RESEARCH ARTICLE

Knowledge, Attitudes, and Practices on Green Technology of a Higher Education Institution in Southern Mindanao, Philippines

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Abstract

Higher education institutions (HEIs) are considered catalysts in environmental sustainability efforts on a global scale. This study determines the knowledge, attitudes, and practices on green technology, particularly on waste minimization, reduction of energy and resource use, and reduction of the carbon footprint of respondents from an HEI in Southern Mindanao, Philippines. A survey was conducted among 141 respondents composed of administrators, faculty, staff, and students of the HEI. Mean, variance, Pearson r, Kruskal-Wallis, and Mann-Whitney tests were the statistical tools used in this study. There was an excellent overall level of knowledge as well as a positive attitude toward green technology. In terms of practices, respondents observed green technology about 50% of the time. There was a significant difference in the level of knowledge between students and staff and between faculty and staff. Likewise, the extent of the practice varied among the respondents. Furthermore, results showed a low relationship between the level of knowledge and extent of practice and also a low relationship between the level of attitude and extent of the practice. The HEI should embark on developing transformative strategies geared toward becoming a green university that embodies sustainable development goals and principles.

Keywords: sustainable development · waste minimization · energy use · resources use · carbon footprint · greening universities

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Introduction

Sustainable development is an essential aspect of any human activity and endeavor. There should be harmonized and balanced growth in the social, economic, and environmental aspects of society to pursue it. Sustainable development thereby encompasses both the simultaneous pursuit of socio-economic growth and environmental protection (World Commission on Environment and Development 1987).

Environmental sustainability is promoted worldwide. Countries, organizations, and institutions are encouraged to align their activities to promote environmental protection and to ensure that adverse environmental impacts are minimized. One of the institutions tapped to take an active role in the pursuit of sustainable development is the higher education institutions (HEIs), which are composed of administrators, faculty, staff, and students. The administrators refer to the head of a particular unit in the university while faculty are instructors and professors handling classes. The staff is the workforce that handle administrative or technical functions.

The United Nations Environment Program (UNEP) envisions HEIs to be fully transformed into green universities. In 2014, UNEP Environment Education and Training developed a toolkit for HEIs to "provide HEIs with the basic strategies and tactics necessary to transform themselves into green, low carbon institutions with the capacity to address climate change, increase resource efficiency, enhance ecosystem management, and minimize waste and pollution" (UNEP 2014, p. 7). Its purpose is to help them adopt green technology or green system in their overall operation, activities, and practices and to support the development and implementation of strategies for transforming universities into environmentally-sustainable institutions. The specific objective is to lead and support universities to plan and adapt their strategies to transform them into green, resource-efficient, and low-carbon campuses. UNEP aims to encourage universities to contribute to the overall sustainability of the planet. According to the toolkit, the most practical objectives that HEIs can adopt as green technology are: a) minimizing waste generation, b) reducing energy and resource usage, and c) reducing carbon footprint.

Universities worldwide have initiated their greening campaign by implementing strategies and programs to improve their operations, policy reforms, development of green infrastructure designs, integration of green or environmentally sustainable technologies, and campus management approaches. Moreover, universities have embarked on research to assess students' knowledge, perception, attitude, and behavior on certain environmental issues (Radwan and Khalil 2021; Sousa et al. 2021; Starovoytova and Namango 2018; Dung et al. 2017; Zhang et al. 2017). Other research focused on assessing the impact of environmental education on students' knowledge, attitudes, and behavior on their lifestyle and overall environmental awareness (Al-Naqbi and Alshannag 2018; Surata 2018; Zsoka et al. 2013). The studies, however, focused mainly on students and did not adopt a holistic approach in their analyses. HEIs are composed of several stakeholders and are not limited only to students. Administrators, faculty, and staff also comprise a tertiary campus, and their knowledge, attitude, and practices should be incorporated into the analysis so that the approach is holistic and dynamic. The researchers mainly assessed the impact of environmental issues on the knowledge, attitude, and practice of a particular group but did not further extend their analysis to establish any correlation or interrelationship among knowledge, attitudes, and practices of the stakeholders that make up the tertiary campus (Tiong et al. 2021; Ifegbesan et al. 2017).

The word "green" was first associated with adopting sustainable alternatives in terms of activities, mitigating measures, and technologies during the United Nations (UN) Conference on Sustainable Development held in Rio de Janeiro, Brazil last 2012. The UN promoted the pursuit of a

"green economy" that results in "improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities"; therefore, an economy that is "low-carbon, resource-efficient, and socially inclusive" (Pisano et al. 2012, p. 20).

Green technology is any technology that contributes to environmental sustainability by minimizing wastes, efficiently using energy, minimizing the use of hazardous materials, developing eco-friendly products and renewable energy sources, and reducing resource consumption. It is geared toward reducing the carbon footprint, reducing energy and resource use, and minimizing waste generation to combat the ill effects of climate change. Examples of green technology are recycling and re-using solid wastes, installing rainwater collectors, installing solar panels and sky roofs, using public transport vehicles or carpooling, and turning off lights during lunch breaks.

The interaction between individuals' perception, their knowledge, attitude, and practice on waste issues has been the subject of several studies. Sarabillo (2005) conducted a study on the extent to which the greening program of a university is incorporated into its overall operations including general waste management. Waste management has indicators that promote minimization of waste and the study showed that students had a low overall perception of the general waste management of the school as compared to the moderate perception of the faculty, administrator, and staff. Bula (2011) studied the link between the nursing students' knowledge, awareness, and practices on solid waste management (SWM). The study showed that the students had very good knowledge of solid waste management in terms of waste segregation, recycling, reuse, and source reduction. The students were also fully aware of SWM and they often practiced it. Tangwanichagapong et al. (2017) and Shiva and Rachit (2017) discussed that different solid waste initiatives had positive effects on environmental attitudes and waste production consciousness in a highly educated community, which may be attributed to the culture and demographic background of the respondents.

The HEI in this study is a public institution with the respondents consisting of 37.6% male and 62.4% female in the age range of 18–61 years old. For the administrators, the age range is 35–61 years old, the faculty is 20–48 years old, the staff is 22–57 years old and students are 18–23 years old. An integrated approach should be undertaken as waste minimization is a key aspect of any SWM strategy and it has become an important aspect of green technology.

Dung et al. (2017) and Desa et al. (2011) assessed the students' knowledge and attitude toward solid waste management and their findings indicated that the students had low and moderate level of knowledge on SWM, respectively, and their attitudes toward it were positive and negative as well. The students' knowledge and attitudes toward SWM had a significant relationship so it was concluded that the students had positive attitudes toward SWM despite their low knowledge of it. The study showed that the respondents' behavior and practice in waste management were because they valued cleanliness and they wanted to mitigate the possible disease occurrences. This was also the finding of Ramos and Pecajas (2016) and Aguirre (2019) wherein the students showed positive attitudes toward SWM but their practices on it were moderate to low.

The study of Babaei et al. (2015) involved household knowledge, attitudes, and practices on solid waste (SW) reduction and other components of waste management. Results showed that a very positive attitude in taking part in SW source separation and recycling plans was exhibited by the community. However, the respondents showed low knowledge of different steps of SWM and were also weak in practicing them.

This study's respondents are mostly students as observed in other studies. Their knowledge, attitudes, perception, behavior, and practice on environmental issues are taken into account and the results are used to draw implications on the institutions that they represent. Some studies mentioned above considered not only students but the academic community as a whole to describe the environmental status of the institution. In either case, the respondents of the institutions become the means to improve the environmental performance of the institution by adopting strategies to improve their environmental sustainability programs and strategies.

Sarabillo (2005) discussed that students had a low perception with regards to reducing energy in terms of electricity, light, and water usage as compared to the moderate perception of the administrators, faculty, and staff. The staff exhibited a high extent of perception in terms of usage of office machines, equipment, and paper supplies while the administrators and faculty had moderate perception and the students had

a low perception. Sopha (2013) explored the behavioral factors that contribute to sustainable paper consumption and found out that the more a person was obliged to reduce paper consumption, the more it became a habit and people with similar behavior tend to associate with one another.

Wang et al. (2021) stated that the energy conservation behavior of students were affected by comfort preference and perceived self-efficacy while Du and Pan (2021) explained that students' energy saving intentions were positively related to their behaviors. Personal moral norms have the greatest impact on energy-saving intention, followed by perceived behavioral control and attitude. In a study conducted by Antunes et al. (2012) about energy use and behavior, a survey on environmental attitudes of respondents yielded a positive environmental attitude. Their attitudes toward the environment in general and energy were positive overall. Cotton et al. (2016) investigated the similarities and variations between students' energy-related attitudes and behaviors and their perceptions of their institution's energy-saving efforts. Variations existed between students' perceptions of their university's environmental practices. The responses indicated that students in the different institutional contexts had varying attitudes and perceptions of energy-saving behaviors and their energy usage.

Roberts and Bacon (1997) discussed that, generally, research indicated a positive relationship between environmental behavior and attitudes. This was supported by the finding of Laroche et al. (2001), which indicated that attitudes, instead of knowledge, were the most significant predictors of consumers' willingness to pay more for environmentally sound products. Ntona et al. (2015) described the notable positive attitudes of students on environmental concerns and energy use and savings. Most of the students demonstrated an intention to act on energy saving and general protection of the environment. Radwan and Khalil (2021) reported that although students had advanced knowledge of environmental sustainability, their behavior was contrary to it. In terms of sustainable consumption, Bhuwandeep (2021) showed a strong relationship between knowledge, attitude, and practice among students.

Polonsky et al. (2012) determined the relationships between carbon and environmental knowledge, attitude, and behavior of United States consumers. Results showed a positive relationship exists between attitude toward the environment and general and carbon-specific knowledge and behaviors. It concluded that general and carbon-specific environmental behaviors were related and may be driven by general attitudes and knowledge. In the Philippines, efforts are being made to reduce carbon transition by balancing energy security, equity, and sustainability as it is still dependent on non-renewable energy systems (La Viña et al. 2018). In the study of consumer attitudes toward domestic solar power systems, Faiers and Neame (2006) found that consumers exhibited a positive perception on the environmental characteristics of solar power.

Clabeaux et al. (2020) assessed the carbon footprint of a university campus by presenting greenhouse gas emission sources such as steam generation, refrigerants, electricity generation, electricity life cycle, and various forms of transportation and quantified the metric tons CO_2- equivalent through the life cycle assessment approach. Results showed that the largest sources of greenhouse gas emissions were electricity generation, automotive commuting, and steam generation. Electricity generation from coal was 29% of the electricity generation resource mix. The same approach was done by Liu et al. (2017) in assessing the ecological carbon footprint of the campus, which indicated the level of environmental sustainability of the institution. Li et al. (2015) assessed the carbon footprint of students in a university and these analyses could help identify student behavior changes that would be most effective in reducing aggregate carbon emissions. Komarek et al. (2013) analyzed the impact of alternative energy management plans on institutions' environmental actions by focusing on the interaction of external and internal influences. Some external influences included the institution's target on fuels, energy conservation efforts, and carbon emissions. The study revealed that the vast majority of students and employees supported decreasing the campus' carbon footprint. The constituents also believed that the university's green reputation resulted in a beneficial gain for them. As an example, the University of Glasgow (Young 2009) included targets to substantially reduce carbon dioxide emissions arising from university transport and travel activities in its carbon management program. Universities such as the Duke University (Duke Office of Sustainability 2020) adopted carbon offsetting initiatives by planting trees or initiating tree-planting activities among its constituents.

Zyadin et al. (2012) and Qu et al. (2011) described the level of awareness and attitudes

of students toward renewable energy and found a positive attitude toward adopting renewable energy sources, particularly solar energy. Ebuehi and Olusanya (2013) studied the knowledge, attitude, and practice toward climate change among the residents of a town in Nigeria. The residents had inadequate knowledge and practices toward climate change mitigation but their attitude was fairly positive as they were willing to reduce carbon emissions.

The objective of this study is to determine the knowledge, attitudes, and practices on green technologies among the administrators, faculty, staff, and students of a state-funded HEI in Southern Mindanao, Philippines. Specifically, this study aims to determine the level of knowledge, attitudes, and extent of practices of the administrators, faculty, staff, and students in terms of a) waste minimization, b) reduction of energy and resource use, and c) reduction of carbon footprints (reducing greenhouse gas emissions). It determines if there is a significant difference in the knowledge, attitudes, and practices of the respondents on green technology as well as whether there is a relationship between the respondents' level of knowledge and attitude and the extent of practices on green technology.

This study also describes the knowledge and attitudes of the higher education institution's respondents concerning green technologies and their translation into actual practices. The results may help improve the existing policies and guidelines currently disseminated by the university. It can help the administrators formulate new guidelines and policies to adopt green technologies; incorporate green technologies in planning; modify design of physical infrastructures such as new buildings, transport systems, and procurement systems; and manage the overall campus operations.

The green technologies that were included in the study were limited to those minimizing waste, reducing energy and resource use, and reducing carbon footprints. This study was limited to the willingness of the respondents to participate in the survey activity and to the number of respondents who participated in the research by submitting their survey questionnaires.

Figure 1 shows the conceptual framework of the study. The independent variables are the level of knowledge and the level of attitude of the constituents (administrators, faculty, staff, and students) toward green technology in terms of minimizing waste, reducing energy and resource use, and reducing carbon footprint. The dependent variable is the level of practice of green technology by the constituents. It is assumed that individuals perform a particular action related to a certain issue if they have the knowledge or information and if they have a positive attitude toward that issue. Each respondent's level of knowledge and attitude toward green technology influences their level of practice on green technology. The independent variables' level of knowledge and level of attitude is compared to see their influence on the level of practice of green technology.

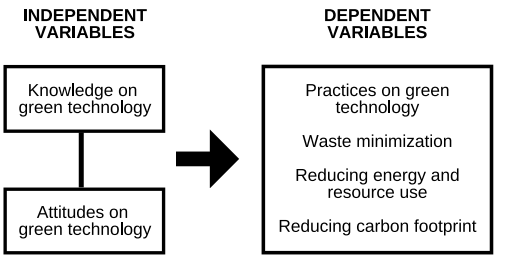

FIGURE 1 Conceptual framework of the study

The pursuit of a green and sustainable HEI will require a shift in the practices and activities of its constituents. Such changes will involve acquiring essential knowledge, thus, reshaping one's mind and redirecting personal views and attitudes. Through these changes, one will be able to consider and establish new practices toward a sustainable and green campus. Social psychology theorizes that people's attitudes stem from experiences and information that is provided (Lilienfield et al. 2009). Gaining information will affect our attitude toward things and other people. Attitude can predict behavior or practices, and in turn, the behavior will predict our attitudes.

The following are the study's null hypotheses:

Ho (1): There is no significant difference in the constituents' level of knowledge, attitude, and practice regarding green technology when grouped according to the sector (administrators, faculty, staff, and students).

Ho (2): There is no significant relationship between constituents' level of knowledge and extent of practice on green technology, and there is no significant relationship between constituents' level of attitude and extent of practice on green technology.

Materials and Methods

Qualitative and quantitative research methods were employed for this study, which enabled the researchers to gain insight into the motives, beliefs, behaviors, and attitudes of the population and investigate the level of relationships, activities, situations, and materials (Prado et al. 2011). Comparative and correlational analyses were also applied. The comparison was made to determine if there was a significant difference between values of variables among different groups.

A three-part survey questionnaire was developed to collect primary data and respondents were identified as administrators, faculty, staff, and students of a higher education institution (HEI) in the Southern Mindanao, Philippines. Stratified random sampling was employed to gather data since the respondents are classified into four groups. Each group was considered a stratum.

Part one was for the level of knowledge of the respondents on green technology, which consisted of 18 multiple choice and true or false questions to assess their actual knowledge and familiarity with facts on environment concepts. Part two was for the level of attitude to green technology, which also consisted of 18 questions using a five-point Likert scale as follows: strongly disagree (SD)=1, disagree (D)=2, neither agree nor disagree (NAD)=3, agree (A)=4 and strongly agree (SA)=5. Attitude referred to the evaluation of green technology issues with some degree of favor or disfavor. Part three was for the extent of the practice to green technology and consisted of 18 questions using a five-point Likert scale as follows: Always (A)=5, Usually (U)=4, Sometimes (S)=3, Rarely (R)=2, Never (N)=1.

Green technology has three aspects: waste minimization, energy, and resource use reduction, and carbon footprint reduction and were incorporated with the knowledge, attitude, and practices to evaluate in the survey. Reducing carbon footprint is explained in the questionnaire to reducing greenhouse gas emissions such as carbon dioxide and methane emitted into the atmosphere. The survey was a similar method employed by Babaei et al. (2015), Dung et. al. (2017), and Desa et al. (2011).

The study followed the methodology of Radwan and Khalil (2021), Sousa et al. (2021), Tiong et al. (2021) Starovoytova and Namango (2018), Dung et al. (2017), Ifegbesan et al. (2017), and Tangwanichagapong et al. (2017). Validity and reliability tests were made for the survey instrument. Its content was validated by tapping experts to give their technical opinion on the contents of the questionnaire: two from the academe, a private environmental practitioner, and another one from an environmental government institution. Pilot testing of the survey instrument was conducted to determine its degree of reliability. This was done by conducting a survey using the questionnaire in a different HEI. The obtained Cronbach's alpha reliability coefficient of the instrument was 0.8752.

The Likert scale was used to measure the level of knowledge, attitude, and practice on green technology of the respondents. The rating scale for knowledge and practice was adopted from Bula (2011) in the study on the level of knowledge and practice in solid waste management of students. The rating scale for attitude used was the same scale used by Dung et. al. (2017), Babaei et. al. (2015), and Antunes et. al. (2012) in their research on the level of attitude toward solid waste management energy-efficient behaviors.

There was a 75.4% turnout of respondents (141 out of 187 invited participants) for the survey. All the participants gave their prior informed consent for the conduct of the survey. They understood that participation was voluntary and that their responses were treated with utmost confidentiality and anonymity.

Means and variance were employed to determine the level of knowledge, attitude, and practices on green technology by the respondents. The correlation was done using Cronbach's alpha to estimate the reliability of the test questionnaires (Starovoytova and Namango 2018; Ifegbesan et al. 2017; Ntona et al. 2015; Babaei et al. 2015). Kruskal-Wallis Test and Mann-Whitney Test *post-hoc* analyses were conducted in testing the significant difference between the variables among the different groups using an alpha (α) value of 0.05 as the level of significance. Pearson-Product correlation coefficient (Pearson *r*) was also used to measure the relationships among the three variables (knowledge, attitude, and practice) for the respondents (Radwan and Khalil 2021; Ramos and Pecajas 2016; Bula 2011; Sarabillo 2005).

Results and Discussion

Knowledge of Respondents on Green Technology

The knowledge of the different respondents is presented in Table 1. All of the respondents gave an excellent rating on their level of knowledge on green technology. The faculty attained the highest value with a mean of 5.0 while the overall mean for the entire constituents was 4.84. This shows that all groups were knowledgeable about the different aspects of green technology. Desa et al. (2011) noted that a comparatively high number of students were knowledgeable in solid waste management (SWM).

TABLE 1 Knowledge of respondents on green technology

Respondents	Mean	Verbal description
Students	4.85	Excellent
Faculty	5.00	Excellent
Staff	4.67	Excellent
Administrators	4.85	Excellent
Weighted mean	4.84	Excellent

Table 2 reveals that there is a significant difference in the knowledge between the different respondents. Further statistical analysis using *post-hoc* analysis shows that the differences in means lie between the students versus staff and faculty versus staff. The knowledge of the students varied when compared to that of the staff.

Furthermore, the knowledge of the faculty differed from that of the staff. This is where the significant differences lie when the means for each group are compared with one another. This may mean that students and faculty may be more familiar with information on green technology than the staff. This implies that students and faculty may continuously get updated information about environmental concepts and issues that form part of their academic activities compared to the staff who are more involved in campus operations. Environmental concepts on green technology may form part of the classroom discussions by the faculty and students, which may increase their knowledge on the topic.

Attitude of Respondents on Green Technology

The attitude of the respondents is shown in Table 3. The respondents had a positive attitude toward green technology. This is a good indication that the constituents will be receptive to the practice of adopting environmental sustainability schemes of the university, which was evident in the findings of Ntona et al. (2015) wherein the respondents demonstrated an intention to act about the general protection of the environment. This may translate to a willingness to follow new policies and guidelines toward greening the university, which they may readily consider and comply with once implemented.

TABLE 3 Attitude of respondents on green technology

Respondents	Mean	Verbal description
Students	4.39	Positive attitude
Faculty	4.49	Positive attitude
Staff	4.40	Positive attitude
Administrators	4.45	Positive attitude
Weighted mean	4.42	Positive attitude

The students' positive attitude in relation to WM is similar to the results obtained by Tangwanichagapong et al. (2017) and Dung et al. (2017) but (Desa et al. 2011) reported that students may have negative attitudes toward SWM. The attitudes of the faculty, staff, and administrators on waste management are similar to the results obtained by Sarabillo (2005).

TABLE 2 Difference in the knowledge of the respondents on green technology

Respondents	N	Mean	P-value	Decision	Interpretation
Students	74	4.85	0.009541	Reject Ho	There is a significant difference in the means of respondents in terms of level of knowledge
Faculty	27	5.00			
Staff	27	4.67			
Administrators	13	4.72			

The students' positive attitude toward reducing energy and resources (RER) use was similar to the findings of Ntona et al. (2015) while the overall positive attitude of the faculty, staff, and administrators was similar to the results obtained by Antunes et al. (2012). Both WM and RER got a mean interpreted as the positive attitude of respondents while reducing the carbon footprint (RCF) indicates a mean interpreted as the highly positive attitude of respondents. Across all groups except for students, RCF obtained the highest mean among the three aspects of green technology concerning the level of attitude. The students' positive attitude toward RCF was similar to the results of Zyadin et al. (2012), Komarek et al. (2013), and Qu et al. (2011). The overall positive attitude of respondents was similar to the results of Polonsky et al. (2012), Faiers and Neame (2006), and Ebuehi and Olusanya (2013).

The statistical test shows, however, that there is no significant difference in the means among the three aspects of green technology in terms of the respondents' level of attitude, which means that the attitude of the constituents toward all the three aspects is similar. Overall, the attitude of the constituents may already lead to a positive outcome in pursuing greener goals for the university, which is consistent with the finding of Roberts and Bacon (1997) wherein it is indicated that a positive relationship exists between environmental attitudes and behavior.

The attitudes of the different respondent groups were also compared and analyzed (Table 4). Statistical analysis reveals that there is no significant difference in their means, which means that their attitude did not differ. This is similar to the findings of Radwan and Khalil (2021), Zhang et al. (2017), and Ramos and Pecajas (2016) wherein respondents had positive attitudes toward environmental sustainability and general WM.

Respondents' Extent of Practice of Green Technology

The results exhibit how the respondents practiced green technology in terms of waste minimization, reducing energy and resource use, and reducing carbon footprints (Table 5). Staff and administrators practiced green technology in the "usually" manner, which means about 75% of the time while the students and faculty practiced it "sometimes" or about 50% of the time. It is appropriate that the staff and administrators practice green technology more frequently since they spend the most time at the HEI. Most are required to be at the office from eight in the morning to five in the afternoon. Hence, they utilize more environmental resources. Pertinent memoranda on this matter are also regularly circulated in the HEI.

TABLE 5 Respondents' extent of practice of green technology

Respondents	Mean	Verbal description
Students	3.25	Sometimes
Faculty	3.15	Sometimes
Staff	3.63	Usually
Administrators	3.70	Usually
Weighted mean	3.35	Sometimes

Table 6 reveals that there is a significant difference in the means of the respondents' extent of practice of green technology. The students' extent of practice is significantly different from that of the staff and the administrators. The level of practice of the faculty is significantly different from that of the staff and administrators.

Staff and administrators frequently practiced green technology more and this made a difference to the relatively less frequent practices of the students and faculty. Students

TABLE 4 Test of difference in the attitude of the respondents on green technology

Respondents	N	Mean	P-value	Decision	Interpretation
Students	74	4.39	0.6864	Accept Ho	There is no significant difference in the means of respondents in terms of the level of attitude
Faculty	27	4.49			
Staff	27	4.50			
Administrators	13	4.45			
Total	141	4.44			

TABLE 6 Test of difference in the respondents' extent of practice of green technology

Respondents	N	Mean	P-value	Decision	Interpretation
Students	74	3.25			
Faculty	27	3.15			There is a significant difference in the means of respondents in terms of the extent of the practice
Staff	27	3.63	0.0002656	Reject Ho	
Administrators	13	3.70			
Total	141	3.35			

may have a higher mean compared to the faculty but further statistical analysis shows that they are statistically similar. They practice green technology at the same level most likely because of their close and frequent interaction.

The results may serve as a guide in formulating plans and guidelines on implementing a green university and take into account the study's findings in terms of the extent of the practice of each group. This result is similar to the findings of Sarabillo (2005) wherein responses of university constituents also differed in terms of various campus operations regarding greening the university.

Relationship Between the Respondents' Knowledge, Attitude, and Extent of Practice on Green Technology

By statistical correlation, this study shows that a linear relationship exists between the variables such as attitude versus practice, which is similar to the findings of Dung et al. (2017) and Aguirre (2019). Results further show that for the level of knowledge and extent of practice on green technology, a low correlation exists (r= 0.0194) (Table 7). Comparing the level of attitude and extent of practice on green technology, a low correlation exists between the two (r = 0.2142). This low correlation between the variables is similar to the results obtained by Radwan and Khalil (2021), Aguirre (2019), Ramos and Pecajas (2016), Babaei (2015), and Desa et al. (2011). This means that the respondents' attitudes and knowledge do not correlate to their practice of green technology. A respondent may have excellent knowledge of green technology but this will not necessarily translate to frequent practice. This explains that while faculty are knowledgeable in green technology, this does not mean that they practice it more often compared to others such as the staff and students.

There are studies, however, that indicated a significant relationship between knowledge, attitude, and practice. Bhuwandeep (2021) stated that building positive attitudes would result in positive practices. Dung et al. (2017) detailed that a significant relationship was found between students' knowledge and their attitudes toward SWM but concluded that although they had low knowledge of SWM, their attitudes toward it were positive. Pardo (2012) also stated that students had high environmental awareness and practice.

TABLE 7 Relationship between the respondents' knowledge, attitudes, and practices on green technology

Indicators	Correlation Coefficient (Pearson r-value)	Interpretation
Knowledge and practice	0.0194	Low relationship
Attitude and practice	0.2142	Low relationship

Conclusions and Recommendations

The respondents have excellent knowledge, a positive attitude, and practice of green technologies about 50% of the time. Their knowledge and practice differ significantly when compared with one another. Their attitude, however, does not differ significantly from one another. There is a low relationship between the respondents' knowledge and practice and also a low relationship between their attitude and practice. Being knowledgeable does not necessarily correspond to frequent practice on green technology. Likewise, having a

positive attitude does not necessarily correspond to the frequent practice of green technology.

Given the above findings and conclusions, there should be an improved information campaign within the campus to disseminate knowledge on green technology and environmental sustainability and to encourage the constituents to imbibe and develop strong convictions to practice green technology on campus. In addition, the institution should have a scheme of leading by example for its leaders to influence others to practice green technology more frequently. The HEI should also tap resource persons who can conduct lectures or talks on technological advances in green technology or share success stories of greening universities in other parts of the country or even from universities abroad. The lectures should not only emphasize imparting knowledge by acquiring new information but should also be geared toward inculcating a positive attitude in the university constituents, which will then encourage the frequent practice of green technology.

The campus currently has an energy-saving policy wherein offices are directed to shorten the operating hours of air conditioning units at the start and closing of office hours. This is a practical measure and the constituents have to practice this continuously to promote sustainable gain of energy conservation in the long run. Aside from this, the campus can also adopt turning off lights during lunch breaks as another means of reducing energy use. Moreover, the HEI can implement projects such as installing rainwater collectors to harness water use. Solar panels can also be installed in various locations as a means of promoting and utilizing renewable energy. Further solid waste reduction can be achieved by formulating policies that will require service providers such as, but not limited to, food caterers and vendors not to use disposable utensils and to provide reusable items and materials. Stakeholders should also be encouraged to bring their reusable utensils and containers, which will greatly reduce throw-away materials such as single-use plastics. Finally, the institution should embark on developing transformative strategies geared toward becoming a green university that embodies sustainable development goals and principles.

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