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Abstract

Education for environmental sustainability nowadays is part of the education curricula. The importance of educating the young generation to be more sensitive and preserve the natural environment is critical to ensure environment sustainability. Therefore, the purpose of this study is to determine the relationship between the independent variables (knowledge, skill, crop management, motivation on environmental sustainability) and dependent variable (attitude on environmental sustainability) and to identify the significant factors (knowledge, skill, crop management, and motivation on environmental sustainability) effecting attitude on environmental sustainability. This study applied a cross sectional study on 29 students in one public university in Kelantan and the data was gathered by using self-administered questionnaire. The statistical analysis that have been applied were Pearson Correlation and Multiple Linear Regression and were analyzed by using Statistical Package for Social Science (SPSS) version 21. In conclusion, only one factor which is knowledge has a significant effect on attitude toward environmental sustainability. This study suggested that conducting the study on large population and include new variables that may have effect the attitude toward environmental sustainability. Environmental sustainability is very important in the future. Therefore, the younger generation needs to be educated to love the environment and have the right attitude towards the environment.

Keywords: Attitude, Environmental Sustainability, Crop Management, Knowledge, Skill

Introduction

Sustainability has attracted increasing attention in higher education over the past two decades. Figueiro and Raufflet (2015) stated the sustainability education rooted from criticism on how sustainability issues were taught in existing educational systems made in the Brundtland report (1987) and the presentations of the Rio-1992 Conference. Since then, the terms “education for sustainability” and “education for sustainable development” have gained international usage (Shrivastava, 2010). Universities are considered as central for disseminating sustainable development principles and increased attention was dedicated to Education for Sustainable Development (ESD). ESD refers to educational programs and experiences that are designed to allow people to acquire the knowledge, skills and values that are necessary to shape a sustainable future (Biasutti and Frate, 2017).

Agrobusiness unit in Universiti Teknologi MARA Kelantan branch joins the bandwagon in instilling environmental education. Cinta Alam was a campaign conducted by the unit to promote positive attitudes towards environmental sustainability. Students were exposed to the university farm and involved in the planting process. They were being taught to understand the challenges in food production including climate change, scarcity of resources such as money, human resources especially the youth in agriculture, importance to sustain natural environment and also the crop management. The objective was to scaffold the students with the concept of being more sensitive to the need of preserving our nature in the means of generating income.

Literature Review

Environmental attitude or awareness refers to an individual's belief, perception and behavior towards the environment (Callicot, 2000). Responsible behavior towards the environment among students is still insufficient even though students have a high attitude and desire to take care of the environment (Norshariani, 2009). Study conducted by Tan Pei San and Norzaini (2011) investigated the relationship between commitment towards environment and environment attitude among final year students in Universiti Kebangsaan Malaysia. The findings revealed that attitude on environmental sustainability among university students is moderate. The best step to overcome environmental problems is to change the attitude of society from focusing on self-interest to focusing on the environment (Knapp, 1999).

Environmental knowledge is considered as awareness, comprehension, and consciousness about the biophysical environment and its challenges, including human interactions and impacts. Cheng and Wu (2014) in the study focused on tourism and claimed that stated that tourists' environmental knowledge can contribute to environmental care and respect in a destination where they belong to. Furthermore, they also proofed that environmental knowledge is an important core characteristic that encourages tourists to engage in adherence to the rule and decrease their negative environmental impacts. Those with a higher level of environmental education are more likely to show care, empathy, and respect for nature at the specific location (Liu & Lin, 2015). Other than that, based on the study conducted by Indriani et al (2019), determined that environmental knowledge was unable to exert a positive influence on Green Purchase Decision, in which can be seen by the case of The Body Shop. The marketing from this brand is still missing in explaining in more depth its attempts to address environmental concern that happened. This happened due to lack of campaign related to environmental knowledge towards the customers because it more focused on expression pro-environmental campaigned. The Earth's resources are limited, and we must respect sustainable environmental development while avoiding excessive development and use that deteriorates our living environment. The most important and natural approach to change is to increase our knowledge through education and modify each individual's attitude and behaviors. This enables everyone to have a wealth of environmental knowledge, a positive environmental attitude, and appropriate environmental practices (Zheng et al., 2018).

Skill related with environment is the ability of an individual to take environmental action. Thus, human is required to have the environmental skill so that environment is continuously sustain in all aspect. Nowadays, employers begin to look for workers with green skills, which are critical for fostering sustainable development in the social, economic, and environmental

spheres (Sern et al., 2018). Kumari et al (2020) emphasized woman towards environment sustainability and determine that women may have played an important role in the process of sustainable development, but women were not given the opportunity to participate actively in this process in different cultures. This led them to not necessarily able to required new skills on how to sustain the environment. Their primary responsibilities are to perform home tasks such as caring for youngsters and elderly members. However, women's domestic obligations foster a good attitude and potential skills for sustaining sustainable growth through the preservation of natural resources. Most individuals are familiar with generic skills, technical skills, and employability skills, but they are unfamiliar with sustainable development and environmental skills (Zolkifli et al., 2016) which should be given more attention in order to keep environment sustain in every area.

During the growing season, accurate crop phenology information is required for crop growth management and yield estimation (Baker, 2019). Climate and agronomic management measures such as sowing date and cultivar characteristics influence crop phenology. Exploring the interaction impacts of climate change and crop management methods on crop phenology can be utilized to develop climate change adaptation strategies (Walthall et al., 2013).

Crop management system are highly related with the application of Internet of Things IOT in which Sahaa et al (2021) emphasized these two variables in their research. In traditional methods, farmer normally come back and forth to test the condition of the crops, however the application of IoT help farmers to manage the crop by reducing the water wastage and also raising crop productivity with minimum obstacles. Smart crop management also applied drones attached with the camera and sensors which able to record and snap everything in one image.

Motivation is mostly been explained by Maslow's hierarchy of needs theory which is frequently depicted as a pyramid, with the most basic requirements at the bottom and the need for self-actualization and transcendence at the top. In other words, the theory holds that people must first meet their most fundamental wants before they may be driven to meet higher level requirements (Trivedi & Mehta, 2019). The impact of sustainable development efforts is heavily influenced by consumer motivations and attitudes toward the environment (Fraj and Martinez, 2007). Consumers are motivated to adopt sustainable practices for a broad range of reasons, some of which environmental organizations do not always consider (Jaca et al., 2018). Human activity is widely acknowledged as one of the key contributors to climate change. Political concern and readiness to adjust human actions to combat climate change are growing substantially. Hungerford and Volk (2021) evaluated studies on the influences on environmental behaviors. They found no evidence to support the premise that additional knowledge will affect attitudes or raise awareness of environmental issues, motivating people to change their behaviour. According to Chawla (1999), from junior high to university, education becomes a significant source of motivation towards environmental commitment. She also discovered that the influence of family and exposure to natural regions is more closely related to childhood (i.e., up to 18 years of age). Friends become more essential sources during the university years. As a result, research into environmental motivation is needed, especially in adolescents, who will grow up to be the citizens and decision-makers of the future. Because these individuals' motivations will affect their behaviors and environmental decisions, the focus of attention is drawn both to a personal and a communal level.

Relationship between Knowledge and Attitude toward Environmental Sustainability

According to English Oxford Dictionaries, knowledge can be defined as certainties, data and abilities procured through involvement or instruction where the hypothetical or viable comprehension of a subject. The definition of knowledge is the fact or condition of understanding things that are familiar and are acquired via experience or association (Shannon, 2013). It can also mean consciousness that is acquired by direct experience of a reality or condition. Knowledge is believed to be tied to human beings' ability for acknowledgment and to the complex cognitive processes of perception, communication, and reasoning.

A study conducted by Alisa et al (2019) among secondary students proved that there exist significant correlation between knowledge and attitude ($r= 0.174$, $p\text{-value} = 0.000$). Knowledge will positively change the students' attitude towards natural sustainability. However, this variable indicate a weak correlation.

Chiang's study (1981) also stated the impact of field study activities in shaping knowledge and attitudes towards the environment among university students found that field studies successfully provide opportunities for university students. However, a study by Lieflander and Bogner (2018) showed different results. They have studied the relationship between habitual attitudes towards the environment and environmental knowledge among schoolchildren in Germany. Their study shows that there is no correlation between knowledge of the environment and attitudes of caring for the environment among students.

Therefore the hypothesis is :

H₁ : There is a relationship between knowledge and attitude on environmental sustainability.

Relationship Between Skill And Attitude Toward Environmental Sustainability

The capacity to complete a task with predetermined results, usually within a defined timeframe, is referred to as a skill. Skills regularly divided into skills in general and specialized areas. In order to quantify how much skill is being exposed and used, there are frequently specific environmental goals and conditions that must be present (Ryu, 2017). For skilled workers, coordinating processes and continual training are necessary (Simpson, 1972). According to Cummings and Teng (2003), skills are knowledge, attitudes, or behaviors that define exceptional performance in a professional setting. The knowledge and attitude that greatly influence a certain type of work are closely tied to the talents. It can be used as a benchmark for success that can be raised through training and development.

Sheilyza and Zulkifli (2019) carried out a cross sectional to examine the influence of knowledge, attitude and skill good agriculture practices in Sabah and Sarawak. The findings suggested that skill and attitude shows negative relationship ($r = -0.359$, $p\text{-value}<0.01$). The same result goes to knowledge and attitude that indicate negative relationship $r = -0.382$, $p\text{-value}<0.01$).

Therefore the hypothesis is

H₁ : There is a relationship between skill and attitude on environmental sustainability.

Relationship Between Crop Management and Attitude toward Environmental Sustainability

A study by Abdul Rahman (2017) states that when a person has high knowledge, high skills, high motivation and high crop management, it will also affect the good attitude towards the environment.

Therefore the hypothesis is

H₁ : There is a relationship between crop management and attitude on environmental sustainability.

Relationship Between Motivation And Attitude Toward Environmental Sustainability

Motivation is one of crucial factor in fostering creativity and productivity inside a company (Bloisi et al., 2003). Zarrintaj et al (2013) has conducted a study that involved secondary school students in Malaysia. Findings revealed that there was strong correlation between motivation and attitude toward environment ($p = 0.000$, $r = 0.990$). This value indicate that there is a positive correlation between motivation and attitude. In addition, Zarrintaj et al (2013) also concluded that high awareness and knowledge in addition to positive habits towards the environment are influenced by family background, the role of teachers, the media, student reading materials and the school curriculum. The study above also suggests that environmental education should be made a subject in the school syllabus. Moreover, study by Hafizah et al. (2003) revealed that relationship exist between motivation and attitude on sustainability. Research was conducted on first year student of Universiti Putra Malaysia. However, there is a weak relationship ($r = 0.241$, $p < 0.05$) between motivation and attitude on environmental sustainability.

This is also like a study conducted by Azman Ismail and Nur Inani Ibrahim (2010) which stated that skills and motivations influence one's attitude in determining the effectiveness of a program or matter done.

Therefore the hypothesis is

H₁ : There is a relationship between motivation and attitude on environmental sustainability.

Methodology

The reference population of this study were students that joined Agrobusiness Unit in one public university in Kelantan. Sample size is obtained by using Raosoft Software. With 5% margin of error, 95% of confident level and 50% for response distribution, the appropriate sample size are 29. Out of 31 population, 29 sample are selected are random by applying simple random sampling. The measuring instrument is questionnaire that consist of 3 parts; Part A covered demographic profiles of respondents including faculty, gender and CGPA. Part B, C, D, E and F measured knowledge, skill, crop management, motivation and attitude on environmental sustainability. Each part consist of 5 questions and it is measured by using 9 point Likert scale from 1 (strongly disagree) to 9 (strongly agree). The primary data were gathered by distributing online questionnaire to the selected respondents. For data analysis, descriptive statistics, Pearson Correlation and the multiple linear regression was applied by using Statistical Package for Social Science (SPSS) version 21. The theoretical framework for this study as shown in figure 1.

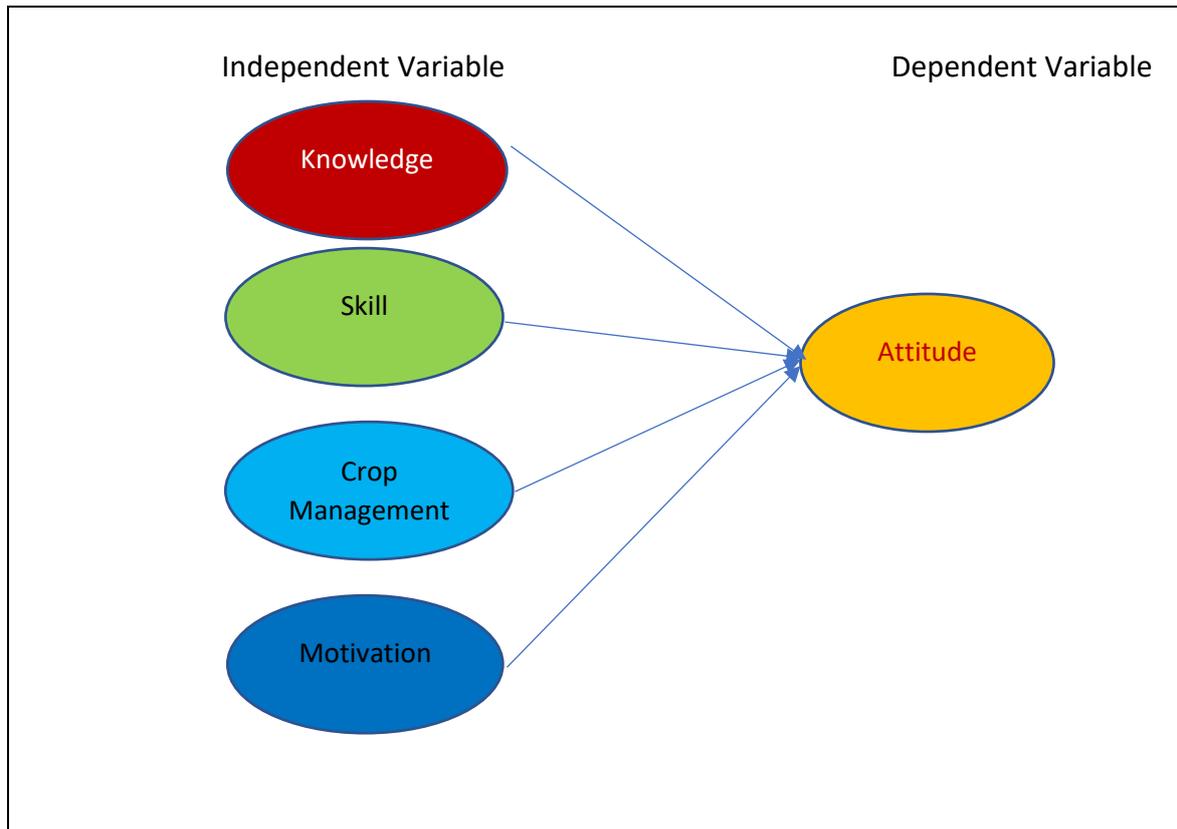


Figure 1. Theoretical Framework

Result and Findings

Reliability analysis was measuring test or the consistency of a research study. The minimum alpha value that acceptable was between 0.7 and 0.8. Based on Table 1, the range of the Cronbach alpha are from 0.948 and 0.964. The values of Cronbach alpha for all variables are greater than 0.7 which is acceptable since the cut off value for Cronbach alpha is 0.7 (Nunnally & Bernstein, 1978). It proved that the internal consistency for all variables were good. Therefore, all items within each variables can be used in real study.

Table 1

Reliability analysis for pilot study

Variables	Cronbach alpha
Attitude	0.962
Knowledge	0.949
Skill	0.964
Crop management	0.948
Motivation	0.957

Descriptive Statistics

A total of 29 questionnaires was collected using Google Form. Firstly, descriptive is applied to have better understanding about the profiles of the respondents. These demographic profiles include faculty, gender and Cumulative Grade Point Average (CGPA). Table 2 describe the demographic profiles of respondents. Based on gender, majority are female (83.3%) while remaining 16.7% are male. Besides that, the highest percentage of respondents come from Faculty of Business (41.7%) follow by Faculty of Accountancy (20.8%). Next, according to

CGPA, half of the respondents (50%) get CGPA 3.00-3.49. The lowest percentage presented by CGPA less than 2.00 and between 2-2.99.

Table 2

Demographic profiles of respondents.

Demographic profiles	Category	Frequency	Percentage (%)
Gender	Male	4	16.7
	Female	20	83.3
Faculty	FPP	10	41.7
	FSSR	1	4.2
	FSPPP	2	8.3
	FP	5	20.8
	FSKM	3	12.5
	FPM	3	12.5
CGPA	<2.00	1	4.2
	2.00-2.99	1	4.2
	3.00-3.49	12	50
	3.50-4.00	10	41.7

Pearson correlation analysis was employed to examine the relationship between the independent variables (knowledge, skill, crop management and motivation on environmental sustainability) and dependent variable (environmental sustainability). Based on table 3, the Pearson correlation for knowledge (0.881), skill (0.819), crop management (0.831) and motivation (0.731) are greater than significance value (0.05). This indicate that these variables have positive strong relationship with students' attitude on environmental sustainability. Among four variables, knowledge recorded the highest relationship with attitude on environmental sustainability.

Table 3

Pearson Correlation

		Knowledge	Skill	Crop management	Motivation
Attitude on environmental sustainability	Pearson Correlation	0.881	0.819	0.831	0.731
	p-value	0.000	0.000	0.000	0.000

Multiple Linear Regression

Multiple linear regression is a regression model to present the relationship between two are more independent variables and dependent variable. For this study, the independent variables involve is students' attitude on environmental sustainability while independent variables covered knowledge, skill, crop management and motivation toward environmental sustainability. The significant factors affecting environmental sustainability also can be determined.

Assumption of Multiple Linear Regression

The first assumption of model adequacy checking in multiple linear regression is residual must be independent. Figure 2 shown that the points are randomly scatter and no pattern exist. Therefore, the independent assumption of error term was satisfied.

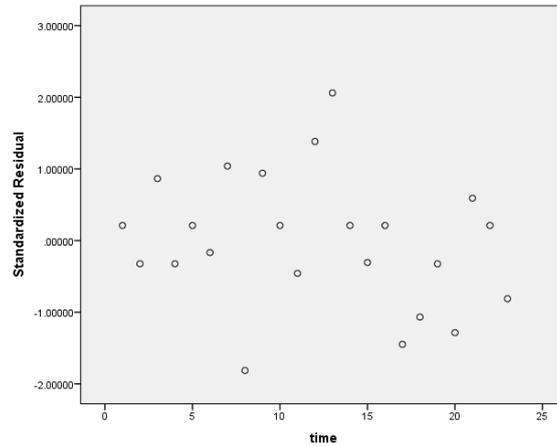


Figure 2. Scatter plot of Independence of Error Term

Figure 3 shows the scatter plot of residual versus predicted value. From the plot, it can be seen that all points are scattered and there is no pattern. Therefore, it can be conclude that the error term have constant variance. Thus, the assumptions of homoscedasticity was satisfied.

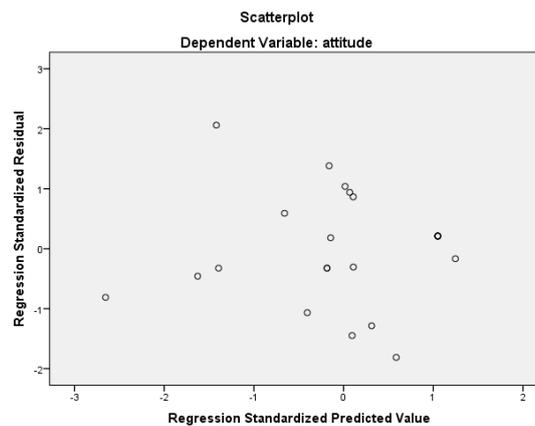


Figure 3. Scatter plot of residual versus predicted value

Apart from that, normality of error should be assessed. Referring Figure 4, the error is normally distributed since the histogram have no skewness.

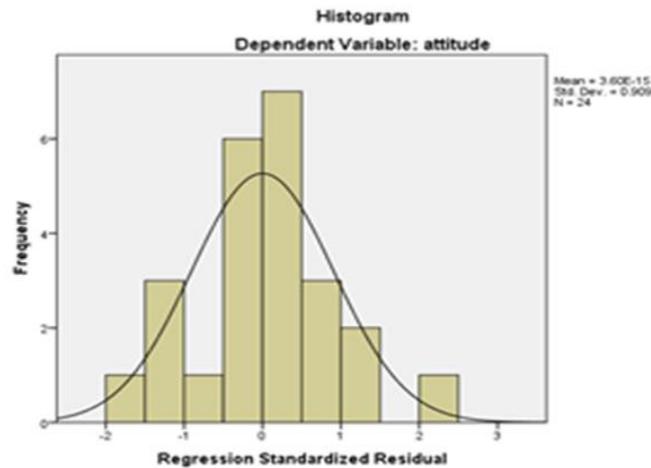


Figure 4. Histogram of normality of error

Another assumption should be fulfilled is no multicollinearity. Multicollinearity means two or more explanatory variables in a multiple linear regression are highly related. It can be determined by referring the Variance Inflation Factor (VIF) and Tolerance (TOL). Table 3 shows the value of Tolerance and VIF for independent variables. The Tolerance values are 0.579, 0.354, 0.831 and 0.304 while the VIF values are 1.726, 2.824, 4.246 and 3.291. Since the Tolerance value are greater than 0.1 and the VIF values are lower than 10 for all variables, multicollinearity does not exist. Therefore, the assumptions of multicollinearity was satisfied.

Table 4
Collinearity Statistics

Variables	Tolerance	VIF
Knowledge	0.579	1.726
Skill	0.354	2.824
Crop Management	0.831	4.246
Motivation	0.304	3.291

All assumptions have been fulfilled. Therefore, multiple linear regression is used to determine the significant factors (knowledge, skill, crop management and motivation) towards attitude on environmental sustainability. Based on table 5, the p-value is 0.000 which is less than significance value (0.05). Therefore, the model is significant. It means that at least one of the independent variables is significant. This indicate that at least one of the variables used was significantly affecting students’ attitude on environmental sustainability.

Table 5
Test of model significant

Model	F	p-value
Regression	21.642	0.000

The t-statistics were used with p-value to check the significance of the independent variables. Based on Table 6, only knowledge is significant factor since the p-value (0.041) is less than significance value (0.05). Therefore, among 4 independent variables, only knowledge effecting students’ attitude toward agriculture. Variables that are not significant are skill (p-value= 0.918), crop management (p-value = 0.104) and motivation (p-value=0.294).

Table 6

Significance of Independent variables

Model	B-coefficient	t	p-value
Constant	1.578	1.971	0.063
Knowledge	0.488	2.193	0.041
Skill	0.022	0.104	0.918
Crop management	0.662	1.709	0.104
Motivation	-0.355	-1.080	0.294

Hence the equation of Multiple Linear Regression for predicting attitude on environmental sustainability was stated as Equation 1.

$$\hat{Y} = 1.578 + 0.488 x_1 + 0.022 x_2 + 0.662 x_3 - 0.355 x_4$$

Where

x_1 = knowledge

x_2 = skill

x_3 = crop management

x_4 = motivation

Based on Equation x, for every one unit increase on mean knowledge, the mean of attitude on environmental sustainability increase by 0.488 units.

Next, R Squared was used to assess the goodness of fit for the regression model. Based on table 7, the value of R-squared is 0.781. It means that 78.1% of total in attitude on environmental sustainability is explained by the total variation in knowledge, skill, crop management and motivation on environmental sustainability while another remaining 21.9% is explained by another variable.

Table 7

Coefficient of Determination

R	R-Squared
0.819	0.781

The summary of the result for multiple linear regression as shown in Table 8.

Table 8

Summary of hypothesis and findings

Hypothesis	Findings
H_1 : There is a relationship between knowledge and attitude on natural sustainability.	Supported
H_1 : There is a relationship between skill and attitude on natural sustainability.	Not supported
H_1 : There is a relationship between crop management and attitude on natural sustainability.	Not supported
H_1 : There is a relationship between motivation and attitude on natural sustainability.	Not supported

Conclusion and Recommendation

From this study, it is revealed that knowledge of student effecting attitude on agriculture. These result are significant and consistent with the findings of (Lutfiye et al., 2017). The findings showed a relatively positive association between students' environmental attitudes and environmental knowledge. Environmental sustainability is very important in the future. Therefore, many programs or activities should be conducted to gain the knowledge. Students can effectively receive environmental knowledge via the internet, as well as through conventional media like television and newspapers. To guarantee that students have improved environmental knowledge, families and educational institutions play important roles to provide students with environmental knowledge. Moreover, universities are encouraged to collaborate with private organizations in planning various activities in the form of fieldwork and experiences to cultivate a good attitude towards environmental conservation. Besides that, it is also recommended to enlarge the population of the study and include more variables to predict students' attitude on agriculture. Thus the findings will be more accurate and precise.

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