acknowledgment of individual actions could impede voluntary efforts to mitigate climate change [44].

Providing education on how individual behaviour affects environmental change is essential for closing the gap between knowledge and behaviour, and encouraging voluntary actions to mitigate environmental issues in a sustainable manner. Voluntary environmental behaviours encompass activities such as walking, cycling, using public transportation, participating in car sharing, using energy-efficient lighting, reducing heating and dressing, recycling, composting, and minimising air travel [45].

Participants identified methods to engage in ecologically conscious behaviours on an individual or communal scale. Frequently observed behaviours encompass recycling and the act of switching off lights. Several measures aimed at reducing greenhouse gas emissions have positive impacts on society, despite the fact that certain actions may not be appealing. Engaging in activities such as walking, cycling, minimising consumption of animal products, utilising cleaner fuels, and enhancing energy efficiency can result in improvements in health and monetary savings [46].

4.5. Implications of the Findings

The findings of this study have important implications for policy-makers, educators, and sustainability advocates. They suggest that enhancing sustainability education in universities could have a ripple effect, improving attitudes and practices among students. Furthermore, extending such educational efforts beyond the university context could help in raising the overall sustainability profile of the broader community.

4.6. Limitations and Future Research

While the findings are significant, the study is not without its limitations. The specific context of the university and its demographic might not represent the general population. Future research could focus on a more diverse sample to validate these findings. Additionally, longitudinal studies could provide more insights into how sustainability knowledge, attitudes, and practices evolve over time practices that contribute to a more sustainable future.

5. Conclusions

The study explored sustainability knowledge, attitudes, and practices among 344 respondents in the UAE. Overall, participants showed positive inclinations toward sustainability, with high scores in knowledge and attitudes. However, there's room for improvement in translating these into actions. University affiliation didn't significantly impact sustainability scores. The study highlighted strong correlations between knowledge, attitudes, and practices, emphasizing the need for targeted interventions to bridge the gap between understanding and sustainable actions.

University, UAEU Social Sciences Ethics Committee Research Number: ERSC_2023_2950 were obtained on 12/06/2023.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Suggested Data Availability Statements are available in section "MDPI Research Data Policies" at https://www.mdpi.com/ethics.

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