

Attitude profile of prospective UMRAH biology teacher students regarding green technology products

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Abstract. The development of science and technology today has created various innovations in life, such as green technology. Raja Ali Haji Maritime University (UMRAH), as a higher education institution in Indonesia that produces prospective biology teachers, is responsible for instilling awareness in students about the importance of protecting the environment and implementing sustainability principles through the use of green technology products. However, the extent to which their attitudes towards these green technology products have yet to be widely disclosed. This study aims to determine the attitude profile of prospective biology teacher students at UMRAH towards green technology products. This descriptive study involved 105 new students of the UMRAH Biology Education Study Program in the last two years (2023-2024) as respondents. The instrument used to collect the data was a questionnaire using a Likert scale. Based on the research results that have been obtained, the attitude profile of prospective biology teacher students at UMRAH regarding green technology products is in the good category.

1 Introduction

The development of science and technology today has created various innovations in life. One of them is the emergence of various environmentally friendly technologies (green technology). Green technology refers to the application of technology to reduce negative impacts on the environment, increase the efficiency of energy use, and support sustainability programs [1]. Sustainable development is a step toward finding a good balance between social, economic, and natural environmental development and community welfare [2]. This technology has produced many green technology products, such as renewable energy (wind power, solar panels), waste management technology, and environmentally friendly products in everyday life. Of course, this has increased public attention amidst the increasing environmental issues that have been felt, such as climate change, pollution, and natural resource depletion. The high level of concern regarding the impact of environmental damage, global warming, and depletion of natural resources has forced humans to find other ways to produce a product that can reduce the negative impact on the environment [3]. This attention also has an impact on the field of education.

Universitas Maritim Raja Ali Haji (UMRAH), one of the higher education institutions in Indonesia, has a Biology Education study program that produces prospective biology teachers. These prospective biology teachers are expected to have broad and strong knowledge of the environment and always follow technological developments that support environmental conservation. However, the extent to which their attitudes towards environmentally friendly technology have yet to be widely expressed. In fact, a positive attitude towards green technology is needed to encourage them to teach and promote best practices related to being environmentally friendly in schools where they will teach in the future. This attitude is important to instil so that humans have the awareness to transition to clean energy sources to reduce the negative consequences of the widespread development of science and technology on the environment [4].

Therefore, aspects of attitudes towards environmentally friendly technology are very important to know. As prospective teachers, biology education students, including at the Raja Ali Haji Maritime University (UMRAH), are also responsible for instilling awareness in students about the importance of protecting the environment and implementing sustainability principles. Therefore, the attitudes of prospective biology teacher students towards green technology products need to be studied in depth. A positive attitude towards green technology among prospective biology teachers is very important because these students are expected to become agents of change in an effort to create a society that cares more about the environment. They have a strategic role in instilling sustainability values in students who will later become the next generation. Based on the background of this problem, the author is interested in conducting research on the attitude profile of prospective biology teacher students at UMRAH regarding green technology products. This study aims to determine the attitudes of prospective biology teachers at UMRAH towards environmentally friendly technology. The results of this study are expected to provide a clear picture of environmental awareness and the readiness of prospective biology teachers to teach and promote green technology to students in the future. The results of this study are also important in providing insight for policymakers both at UMRAH and other stakeholders to formulate appropriate strategies to improve positive attitudes towards green technology among prospective teachers. In addition, the results of this study can also be used as a reference for compiling a more integrative curriculum that supports sustainability so that prospective biology teachers are better prepared to face increasingly complex global environmental challenges.

2 Methods

This research is a descriptive study. The subjects of this study were 105 new students of the UMRAH Biology Education Study Program in the last two years (2023-2024). The instrument used to collect the data was a questionnaire using a Likert scale. The statements used can be seen in the following Table 1.

The quantitative data obtained were then used to measure the attitudes of prospective biology teacher students towards green technology products. These data were processed using descriptive statistics to describe the profile of student attitudes. The descriptive analysis was processed using average frequency distributions of the number of respondents based on the attitude categories asked. After that, the results will be grouped and interpreted into categories, as shown in the following Table 2 [5].

Table 1. Questionnaire Items

No.	Items
1.	The existence of solar panels can reduce human dependence on fossil fuels.
2.	The existence of electric vehicles can reduce human dependence on fossil fuels.
3.	The existence of electric vehicles can reduce air pollution.
4.	The use of LED lights can save electricity in my house compared to ordinary lights.
5.	The technology of processing wastewater into clean water that can be reused is very useful for Indonesian society today.
6.	The use of wood as a cutting board provides more positive benefits compared to plastic cutting boards.
7.	Smart building technology as an environmentally friendly building is very important to continue to be developed, especially in Indonesia.
8.	I am more comfortable using a tote bag for shopping or carrying certain items compared to plastic bags.
9.	Clodi (cloth-based children's diapers) are very helpful in reducing diaper waste in other packaged environments.
10.	The use of environmentally friendly food boxes as a place for supplies can reduce my desire to buy food.

Table 2. Interpretation of Student Attitudes

Average	Interpretation
0-0.9	Very not good
1.0-1.9	Not good
2.0-2.9	Neutral
3.0-3.9	Good
4.0-5	Very good

3 Result and Discussion

Based on Table 3, all students had a good response to the questionnaire statements given. However, students still need to understand or learn about the green technology products that are already in circulation. There is a role for the government, which has yet to pay much attention to the community regarding the existence and benefits of this product [6]. Suppose students know and understand the benefits of these products. In that case, it is expected that there will be awareness and concern for the environment that influences attitudes towards the existence of green technology products becoming increasingly important [7]. This result also indicates that there needs to be a study that measures students' understanding of these green technology products. When these prospective biology teacher students understand the benefits, this can have an impact on other aspects. For example, increasing people's purchasing power for green technology products. Several studies also show that a consumer's attitude has a positive relationship with the purchase of green technology products [8].

The recapitulation of the data obtained can be seen in the following Table 3.

Number of Items	Frequency				Average	Interpretation
	1	2	3	4		
1.	2	7	66	30	3.18	Good
2.	3	8	65	29	3.14	Good
3.	1	5	55	44	3.35	Good
4.	1	10	64	30	3.17	Good
5.	4	5	50	46	3.31	Good
6.	1	9	42	53	3.40	Good
7.	1	4	58	42	3.34	Good
8.	1	2	43	59	3.52	Good
9.	0	2	53	50	3.46	Good
10.	1	7	40	57	3.46	Good
Average					3.33	Good

4 Conclusion

Based on the research findings that have been analyzed, it can be concluded that the attitude profile of UMRAH biology teacher candidates toward green technology products falls into the good category. This indicates that the prospective biology teachers demonstrate a positive outlook and readiness to embrace and promote the use of green technology in their professional practices. Their awareness and acceptance of environmentally friendly innovations reflect an understanding of the importance of sustainable development and the role of education in fostering ecological responsibility. These findings highlight a promising foundation for integrating green technology concepts into the teaching and learning processes, ensuring that future educators are equipped to instill environmental consciousness in their students.

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