

The Influence of student understanding and concern for the environment on sustainable campus in the UI GreenMetric Ranking

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Abstract. Development that ignores the concept of sustainability can result in losses and negative impacts on environmental sustainability as well as acceleration of the phenomena of climate change and global warming. Therefore, it is important to minimize environmental damage by implementing the concept of sustainable development in various aspects to meet the needs of future generations. This research aims to provide information and determine the influence of students' understanding and concern for the environment in achieving a sustainable campus. The research method uses a correlational approach with a survey type via questionnaire. The data analysis technique uses regression testing with SPSS software version 26.00. The results of this research show that there is a significant positive influence if students' understanding and concern for the environment increases, this will have an impact on campus sustainability. The highest influence on a sustainable campus is environmental awareness, followed by students' understanding of the environment.

1 Introduction

The concept of sustainable development is a development concept that pays attention to the continued availability of natural resources and environmental sustainability for the current and future generations [1, 2]. Development that ignores the concept of sustainability has the potential to result in losses and negative impacts on environmental sustainability, such as various damages that occur due to meeting needs that are not environmentally friendly. Other damages include destruction of the availability of natural resources, decreased food and energy security, natural disasters, acceleration of the phenomena of climate change and global warming. Based on the damage that has occurred, the concept of sustainable development needs to be intensified in its application in various aspects of life so as not to threaten the availability of meeting the needs of future generations [3].

Sustainable campus development is a strategic step because the campus environment has a very large mass, so the frequency of use of clean water and energy in the campus environment is also large. Apart from that, waste and waste management that is not environmentally friendly will have an impact on environmental pollution. If these problems are ignored and not followed up, they will have a negative effect on environmental sustainability in and around campus. These bad effects give rise to

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discomfort such as increasing temperatures in the campus environment as a result of pollution resulting from the use of private vehicles, lack of sufficient clean water in the environment and outside the campus, and environmental pollution as a result of waste management that is not environmentally sound as a result of activities. activities on campus [4]. A sustainable campus is a concept that implements sustainable development in the aspect of campus environmental management. Sustainable campuses emerge from academics' awareness of the importance of campuses contributing to maintaining the integrity of the current environment for future generations, starting in the campus environment [5]. A sustainable campus is defined as a concept that prioritizes the practice of sustainable environmental protection, management and preservation efforts in educational institutions [6].

The criteria for creating a sustainable campus include the layout and condition of campus facilities and infrastructure, energy utilization and anticipation of global warming, integrated waste management, economical use of water, use and creation of environmentally friendly transportation facilities, and environmentally sound education. In Indonesia itself, this concept has begun to be widely implemented on various campuses [7, 5]. A sustainable campus is a concept of campus management that considers ecological sustainability consisting of material, air, water, land and energy components, by creating an environmentally sound lifestyle through developing knowledge, community, health and institutions for the communities that are part of it. from the campus environment [8, 9]. A sustainable campus (green campus) is closely related to a university's high commitment to creating environmentally friendly campus infrastructure. A sustainable campus (green campus) is an integration concept in research, education and community service in environmental management. Thus, the role of campuses in environmental conservation efforts is very substantial [10, 8, 7].

UI Green-Metric World University Ranking is a movement that contributes to the discourse of sustainable development for the field of education and campus greening, becomes a promotional tool initiated by the campus as an agent of change related to sustainable achievements, becomes a basic guideline regarding campus sustainability standards for educational institutions High levels throughout the world, and socialize to the general public about sustainable programs on campus [11, 12]. A sustainable campus based on the UI Green-metric has six assessment categories including: (1) setting and infrastructure, (2) energy and climate change, (3) waste, (4) water (water), (5) transportation, and (6) education and research (education and research)[13]. The assessment criteria in the UI Green Metric include six categories, namely regulation and infrastructure, energy and climate change, waste, water, transportation, and education and research [14, 10, 15].

This research aims to obtain information and determine the influence of students' environmental understanding and concern for sustainable campuses in the UI Green Metric ranking. Students' understanding and concern regarding sustainable campuses in higher education regarding the importance of environmental sustainability in the future has increased. One of the universities that has a vision to play an active role in sustainable development at the national and global level is Budi Luhur University, Jakarta [16]. Budi Luhur University Jakarta is one of the universities participating in the UI Green-Metric World University Ranking program [13]. It is hoped that the results of the research will

increase student understanding and concern, and the UI Green Metric at national and international levels at Budi Luhur University Jakarta will also increase. Therefore, it is very important that this research is carried out regarding students' environmental understanding and concern for sustainable campuses in the UI Green Metric ranking. Comprehension is a measure of a person's ability to be able to understand or understand the activities they are carrying out, so in learning, teachers must understand or comprehend what they are teaching to students [17, 18]. In understanding (comprehension) a person is asked to prove that he understands simple relationships between facts [19]. Apart from understanding that achieving a sustainable campus also requires caring for the environment. This is an expression when someone pays attention feels something that is happening and takes positive action regarding the incident. Concern does not always have to be directed at a person, but also towards all living creatures and the surrounding environment [20, 21]. Environmental concern is an attitude towards environmental consequences [22]. Environmental concern is an important attribute that can represent an individual's affection, likes and dislikes, and concern for the environment [23, 24].

2 Methods

Students' understanding and concern regarding sustainable campuses in higher education regarding the importance of environmental sustainability in the future has increased. One of the universities that has a vision to play an active role in sustainable development at the national and global level is Budi Luhur University, Jakarta. Budi Luhur University Jakarta is one of the universities participating in the UI Green-Metric World University Ranking program. This research is limited to: From the identification of the problems above, the researcher limits the research problem to: students' environmental understanding and concern for sustainable campuses in the UI Green Metric ranking. The research aims to obtain information and determine the influence of students' environmental understanding and concern for sustainable campuses in the UI Green Metric ranking. provide a contribution to the efforts made to increase students' understanding and awareness of sustainable campuses in the UI Green Metric ranking, so that it can be more applied in the campus environment. Apart from that, it can be used by campus policymakers in efforts to sustain the campus in the UI Green Metric ranking.

The focus of this research was carried out at Budi Luhur University with a sample of all students at Budi Luhur University Jakarta in 2022-2023. Implementation time is from May to July 2023. The sampling technique in this research uses simple random sampling. Simple random sampling is a sample taken from a population by not selecting individuals who are members of the sample based on certain reasons or subjective reasons. The number of samples taken was based on the formula proposed by Slovin, that is:

$$n = \frac{N}{N(d)^2 + 1} \quad (1)$$

Information :

n = Number of samples sought

$N = \text{Total population}$

$e = \text{error} (0.05)$

Known: Total population (N) = 75

$e (\text{error}) = 0.05$

Thus, the sample size can be calculated as follows:

$$\begin{aligned} n &= \frac{75}{75 (0.05)^2 + 1} \\ &= \frac{75}{1.2} \\ &= 62.5 \text{ (rounded 63)} \end{aligned}$$

The total sample was 63 students at Budi Luhur University.

After determining the sample size, the second stage is determining the research variables. Research variables are based on indicators of students' level of understanding and sense of concern for the environment to achieve a sustainable campus. The research variables are as follows: 1) Students' environmental understanding in this research is the students' ability to provide explanations or give more detailed descriptions of the environment through indicators of self-confidence, opportunities to communicate freely, and involve themselves actively and creatively; 2) Environmental concern in this research is the emotional involvement of students towards environmental protection through indicators of concern about the deteriorating quality of the environment, attention to the environment, emotional involvement in environmental protection issues, and playing an active role in improving the quality of the environment; 3) A sustainable campus in this research is students' awareness of the importance of the campus contributing to maintaining the integrity of the current environment for future generations, starting in the campus environment through indicators of the layout and condition of campus facilities and infrastructure, energy utilization and anticipation of global warming, , integrated waste management, economical use of water, use and creation of environmentally friendly transportation facilities, and environmentally sound education.

The third stage is to determine the data collection method based on the problems and objectives to be achieved in this research. So it was determined that the method used was a survey method to get an overview of students' level of understanding and concern for the environment using correlational techniques. This research method is concerned with determining whether or not there is a relationship between variables and how strong the relationship is (correlation coefficient). The relationship between research variables can be seen in Figure 1 below:

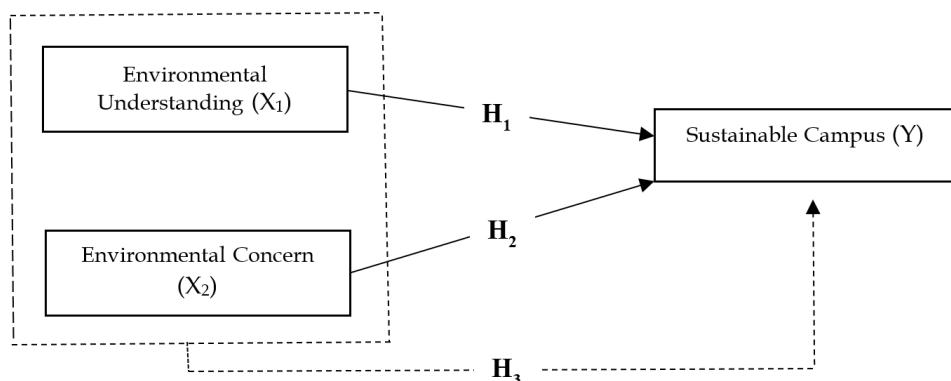


Fig. 1. Research Data Collection Methods

Information :

X₁ = Environmental Understanding

X₂ = Environmental Concern

Y = Sustainable Campus in the UI Green Metric Ranking

The fourth stage is to determine the validity and reliability values. Validity testing and reliability calculations were carried out on 30 students at Budi Luhur University, Jakarta. The results of testing the validity and calculating the reliability of the employee environmental knowledge variable instrument and the environmental understanding, environmental awareness and sustainable campus variable instruments in the UI Green Metric ranking are as follows:

1. Testing the validity and reliability of environmental understanding (X₁), the environmental understanding variable instrument (X₁) is composed of 15 items. The item validity testing technique is carried out by determining the correlation coefficient between the item score and the total score. This determination uses the product moment correlation formula. The validity test was carried out at $\alpha = 0.05$ and for r table with $n - 2 = 30 - 2 = 28$ was 0.361. If $r_{count} > r_{table}$, then the item is declared valid. Vice versa, if $r_{count} < r_{table}$ then the item is declared dropped. Of the 15 instrument items that were tested and declared valid, there were 14 items. Meanwhile, 1 item is invalid/dropped. The reliability coefficient for the environmental understanding variable instrument (X₁) is calculated using Cronbach's Alpha formula as follows: 1) The calculated reliability coefficient for 30 people and 15 items is 0.891. This means that the questionnaire given to respondents has a confidence level of $(0.891)^2 \times 100\% = 79.4\%$; 2) The results of calculating the reliability coefficient were 30 people and 14 valid items after removing 1 drop item, namely 0.898. This means that the questionnaire given to respondents has a confidence level of $(0.898)^2 \times 100\% = 80.6\%$.
2. Testing the validity and reliability of environmental concern (X₂), the environmental concern variable instrument (X₂) is composed of 16 items. The item validity testing technique is carried out by determining the correlation coefficient between the item

score and the total score. This determination uses the product moment correlation formula. The validity test was carried out at $\alpha = 0.05$ and for r table with $n - 2 = 30 - 2 = 28$ was 0.361. If $r_{\text{count}} > r_{\text{table}}$, then the item is declared valid. Vice versa, if $r_{\text{count}} < r_{\text{table}}$ then the item is declared dropped. Of the 16 instrument items that were tested and declared valid, there were 13 items. Meanwhile, 3 items are invalid/dropped. The reliability coefficient for the environmental concern variable instrument (X2) is calculated using the Cronbach's Alpha formula as follows: 1) The calculated reliability coefficient for 30 people and 16 items is 0.867. This means that the questionnaire given to respondents has a confidence level of $(0.867)^2 \times 100\% = 75.2\%$; 2) The results of calculating the reliability coefficient were 30 people and 13 valid items after removing 3 drop items, namely 0.883. This means that the questionnaire given to respondents has a confidence level of $(0.883)^2 \times 100\% = 78\%$.

3. Testing the validity and reliability of sustainable campus in the UI Green Metric (Y) ranking, the sustainable campus variable instrument in the UI Green Metric (Y) ranking is composed of 18 items. The item validity testing technique is carried out by determining the correlation coefficient between the item score and the total score. This determination uses the product moment correlation formula. The validity test was carried out at $\alpha = 0.05$ and for r table with $n - 2 = 30 - 2 = 28$ was 0.361. If $r_{\text{count}} > r_{\text{table}}$, then the item is declared valid. Vice versa, if $r_{\text{count}} < r_{\text{table}}$ then the item is declared dropped. Of the 18 instrument items that were tested and declared valid, there were 16 items. Meanwhile, 2 items are invalid/dropped. The reliability coefficient for the sustainable campus variable instrument in the UI Green Metric (Y) ranking is calculated using the Alpha Cronbach formula as follows: 1) The calculated reliability coefficient for 30 people and 18 items is 0.909. This means that the questionnaire given to respondents has a confidence level of $(0.909)^2 \times 100\% = 82.62\%$; 2) The results of calculating the reliability coefficient for 30 people and 16 valid items after removing 2 drop items, namely 0.919. This means that the questionnaire given to respondents has a confidence level of $(0.919)^2 \times 100\% = 84.46\%$.

The fifth stage is an analysis using data analysis techniques with classic assumption tests consisting of normality, linearity, heteroscedasticity and multicollinearity tests. Data analysis with descriptive statistics and inferential statistics. Hypothesis testing using t-test (partial) and F test / ANOVA (simultaneous). The analysis program for processing data in research used SPSS software version 26.00.

3 Result and discussion

3.1. Description of data and processing

Based on data obtained from the field, descriptive statistical data processing was then carried out, the results of this research are presented in Table 1 as follows:

Table 1. Statistical Description of Research Data

		Environmental Understanding	Environmental Concern	Sustainable Campus
N	Valid	63	63	63

	Environmental Understanding	Environmental Concern	Sustainable Campus
Missing	0	0	0
Mean	49.59	46.71	58.97
Median	50.00	48.00	62.00
Mode	50	52	65
Std. Deviation	8.368	7.821	10.565
Variance	70.020	61.175	111.612
Range	33	33	41
Minimum	31	26	37
Maximum	64	59	78
Sum	3124	2943	3715

The results of the validity testing of research variables are as follows:

1). Sustainable Campus in the UI Green Metric (Y) Ranking

From the data that has been collected regarding sustainable campuses in the UI Green Metric (Y) ranking, 16 valid items were obtained so that the value range is 16 – 80. Mean = 58.97; median = 62.00; mode = 65; standard deviation = 10.565; variance = 111.612; range = 41; minimum = 37; maximum = 78; sum = 3715.

2) Environmental Understanding (X1)

Based on the environmental understanding data (X1) collected, 14 valid items were obtained, so the value range was between 14 – 70. Mean = 49.59; median = 50.00; mode = 50; standard deviation = 8.368; variance = 70.020; range = 33; minimum = 31; maximum = 64; sum = 3124.

3). Environmental Concern (X2)

Based on the environmental awareness data (X2) collected, 13 valid items were obtained, so the value range was between 13 – 65. Mean = 46.71; median = 48.00; mode = 52; standard deviation = 7.821; variance = 61.175; range = 33; minimum = 26; maximum = 59; sum = 2943.

3.2. Classic assumption test results

3.2.1 Normality test

Normality testing uses the Kolmogorov-Smirnov test from two groups of data. The normality test results are presented in table 2 as follows:

Table 2. Data Normality Test Results

Group	N	α	Kolmogorov-Smirnov (Sig.)	Conclusion
Y atas X ₁	63	0,05	0,200	Normal
Y atas X ₂	63	0,05	0,200	Normal

Based on the table above, the Kolmogorov-Smirnov (Sig.) value of 0.200 is greater than $\alpha = 0.05$; then all variables indicate that the sample distribution follows a normal distribution. In conclusion, the distribution of sustainable campus scores in the UI Green

Metric ranking of environmental understanding and environmental awareness scores is normally distributed.

3.2.2 Linearity test

The results of the linearity test for the sustainable campus variable in the UI Green Metric ranking for scores on environmental understanding and environmental concern using the test of linearity. The linearity test results are presented in table 3 as follows:

Table 3. Test Linearity With A Test Of Linearity

Group	N	α	Test of linearity (Sig.)	Conclusion
Y atas X ₁	63	0,05	0,000	Linear
Y atas X ₂	63	0,05	0,000	Linear

Based on the table above, the test of linearity (Sig.) value of 0.000 is smaller than $\alpha = 0.05$; then all variables indicate that the sample distribution is linear. In conclusion, the distribution of sustainable campus scores in the UI Green Metric ranking on environmental understanding and environmental awareness scores is linear.

3.2.3 Heteroscedasticity test

The results of the heteroscedasticity test for the sustainable campus variable in the UI Green Metric ranking for scores on environmental understanding and environmental concern using a scatterplot of the heteroscedasticity test. The linearity test results are presented in figure 2 as follows:

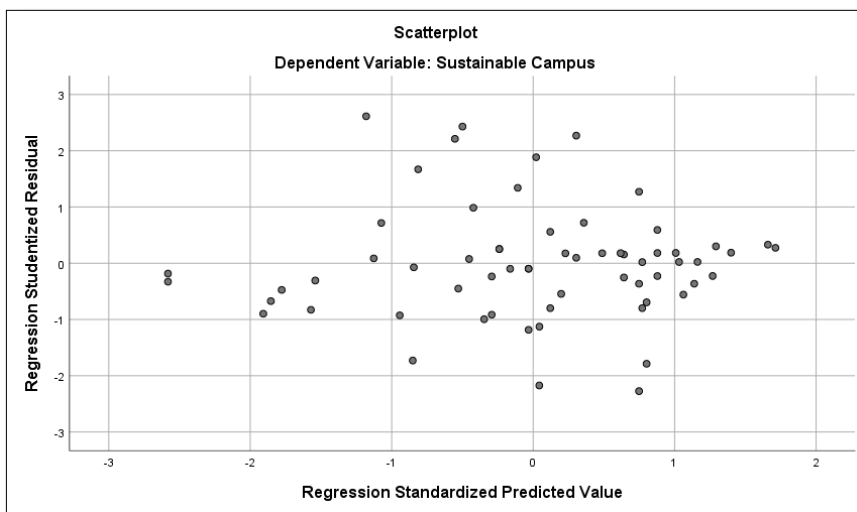


Fig. 2. Scatterplot of heteroscedasticity test

Based on the picture above, there is no particular pattern because the points are spread irregularly above and below the 0 axis on the Y axis. So it can be concluded that there are no symptoms of heteroscedasticity.

3.2.4 Multicollinearity test

Multicollinearity test results for the sustainable campus variable in the UI Green Metric ranking on environmental understanding and environmental awareness scores using tolerance and VIF. The results of the multicollinearity test are presented in Table 4 as follows:

Table 4. Multicollinearity Test Results

Group	N	Tolerance	VIF	Conclusion
Y atas X ₁	63	0,326	3,064	Multicollinearity does not occur
Y atas X ₂	63	0,326	3,064	Multicollinearity does not occur

From the table above, it can be seen that the Tolerance value is close to one for all variables and the VIF value is around one, thus the sustainable campus variable in the UI Green Metric ranking for environmental understanding and environmental concern scores shows that there are no cases of multicollinearity in the model.

3.3 Hypothesis testing and discussion of research results

Hypothesis testing in this research was carried out to draw conclusions that were supported by empirical data. This hypothesis testing was carried out using correlation and multiple or simultaneous regression analysis. The influence of environmental understanding and environmental concern together on sustainable campuses in the UI Green Metric ranking was analyzed using multiple or simultaneous regression. The summary of the results of multiple or simultaneous regression analysis is as follows.

Table 5. Joint Environmental Understanding and Environmental Concern Test Results for Sustainable Campuses in the UI GreenMetric Ranking

Sample (n)	Constant (B)	Environmental understanding (X ₁)	Environmental awareness (X ₂)	Correlation coefficient (R)	R square	F _{Count}	F _{table} (0,05)
63	11,420	2,070	2,767	0,722	0,521	32,695	3,15

The results of multiple or simultaneous regression analysis show the equation $\hat{Y} = 11.420 + 2.070X_1 + 2.767X_2$. In the regression equation $\hat{Y} = 11.420 + 2.070$ 11.420. The correlation coefficient for environmental understanding and environmental concern together with a sustainable campus in the UI Green Metric ranking is 0.722.

The F test results for F_{count} are greater than F_{table}, namely 32.695 > 3.15 at $\alpha = 0.05$. This means that the correlation coefficient between environmental understanding and environmental concern together with a sustainable campus in the UI Green Metric ranking is significant. The conclusion is that there is a significant positive influence between environmental understanding and environmental concern together with a

sustainable campus in the UI Green Metric ranking. This means, that the more environmental understanding and concern students increase, the more sustainable campuses will increase in the UI Green Metric ranking. The calculation of multiple or simultaneous regression test results can be summarized in Table 6 as follows:

Table 6. Multiple or Simultaneous Linear Regression Test Results

Variable	Beta (β)	T _{count}	Significance (Sig.)
X ₁ to Y	0,324	2,070	0,043
X ₂ to Y	0,433	2,767	0,008

Based on table 6 above, the results of multiple or simultaneous regression tests show that the highest influence on sustainable campuses in the UI Green Metric ranking, the first rank is an environmental concern with a beta value (β) = 0.433; tcount = 2.767; and sig. = 0.008. The second rank is environmental understanding with a beta value (β) = 0.324; tcount = 2.070; and sig. = 0.043. The coefficient of determination of the influence of environmental understanding and environmental concern together with a sustainable campus in the UI Green Metric ranking is obtained from the R square value of 0.521. So 52.1% of the variance in students' environmental understanding and concern can be explained by the sustainable campus variable in the UI Green Metric ranking.

The results of testing the three hypotheses proposed in this research concluded that all research hypotheses proposed in chapter II were accepted. This means that a sustainable campus in the UI Green Metric ranking of 52.1% can be clarified by students' environmental understanding and concern. Based on the description above, the independent variable that has the strongest influence and the greatest contribution to the dependent variable is students' environmental awareness. The research results obtained from testing the first, second and third statistical hypotheses do not contradict this research hypothesis. By testing each of the research hypotheses, the theoretical framework developed based on the theoretical description as outlined in Chapter II can be supported by empirical evidence through this research data. The conclusions that can be drawn from each hypothesis test are in accordance with the concepts used to explain the influence of the independent variable on the dependent variable. The conclusions drawn in this research mean that it can become a treasure that enriches scientific knowledge, especially about sustainable campuses in the UI Green Metric ranking. This is in accordance with the results of research conducted by Dewi, Kusumoarto, & Rejoni [5] said that a sustainable campus emerged from academics' concern and awareness of the importance of campuses contributing to maintaining the integrity of the current environment for future generations, starting in the campus environment. Marsudi et al. [24] said that UI Green Metric is one of the indicators used by universities in Indonesia and internationally as part of a strategy to increase sustainability.

Research by Muslih, Priyanto, & Muslim [11] shows that a sustainable campus is closely related to a university's high commitment to creating environmentally friendly campus infrastructure. Apart from that, the concept of integration in research, education and community service in environmental management. Thus, the role of campuses in environmental conservation efforts is very substantial. Research by Atici et al. [6] states that a sustainable campus is defined as a concept that prioritizes the practice of sustainable environmental protection, management and preservation efforts in educational institutions. Gunawan, Prayogo, & Mardiono [4] stated that sustainable campus development is a strategic step because the campus environment has a very large mass, so the frequency of use of clean water and energy in the campus environment is also large. Apart from that, waste and waste management that is not environmentally friendly will have an impact on environmental pollution. Pelcher et al., [7] said that the criteria for creating a sustainable campus include the layout and condition of campus facilities and infrastructure, energy utilization and anticipation of global warming, integrated waste management, economical use of water, use and creation of environmentally friendly transportation facilities, and environmentally friendly education. In Indonesia itself, this concept has begun to be widely implemented on various campuses. Phramesti and Yuliasuti [8] stated that a sustainable campus is a concept of campus management that considers ecological sustainability consisting of material, air, water, land and energy components, by creating an environmentally sound lifestyle through developing knowledge, community, health and institutions for society. which is part of the campus environment.

4. Conclusion

The findings show that there are partial and simultaneous influences on campus sustainability. A sustainable campus in the UI Green Metric ranking can be improved by paying attention to factors that can support environmental sustainability, namely by increasing environmental understanding and awareness in the academic community. There are several efforts to improve these factors as stated in the Implications as follows: 1) Policy implications; through efforts to increase students' environmental understanding and awareness in creating curiosity, activity, creativity, and ability to change attitudes, intentions and behavior related to sustainable campus efforts in the UI Green Metric ranking to become a campus policy; 2) Theoretical implications; can be done with or through anything that is lacking or not yet included in sustainable campus measurements in the UI Green Metric ranking or elements such as considerations for increasing students' environmental understanding and concern; and 3) Research implications; can be done by involving more variables using more complex methods and analysis such as experiments, ex post facto, path analysis, factor analysis and SEM (Structural Equation Modeling).

Based on the findings, conclusions and implications, the suggestions in this research are as follows: 1) For the Budi Luhur University campus, it is necessary to consider increasing students' environmental understanding and awareness as factors that influence a sustainable campus in the UI Green Metric ranking in every decision and planning campus activities; 2) For students in an effort to improve the sustainability of the campus

in the UI Green Metric ranking, environmental action and training activities are needed that can increase knowledge, understanding and concern about the environment in everyday life; 3) For companies and private parties, it is hoped that there will be cooperation between companies and universities in which there are many experts and students so that they can bridge the relationship between lecturers and students and companies to carry out research, including in matters of funding and research permits for companies; and 4) For further research, you can examine sustainable campuses in the UI Green Metric ranking which is not only connected to students' environmental understanding and concern but there are many other variables that influence it, such as environmental action, ability, trust, justice and ethics.

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