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THE ROLE OF ECOLOGICAL BEHAVIORS AND LIFESTYLES IN DEVELOPING SUSTAINABILITY AWARENESS AMONG UNIVERSITY STUDENTS

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ABSTRACT

Sustainability is a concept that focuses on the condition of Earth's biophysical environment, particularly with respect to the use and depletion of natural resources. This study aimed to find the sustainability awareness among the university students along with the role played by the awareness in attaining ecological behaviors and lifestyles among university students in Punjab, Pakistan. Quantitative research method was used for collection and analysis of data. The population of the study was all the university students in Punjab. A sample of 1000 university students was selected by using multistage random sampling technique. Two research instruments were developed for questionnaire, one for sustainability awareness and one for ecological behaviors and lifestyles. Both scales were based on five-point Likert scales. After developing research instruments, both instruments were validated through pilot testing. Results indicated that there was not any significant gender difference among university students regarding sustainability awareness and ecological behaviors and lifestyles. Significant difference between groups of university students were found regarding sustainability awareness and ecological behaviors and lifestyles. Results also showed that sustainability awareness is a significant predictor of ecological behaviors and lifestyles. will also help to indicate that there is a need to create awareness among the people of whole nation to promote more ecological behaviors because awareness plays an important role to strengthen sustainable development but further research is required to deal with the delimitations of this study.

Key words: sustainability, sustainability awareness, sustainable development.

INTRODUCTION

Since now a lot of definitions have been proposed for sustainability and it illustrates the complexity of sustainability (Selby, 2006). "Sustainability means maintaining the environmental assets or at least not depleting them" (Goodland, 1995). Sustainability is an important topic in order to understand the reusing and upgrading of renewable and non-renewable natural resources. Our world is facing major challenge of environmental protection and restoration nowadays. World's population has increased and it is continuously increasing more rapidly. Now there is a need to protect the natural resources of the planet to maintain the natural environmental system. "Sustainability is a concept that focuses on the condition of Earth's biophysical environment, particularly with respect to the use and depletion of natural resources" (Portney, 2015). Sustainable development has three major domains i.e. society, economic and the environment (Passet, 1979). Sustainability can be achieved by using deep ecological knowledge. It focuses on fulfillment of needs of human while conserving life support system of earth (Palmar et al., 2005). Allen and Hoekstra (1993) described that all of us believes that sustainability is an advantageous act but biodiversity and sustainability are both in danger because people are more concerned about their personal benefits rather than biological

conservation. We need to take care of the environment not only for its innate worth but also to save resources for our children (Kuhlman & Farrington, 2010). Environmental sustainability is regarded as one of the most pressing issues that need immediate attention and action today (Arora, 2018). A system that is eco-friendly is required to save both renewable and non-renewable resources. With the increasing population of the world and the ongoing impact of these populations on environment, there is growing concern about the sustainability of natural resources. Now, it is critical and crucial to maintain a balance between population and total resource requirements in order to preserve habitat integrity and species variety (Haris, 2003).). Emerging environmental issues on a global level like overpopulation, climate changes, destruction of agricultural areas, decreased fresh water level and increased number of extinct and endangered animals, brought sustainability in forefront of research (Ceylan, 2019). Education is critical for knowledge delivery and for promoting long-term growth and sustainable development. It is crucial for establishing the appropriate awareness, values, and attitudes to accomplish sustainable development (Biasutti & Frate, 2017). Educational institutions have a significant impact on the development of human intellect and conduct (Scott, 2013). Higher education is seen as a platform for transforming human-related issues into solutions (Shephard, 2008). Education is considered as an important strategy to understand the complex concept of sustainability, it make us able to make sustainable lifestyle decisions (Birdsall, 2014). Sustainability can be achieved by using deep ecological knowledge. It focuses on fulfillment of needs of the humans at the same time conserving the system of life support of earth (Palmar et al., 2005). High knowledge and high understanding of green practices will improve ecological behavior and the person will be able and willing to implement these behaviors in his environment (Chan & Hawkins, 2010).

Literature shows that how environmental attitudes and behaviors are affected by environmental knowledge. People could gain a good understanding of three components e.g. environment, society and economy of sustainability via their knowledge. Knowledge provides awareness that strengthens the modifications in attitudes and lifestyles, it also provides the authentication for new policies (Horton, 2019). Human morality contains important aspects like feeling of responsibility and to have knowledge about our place with reference to biosphere. In some societies it is even a part of their religious beliefs and cultural practice (Horton & Horton, 2019).

Natural resources all around the world are limited. Our earth has a huge population of living things to support that includes humans, animals, plants and all other species. Humans are using the natural resources to make their lives luxurious, easier and more comfortable. Pakistan is among the developing countries and also among the most populated countries of the world. Due to its huge population, the country is running out of its natural resources rapidly. For this reason, sustainability is the need of the hour especially for our country. Now people need to understand that we have to save our natural resources and environment not only for us but for our future generations too. The goal of this study is to determine the differences in sustainability awareness and ecological behaviors and lifestyles among university students.

RESEARCH QUESTIONS

The following research questions were developed to fulfil the requirements of the objectives of the study.

1. To find any gender difference among university students regarding sustainability awareness and ecological behaviors and lifestyles.
2. To find differences between groups of students of different universities regarding sustainability awareness and ecological behaviors and lifestyles.
3. To find if sustainability awareness can predict ecological behaviors and lifetstyles among university students.

HYPOTHESES

On the basis of objectives of the study, some tentative hypothesis was formulated which are as follows:

1. There will be significant gender differences regarding sustainability awareness and ecological behaviors and lifestyles among university students.
2. There will be significant difference between students of different universities regarding sustainability awareness and ecological behaviors and lifestyles.
3. Sustainability awareness will predict ecological behaviors and lifestyles among university students.

SIGNIFICANCE OF STUDY

Sustainability is an important topic in order to understand the reusing and upgrading of renewable and non-renewable natural resources. Our world is facing major challenge of environmental protection and restoration nowadays. World's population has increased and it is continuously increasing more rapidly. Now there is a need to protect the natural resources of the planet to maintain the natural environmental system. Pakistan is a developing country and it ranks on 5th largest country in respect to population. Pakistan's natural resources are decreasing day by day to fulfill the needs of its large population. Now it is the time to take steps to restore that resources or to deficit the use of these resources as much as possible.

Sustainability is an approach which guides how we can modify our behaviors and lifestyles to save our natural resources of environment and also to secure them for our future generations. Now it's a need of time to get aware of the negative consequences of overconsumption of these natural resources. This study will serve to assess university students' sustainability awareness and to report on the existing situation in relation to global norms. This study will help to identify the importance of sustainability awareness of university students in the betterment of environment.

LITERATURE REVIEW

When we talk about Earth it develops overtime without growing (Goodland, 1995). According to comprehensive or systematic point of view sustainable development is a procedure of modification lead by different values or principles (Hopkins & McKeown, 2002). According to Brundtland report (1987) Sustainable development can be explicate as "development that meets the needs of the present without compromising the ability of future generations to meet their needs". Sustainable development consists of two components, development tells about the goals and conditions tell about the steps necessary for sustainability (Pezzey, 1989). The goal of development is to improve everyone's quality of life in several ways. The three pillars of sustainable development; economic development, social development, and environmental protection, are interrelated and mutually reinforcing" (United Nations, 1997). When one component changes in any way it influence the other two components, however we are not able to predict in what way, because we have limited knowledge (Birdsall, 2014). Environmental dimension is considered to have less weight than other two dimensions but some authors suggested that all three dimensions should have equal weight (Pope, Annandale & Saunders, 2004).

Sustainability of environment is also described as "a state of equilibrium, adaptability, and interconnectedness that permits human civilization to meet its demands without going beyond the capability of the ecosystems that sustain it to continue to renew the services required to do so, nor through our activities reducing biological diversity" (Morelli, 2011). Sustainability is said to have three dimensions, the environment, the economy and society and it can be a two-way relationship in between ecosystem and the human beings (Morelli, John & Lackwood, 2011). Environmental development is the ability to grow and to make sure natural resources and environmental heritage are renewed and protected. It consists of the system's flexibility to respond to change (Bran, 1991). There is need to maintain vital environmental systems at healthy levels, to a extend that will help to improve environmental system rather than deteriorating it (Paris & Kates, 2003).

A collection of 17 interrelated global objectives known as the Sustainable Development Goals are meant to act as a "roadmap to a better and more sustainable future for everybody" (United Nations, 2017). The United Nations institutionalized the concept of sustainable development through the Sustainable Development Goals (SDGs). "No poverty, zero hunger, good health and well-being, quality education, gender equality, clean water and sanitation, affordable and clean energy, decent work and economic growth, industry, innovation, and infrastructure, reducing inequality, sustainable cities and communities, responsible consumption and production, climate action, life below water, life on land, peace, justice, and strong institutions and partnerships are among the 17 Sustainable Development Goals" (United Nations, 2017). 70% of enterprises consider sustainability in their strategic goals and objectives, according to a global poll of 2800 multinational organizations (Kiron et al., 2012). Failure to meet the Sustainable Development Goals may expose humanity to forms

of global disastrous outcomes and existential risks (Cernev & Fenner, 2020).

Understanding sustainability is critical because individuals must deal with challenges related to overpopulation and overuse of natural resources. Education is recognized as a crucial technique for assisting in the improvement of people's understanding of a complicated topic like this, which might subsequently help them in making sustainable lifestyle decisions (Birdsall, 2014). Recent studies have concentrated on how human behavior affects resource preservation and sustainable development (Pfeffer, 2010). To ensure sustainability and to improve the quality of our environment, we must deploy renewable energies and energy efficiency measures, which will eventually reduce energy consumption and air pollution (Msengi et al., 2019). According to Duran et al., (2015), in 21st century sustainable development plays an important role in business and resources conservation. There is no environmental development without environmental protection. Due to the need of continuous social and economic development, there is an essential need to protect and improve the environment because it is the only possibility to make and maintain the welfare for present generation and for future generations (Glasbergen, 2000). Global economy has strong impact on environment and deteriorating natural resources system, it is creating problems like reduction in forest area, global warming, reduction in fresh water, extinction of wild animals and plants, reduction in farmland per person and melting glaciers (Popescu, 2001).

Climate change is driven by human actions such as the use of fossil fuels, hence experts are working to improve and justify the usage of fossil fuels (Walmsley et al., 2014). Economic, social, energy, and environmental studies are being done in order to replace fossil fuels with renewable fuels (Koziol & Mendecka, 2015). People's awareness of the environmental catastrophes brought on by human civilization has significantly risen due to the increasing frequency of extreme weather occurrences, air pollution, and pollution produced by plastic trash (Horton & Horton, 2019). Knowledge raises awareness, which encourages behavioral and mental shifts and also offers justification for new policies (Horton, 2019). However, research to access their understanding of sustainability is insufficient (Walshe, 2008). Many individuals lack a coherent grasp of sustainability (Jucker, 2002). Therefore, the purpose of this study is to investigate how Pakistani students are aware of the notion of sustainability. When people are asked about sustainability, first thing that come to their mind are ideas related to environmental components nearly 48.9% individuals responded in this way (Summers, Child & Corney, 2005; Summers & Childs, 2007).

Worldwide, 62 percent of respondents in 1995 said they "would agree to an increase in taxes if the additional money were utilized to decrease environmental harm," while 33 percent indicated they would be opposed to such a move (Inglehart, 1995). Msengi et al. (2019) conducted a research and concluded, more than half of the students revealed that there were no courses or programs that focused separately on sustainability issues. To find the approaches of awareness of sustainable development studies may focus on various areas and the general or chosen age groups, with an emphasis on secondary and university students in particular (Patrzałek, 2016). The latter strategy is particularly justified by the explanation that how young people are educated and raised will influence the attitudes and decisions they make in the future (Molina et al., 2013). It is thought that education is the only way to achieve the environmental awareness notion of sustainable development. Knowledge, awareness, skills, and participation are the main objectives that should be fulfilled by special programs designated by educational institutions (Osman & Pudin, 2009).

If awareness is lead to action, students must not only be made aware of the problem but also acquire the abilities needed to examine it, learn about efficient corrective measures, and have a comprehensive understanding of the underlying ideas (Hungerfold & Volk, 1990; Munson, 1997). There is a need to use new knowledge and new technologies, firstly it should be visualized and then shared (Horton & Brown, 2018). Two routes have been described for sustainable development, in first route we try to reduce the use of resources and in second it is believed that technology can be used to recover the loss and to increase sustained growth (Horton, 2019).

A research was conducted by Naqbi and Alshannag (2017) in United Arab Emirates to investigate knowledge of UAE students regarding sustainability and its development. The study's descriptive

findings demonstrated that students had a strong understanding of sustainability and its development. Students showed significant gender difference for knowledge; females had more sustainable knowledge.

The outcomes of a study by Hay and Eagle (2020) demonstrated that the modified curriculum was effective in raising students' knowledge and executing a behavior shift toward sustainability. The degree of student knowledge and sustainability-related actions are positively correlated with strengthening the curriculum with sustainability education.

Research of Awan and Abbasi (2013) in Pakistan showed that students had above average level of environmental knowledge (3.62) and awareness (2.83). Additionally, findings indicated that there was no gender difference in mean environmental knowledge but regarding awareness it was significant. Low level of awareness in the male students is mainly because that they are not often engaged in domestic responsibilities (Awan & Abbasi, 2013)

METHODOLOGY

The study was a quantitative research and data was analyzed by using statistics. It was a cross-sectional study. Moreover, it was a correlational research and it helped to find the relationship of sustainability awareness and ecological behaviors and lifestyles of university students. University students of different districts of Punjab made up the study's target population. Due to lack of time and finance only five universities were selected from Punjab, Pakistan. These universities were located in three different cities i.e. Lahore, Faisalabad and Rawalpindi. Multistage random sampling technique was used to collect data. In the first stage, three-divisions of Punjab were selected. In the second stage, five general universities were selected; two universities from Lahore, one university from Rawalpindi and two universities from Faisalabad. A sample of 1000 students were drawn from five selected universities, 200 students from each university were selected randomly.

For collection of data a self-reported questionnaire was developed and validated according to the objectives of the study. This questionnaire was consisted of demographic information of participants and two main measuring tools named as Sustainability Awareness Scale (SAS) consisted of 19 items and Ecological Behaviors and Lifestyles Scale (EBLS) consisted of 17 items. The instrument was pilot tested on a sample of 76 university students and following are the results of reliability analysis:

Table 1

Table showing reliability of study instruments

Variables	*M*	*SD*	*Range*	*Cronbach's α*	*Skewnesss*	*Kurtosis*
Sustainability Awareness scale (SAS)	75.10	7.87	0.61	0.75	-.50	-.04
Ecological Behaviors and Lifestyles Scale (EBLS)	65.79	10.29	0.53	0.86	-.67	-.23

Note M=mean, SD= Standard Deviation

Table 4.2 showed that Sustainability Awareness Scale (SAS) had fair or adequate reliability and Ecological Behaviors and Lifestyles Scale (EBLS) had good reliability.

RESULTS

After completing data collection and scoring, statistical analysis was done to evaluate the study's tentative hypothesis. Demographic data was consisted of gender, age, education, institute and city of participants under study. Demographic information of the study participants is shown in table 1.

Table 2

Demographic characteristics of Participants

Variables	**F**	**%**
Gender		
Male	304	30.4
Female	696	69.6
Age		
16-20 years	111	11.1
21-25 years	826	82.6
26-30 years	59	5.9
31-35 years	4	0.4
Education		
Undergraduate	215	21.5
Graduate	527	52.7
Postgraduate	258	25.8
University		
Punjab University Lahore	200	20.0
Kinnaird College for Women University	200	20.0
Government University Faisalabad	200	20.0
University of Agriculture Faisalabad	200	20.0
Pir Mehr Ali Shah *Arid Agriculture University* Rawalpindi	200	20.0
City		
Lahore	400	40.0
Faisalabad	400	40.0
Rawalpindi	200	20.0

Note, N=1000, f= frequency, %= percentage

Gender differences in sustainability awareness and ecological behaviors and lifestyles

The analysis revealed that the gender difference among study participants was non-significant which represented that there was no gender difference among male students and female students of universities regarding sustainability awareness. Table 2 shows findings of t-test.

Table 3

Independent Sample t-test showing Gender Differences in sustainability awareness and ecological behaviors and lifestyles among University Students.

	Males		Females				95% Cl		
Variable	*M*	*SD*	*M*	*SD*	*t(df)*	*P*	*LL*	*UL*	*Cohen's d*
1.SA	3.97	0.38	3.94	0.43	0.98(998)	0.33	-0.02	0.08	0.07
2.EBL	3.91	0.60	3.85	0.61	1.58(589)	0.15	-0.03	0.15	0.09

Note: SAS= Sustainability awareness, *EBL*= Ecological behaviors and lifestyles, Males = 304; Females = 696; M= mean; SD= standard deviation; Cl= confidence interval; LL= lower limit; UL= upper limit
*$p < .05$, **$p < .01$, ***$p < .001$

The results indicate that gender difference was not significant in terms of sustainability awareness among university students. It means that male and female university students had almost equal level of sustainability awareness. Results also showed that gender difference was not significant in terms of ecological behaviors and lifestyles. It means that males and females had no difference in their ecological behaviors and lifestyles. So, the tentative hypothesis was rejected.

Differences in sustainability awareness and ecological behaviors and lifestyles on the basis of Universities

Results showed that there was significant difference among the students of different universities who participated in this study. Results of one-way ANOVA are displayed in Table 3.

Table 4

Table showing One Way Analysis of Variance depicting Group Differences in sustainability awareness

	PU		KCWU		GCUF		UAF		PMAS-AAUR			
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F(df)*	*p*
1.SAS	3.89	.42	3.73	.38	4.18	.31	4.12	.35	3.85	.44	49.15(4, 995)	<.001

Note: PU= Punjab university Lahore, *KCWU*=Kinnaird college for women university, *GCUF*= Government college university Faisalabad, *UAF*= university of agriculture, *PMAS-AAUR= Pir Mehr Ali Shah Arid Agriculture University Rawalpindi*, *M*=mean, *SD*= standard deviation, *$p < .05$, **$p < .01$, ***$p < .001$

The findings revealed a significant difference between students of different universities regarding sustainability awareness, F (4, 995) = 49.15, p< .001. Tukey post hoc test revealed that sustainability awareness was significantly higher among students of Government University Faisalabad (GCUF) as compared to students of Punjab University Lahore (PU) (p< .001), Kinnaird College for Women University (KCWU) Lahore (p< .001)

and Pir Mehr Ali Shah Arid University Rawalpindi (PMAS-AAUR) (p< .001). Findings also showed that students of UAF have significantly higher sustainability awareness as compared to students of PU (p< .001), KCWU (p< .001) and PMAS-AAUR (p< .001). Students of PU has significantly higher sustainability awareness as compared to students of KCWU (p< .001) and students of PMAS-AAUR has significantly more sustainability awareness as compared to students of KCWU (p<.05). The differences regarding sustainability awareness were insignificant among the students of Government college university Faisalabad (GCUF) and University of Agriculture Faisalabad (UAF) (p=.55) and students of PU and PMAS-AAUR (p=.82).

To find the differences among students of different universities regarding ecological behaviors and lifestyles one-way ANOVA was used.

Table 5

Table showing One Way Analysis of Variance depicting Group Differences regarding ecological behaviors and lifestyles

	PU		KCWU		GCUF		UAF		PMAS-AAUR			
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F(df)*	*p*
1.EBL	3.73	.61	3.43	.61	4.27	.33	4.18	.45	3.73	.57	89(4)	<.001

Note: EBL= Ecological behaviors and lifestyles, *PU*= Punjab university Lahore, *KCWU*=Kinnaird college for women university, *GCUF*= Government college university Faisalabad, *UAF*= university of agriculture, *PMAS-AAUR= Pir Mehr Ali Shah Arid Agriculture University Rawalpindi, M*=mean, *SD*= standard deviation, **<.05, **p<.01, ***<.001*

The assumption of homogeneity of variance was fulfilled. Results indicated that there was a significant difference among students of different universities participated in this study regarding ecological behaviors and lifestyles, F=87.14 (4,995), p<.001. Tukey post hoc test revealed that ecological behaviors and lifestyles were significantly higher among students of Government University Faisalabad (GCUF) as compared to students of Punjab University Lahore (PU) (p<.001), Kinnaird College for Women University (KCWU) (p<.001) and Pir Mehr Ali Shah Arid Agriculture University Rawalpindi (PMAS-AAUR) (p<.001). Results also showed that there was significantly higher ecological behaviors and lifestyles among students of UAF as compared to students of PU (p<.001), KCWU (p<.001) and PMAS-AAUR (p<.001). Students of PU has significantly higher ecological behaviors and lifestyles as compared to students of KCWU (p<.001) and results also indicate that students of PMAS-AAUR has significantly more higher ecological behaviors and lifestyles as compared to students of KCWU (p<.001). There was no significant difference among students of GCUF and UAF (p=.41) and among students of PU and PMAS-AAUR (p=1.0). The hypothesis was accepted since there was a significant difference between the student groups.

Sustainability awareness as predictor of ecological behaviors and lifestyles among university students

The results of simple linear regression are presented.

Table 6
Simple Linear Regression showing Sustainability awareness as a predictor of Ecological Behaviors and Lifestyles among University Students (N=1000)

Predictor	B	95% Cl for B		SE B	β	R^2
		LL	*UL*			
Model I						.22***
(Constant)	1.14	.82	1.46	.16***	--------	
Sustainability Awareness	.69	.61	.77	.04***	.47	

Note: CI= confidence interval; LL= lower limit; UL= upper limit
*p < .05, **p < .01, ***p < .001

Simple linear Regression was used to test the predictor of ecological behavior and lifestyles of university students. Sustainability awareness was entered as predictor variable in the regression model. Ecological behaviors and lifestyles were entered as outcome variable.

Simple linear regression was run to identify predictor of ecological behaviors and lifestyles. No influential case was observed in the data. All the assumptions were met completely.

A significant regression equation was found (F (1, 998) = 286.05, p<.001) with an R2 of .22. It means that 22% variance in ecological behaviors and lifestyles can be explained by one's sustainability awareness. This suggests that the change in sustainability awareness of university students can also influence ecological behaviors
and lifestyles of university students. So, the hypothesis was accepted.

DISCUSSIONS

The results of this study had also been contrasted and connected with the literature that had been reviewed. The findings of the current study are in line with the study of Shivakumara et al. (2015) which was conducted in India, Yuan et al., (2021) which was conducted in China and Ozden (2008) which was conducted in Turkey. After t-test analysis they found no significant difference between males and females regarding sustainability awareness. However, study of Ogunbode and Arnold (2012) showed contrary results which showed significant gender difference among general population regarding environmental awareness and knowledge. Males had more environmental awareness and knowledge than females. Awan and Abbasi (2013) conducted research which also revealed that there was a difference among males and females regarding environmental or sustainability awareness. To determine whether there was any difference between the five different groups of students (students of different universities) regarding sustainability awareness, a one-way analysis of variance was conducted. Results indicated that there was a significant difference between students of different universities (between five groups of students).

Result of this research was similar with the results of a study conducted in China by Hong et al., (2011) that showed a significant difference among students from different regions of country. Another study conducted by Molina, Sainz and Olaizola (2013) showed similar results They found significant difference among the groups of students, most likely due to influence of different external factors like culture and environmental services. Environmental differences can influence environmental awareness of students. Research conducted by Karatepe et al. (2012) in Turkey also showed similar results. Students from three different universities in Turkey participated in the research and findings showed that there was significant difference regarding sustainability awareness among the groups. Some studies also showed opposite results like for example a research was done by Dagiliute et al. (2018) in which data was collected from two universities and no significant difference regarding sustainability aspects were observed. Study of Dagiliute et al. (2018) had similar results with current study, it was found after regression analysis that sustainability awareness and environmental information predict student's ecological behaviors. Study of Geiger et al (2019) got similar results in their study where the environmental awareness and knowledge was the significant predictor of ecological behaviors.

CONCLUSION

It is concluded from the findings that sustainability awareness is an important aspect for the betterment of environment and restoration of natural resources. People use their sustainability awareness to maintain a balance between using and replacing resources while considering the environment, the economy, and social factors. Findings of the study revealed that there was not any significant gender difference among university students regarding sustainability awareness in Punjab, Pakistan. Findings of the study also revealed that there was significant difference between the students of different universities. Students of GCUF showed highest level of sustainability awareness and students of KCWU showed lowest level of sustainability awareness. Findings indicated that sustainability awareness is a significant predictor of ecological behaviors and lifestyles among university students. this showed that a change in sustainability awareness can effect ecological behaviors and lifestyles of university students.

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