



## Predictors of environmentally responsible behavior: The role of ecosystem conceptual and critical thinking skills

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ARTICLE INFO	ABSTRACT
<p><b>Article history</b> Received: 23 July 2025 Revised: 01 January 2026 Accepted: 11 March 2026</p> <p><b>Keywords:</b> Critical thinking skills Ecosystem literacy Environmentally responsible behavior</p>	<p>Strong knowledge of ecosystem concepts and critical thinking skills are essential for developing environmentally responsible behavior to address contemporary environmental challenges. This behavior ensures that students not only understand ecological solutions but also actively participate in preserving the environment. This study aims to determine the relationship between students' mastery of ecosystem concepts and critical thinking skills with environmentally responsible behavior. Conducted in February 2025 at SMP Shidqia Islamic School with 112 students, the research employed a descriptive method with a correlational design. Data analysis involved prerequisite tests for normality, homogeneity, linearity, and multicollinearity to ensure validity. The findings indicate a moderate correlation between ecosystem concept mastery and environmentally responsible behavior, as well as between critical thinking skills and environmental responsibility. Furthermore, a simultaneous correlation exists when both ecosystem mastery and critical thinking skills are combined. It is recommended that biology educators integrate critical thinking exercises within ecological curriculum to effectively foster students' environmental responsibility. School policies should prioritize the implementation of active learning models that effectively bridge theoretical ecological knowledge into tangible and sustainable environmentally responsible behaviors within the educational ecosystem.</p>

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## INTRODUCTION

The 21st-century education landscape demands that students develop high-order competencies to navigate the complexity of globalization and the industrial revolution of 4.0. Success in this era is measured by academic achievement and the ability to implement knowledge and technology in responding to real-world challenges (Alismail & McGuire, 2015). In addressing these challenges, the 21st-century young generation should master science, gain metacognitive skills, and be able to think critically and creatively. Moreover, they must be able to collaborate effectively and utilize technology to innovate (Önür & Kozikoğlu, 2020). Among these competencies, critical thinking skills and mastery of concepts in the sciences are the fundamental pillars allowing students to process information effectively and make appropriate decisions in a rapidly changing world (Changwong, 2018).

Overcoming these challenges will require not only attitude, but also responsible environmental behavior to take real actions for environmental problems. All actions aiming at recovering and preventing threats and damage to the environment are part of environmentally responsible behavior (Short, 2009). Hines defines environmentally responsible behavior as any actions, both individual and group, directed to environmental improvement (Hines et al., 1987). One of the influencing factors for environmentally responsible behavior is knowledge and critical thinking that will shape the environmentally responsible behavior (Kaan, 2019)

Knowledge is one of the components responsible for environmental problems (Prastiwi et al., 2019; R. Ristanto et al., 2022). The mastery of ecosystem or biology concepts is crucial to be developed in society, especially students who play a role as the next generation who are responsible for their environment (Khairunnisa et al., 2022; R. H. Ristanto et al., 2023). Teachers must set a mastery standard that must be achieved by students before they can proceed to the next level (Yeh et al., 2019). The mastery of biology concepts is students' cognitive skills in understanding and mastering the concept of knowledge through a phenomenon, event, object, or activity related to biology materials. The mastery of a concept requires students to explain the relationship between concepts being studied; therefore, the mastery of materials becomes meaningful and can proceed to higher materials (Ristanto et al., 2018). If students possess good mastery of the concept, then it is expected to impact their behaviors that are applied in their daily life based on the ecosystem they mastered.

Junior high school students at the age of 13-15 years old are in the critical period where they start a transition from concrete to abstract thought (Fuad et al., 2017; Wicaksana et al., 2019). Critical thinking skills begin to develop, yet they are not in line with their real behaviors. Instilling environmentally responsible behavior in this age range is more effective in forming long-term habituation than among adults. The junior high school Biology curriculum in Indonesia emphasizes understanding of basic ecosystems; therefore, it is appropriate to examine whether the understanding is strong enough to trigger solution-based actions (Chu, 2008; Wahyuni et al., 2020).

Current research in Biology education has broadly explored how cognitive skills affect students' environmental awareness. The latest development shows that students with high ecological literacy tend to indicate better involvement in conservation efforts (Torkar & Krašovec, 2019). However, most existing literature still focuses on separate studies between conceptual knowledge and cognitive skills and often overlooks how a simultaneous interaction between both variables could stimulate changes in real behaviors. A previous study by Pavalache-Ilie and Cazan (2018) has highlighted psychological predictors of environmental actions; however, there was a gap in understanding how specific mastery of ecosystem concept integrated with critical thinking functioned in a formal school environment (Pavalache-Ilie & Cazan, 2018).

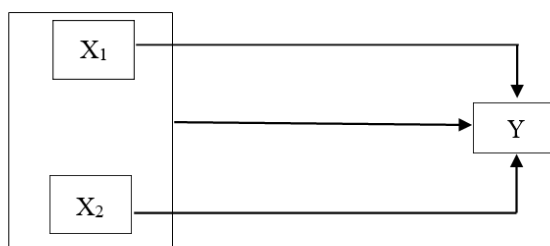
This research analyzes the simultaneous correlation between the mastery of ecosystem concepts and critical thinking skills and was specifically directed to environmentally responsible behavior in the context of secondary education. The urgency of the research was emphasized by the increase in the global climate crisis and environmental degradation, which demand an action-based education instead of theoretical understanding. Without a clear synergy between what the students know (concept) and how they respond to the knowledge (critical thinking), education will fail in producing generations that play an active role in preserving the environment. Through a case study in SMP Shidqia Islamic School, this research provides a real illustration of student profiles in the 21st century in Indonesia who tend to have an even and moderate level critical thinking skill profile. This is an important basis for

policymakers in Indonesia to design action-based education to achieve the Sustainable Development Goals.

## METHODS

### Research Design

The research employed a descriptive quantitative method with a correlational study design. The design examines the extent to what extent the variation in one factor is related to the variation of other factors based on the correlation coefficient (Fraenkel et al., 2012). There were three variables in the research, namely, the mastery of ecosystem concept ( $X_1$ ) and critical thinking skills ( $X_2$ ) as independent variables, and environmentally responsible behavior ( $Y$ ) as a dependent variable. The relationship between variables is illustrated in Figure 1 to identify the correlation between the mastery of ecosystem concept and environmentally responsible behavior ( $X_1Y$ ), the correlation between critical thinking skills ( $X_2$ ) and environmentally responsible behavior ( $X_2Y$ ), and the correlation between mastery of ecosystem concept and critical thinking skills and environmentally responsible behavior ( $X_1X_2Y$ ). The research took place in January-March 2025 in SMP Shidqia Islamic School.



**Figure 1.** Research Design of Correlational Study (Fraenkel et al., 2012).

### Population and Samples

The selection of sample and population was conducted using a multi-stage random sampling technique using the following stages: 1) the research population was all students of SMPs (junior high school) in Bekasi City; 2) SMP Shidqia Islamic School, Bekasi City was selected of all the SMPs using the purposive sampling technique, 3) Grade VII was selected among all students in the SMP Shidqia Islamic Bekasi City using cluster random sampling technique; 4) 155 students were selected as respondents from all students in Grade VII using a simple random sampling. Based on the respondent data, 112 samples were selected from 155 respondents using Slovin's formula (Appendix 1). The number of students taken as the research sample from each class in Grade VII was 22-23 students using a simple random sampling technique.

### Instrument

The research employed 2 types of instruments: a questionnaire and a test. The mastery of ecosystem concept and critical thinking skills was tested using an instrument, whereas, the environmentally responsible behavior was measured using a questionnaire instrument. The instruments had been validated empirically to 47 students of SMP Shidqia Islamic School randomly. The invalid question items and questions were excluded from the research. The following is the instrument grid of the mastery of ecosystem concept, critical thinking skills, and environmentally responsible behavior. Table 1 presents the instrument grids of the environmentally responsible behavior, consisting of five primary dimensions: eco-management, consumerism, persuasion, legal action, and political action. These instruments initially consisted of 64 question items divided equally between positive (32 items) and negative (32 items) questions. Based on the results of the validity test, 30 positive questions and 22 negative questions were valid.

**Table 1.**

Environmentally Responsible Behavior Instruments

Dimension	Indicator	Question Item	
		Positive	Negative
Eco-management	Avoiding air pollution	1*, 51	39, 55*
	Recycling goods	8, 52*	2, 56*
	Maintaining the sustainability of animals and plants' life	3*, 53	23*, 44

Dimension	Indicator	Question Item	
		Positive	Negative
Consumerism	Energy saving	4*, 54	9, 57
	Throwing garbage in its place	5, 43	25, 58
	Rejecting overuse of plastic	6, 59	24, 60*
	Replacing plastic shopping bag with shopping bag	10, 41	26, 61*
	Environmental socialization	28, 62	17, 64*
Persuasion	Active in environment-related activities	27*, 63	29, 42
	Informing the danger of imbalanced environment	18, 65	30, 7*
	Repriminding Environmental Destroyers	20, 38	11*, 66
	Promoting recycling program	19, 67	50, 68*
Legal Action	Promoting healthy and clean living	22, 40	21*, 69
	Taking real action for the environment	12, 45	32*, 70
	Imposing fine on those who damage the environment	16, 71	31*, 46
Political Action	Participating in environmentally awareness organization	15, 72	36, 48*
	Forest and marine conservation	35, 73*	37*, 74
	Saving energy use	34*, 47	14, 49*
	Providing recommendations to the government regarding environmental issues	13, 75*	33, 76*
Total		32	32

\*Invalid

The instruments of the mastery of concept in Table 2 were arranged following a revised Bloom's cognitive taxonomy, including Remembering (C1) to Creating (C6) levels. The total number of items tested was 54, with a total of 31. After eliminating the invalid items, the final instruments represent all cognitive levels; therefore, they could provide a comprehensive description of students' mastery of the ecosystem concept systematically.

**Table 2**  
Instruments of Mastery of the Ecosystem Concept

Dimension	Description	Question Item
Remembering	Remembering the concept of ecosystem components	1, 12*, 13, 19*, 25*, 31, 37, 43, 49
Understanding	Understanding and classifying types of interaction	2, 8, 14, 20*, 26*, 32, 38, 44*, 50
Applying	Methods of pest control in improving food production	3, 9, 15*, 21*, 27*, 33, 39, 45*, 51*
Analyzing	Criticizing the impact of increasing levels in carbon dioxide gas in the atmosphere originating from human activities.	4, 5, 16*, 22*, 23, 24*, 40*, 46*, 52
Evaluating	Evaluating the causes of the growth of algae and other nuisance plants that thrive in slow-flowing rivers	10, 11*, 17, 28, 29*, 35, 41*, 47*, 53*
Creating	Developing and formulating several organisms to form food chain	6, 7, 18, 30, 34*, 36*, 42, 48, 54
Total		54

\*Invalid

These instruments measured students' deep-thinking process in Table 3, through dimensions of interpretation, analysis, conclusion, evaluation, explanation, and self-regulation. These instruments have the most stable validity level compared to the other two instruments. Although invalid instruments existed in each dimension, on average, 1–2 items per dimension, the number of valid items was still sufficient to measure students' critical thinking profile comprehensively. The elimination of items number 7, 26, and 21 still resulted in the instruments meeting the requirement to measure critical thinking skills accurately in the context of ecosystem material.

**Table 3.**  
Critical Thinking Skills

Dimension	Description	Question Item
Interpretation	Interpreting and grouping food chains into food webs	1, 7*, 13, 19, 25*
Analysis	Analyzing interactions occurred between organisms	2, 8, 14, 20, 26*
Conclusion	Making conclusions from a case that occurred in food webs	3, 9, 15, 21*, 27
Evaluation	Evaluating the cause of ecosystem damage	4*, 10, 16, 22, 28*
Explanation	Explaining biogeochemical cycle	5, 11*, 17, 23, 29*
self-regulation	Responding to conservation efforts for endangered biodiversity	6, 12, 18*, 24*, 30

\*Invalid

### Procedure

The research started with the development of research instruments that were validated empirically with 47 students. Next, the valid items were used for the research on 112 students. Data collection for each variable was conducted separately in 3 meetings.

### Data Analysis Techniques

Data analysis was conducted systematically through a descriptive statistical approach and inferential statistics using SPSS. In the initial stage, the generated data were analyzed using descriptive statistics, where each variable contained mean, standard deviation, and frequency distribution. The assumption prerequisite tests consisted of normality and homogeneity tests of population variance, linearity of relations, and examination of the potential of heteroscedasticity, multicollinearity, and autocorrelation. Further, the strength of the influence between variables was tested using multiple linear correlation analysis with the following model:  $\hat{Y} = a + b_1X_1 + b_2X_2 + e$ . The multiple linear correlation analysis has three correlation coefficients, namely the multiple determination coefficient ( $R^2$ ), multiple correlation coefficient ( $R_{x_1x_2}$ ), and partial correlation coefficient. The significance test in the multiple correlation test and partial correlation test used the F test. The multiple linear regression correlation coefficient test used the t-test.

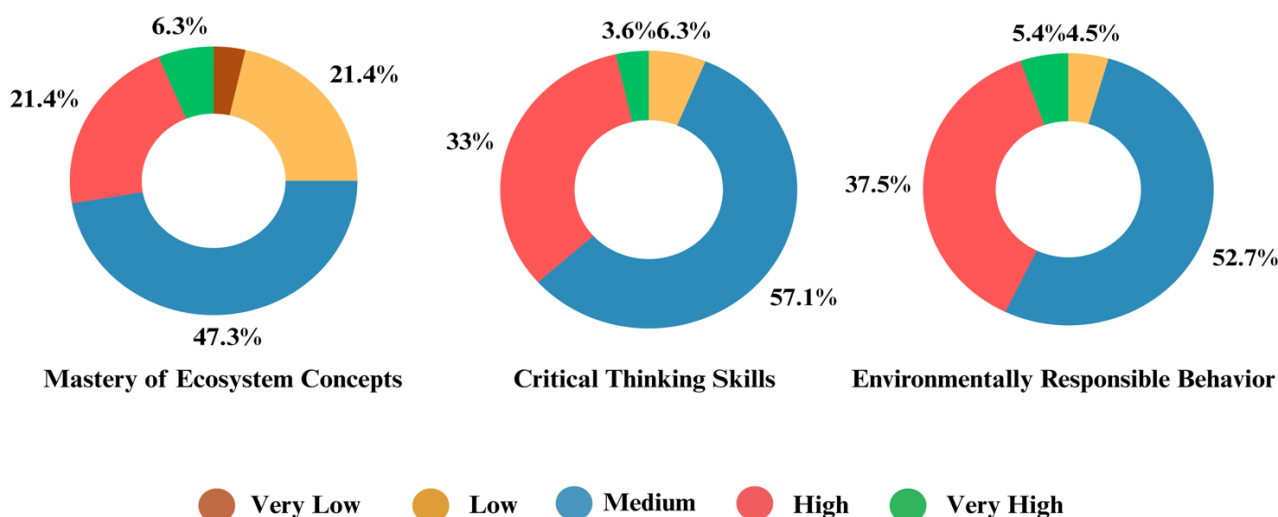
## RESULTS AND DISCUSSION

Table 4 suggests that the difference between the maximum and minimum values in the mastery of ecosystem concept was 71, critical thinking skills was 55, and environmentally responsible behavior was 59. The results indicate many variations in values in the variable of mastery of the ecosystem concept. Additionally, the mastery of the ecosystem concept has a greater standard deviation value than other variables; therefore, a broader data distribution. This suggests that students' mastery of the ecosystem concept was varied. The low average on concept mastery, however, indicates that the achievement of the values of the mastery of ecosystem concept was low despite the broad achievement distribution.

**Table 4**  
Statistic Descriptive of Research Variable

Description	n	X <sub>min</sub>	X <sub>max</sub>	$\bar{X}$	SD
Mastery of Concept (X <sub>1</sub> )	112	16	87	53.45	15.08
Critical Thinking Skills (X <sub>2</sub> )	112	34	89	61.33	10.21
Environmentally Responsible Behavior	112	45	94	69.40	9.16

The standard deviation of the environmentally responsible behavior was lower than that of other variables, suggesting that the data distribution of the students was mostly closer to the average value. If the standard deviation is large, then the distribution is broader and further away from the average achievement.



**Figure 2.** Frequency relative to mastery of concept, critical thinking skills, and environmentally responsible behavior.

The three variables in Figure 2 indicate that a moderate category had the highest frequency, indicating that the respondents generally had a moderate understanding of concept, thinking skills, and environmental behavior. Critical thinking skills and environmentally responsible behavior show higher results despite the evenly distributed mastery of concept. More than 90% of students indicate that their level in both variables was between moderate and high levels. This means that although respondents' conceptual understanding of the ecosystem is moderate, it is sufficient to improve critical thinking skills and environmentally responsible behavior (moderate to high category).

Based on the achievement results of each indicator, the mastery of the ecosystem concept, with 6 measured indicators, experienced a decrease in percentage along with an increase in the cognitive level. This suggests that the respondents find it easier to answer questions that require low-order thinking skills than higher-order thinking skills questions. The achievement in C1-C3 dimensions was above 50%, indicating that the respondents had a basic understanding and sufficient ability to apply the concept. There were weaknesses in the achievement of C4-C6 dimensions, suggesting that students have not fully mastered the higher-order thinking skills. All indicators had an almost identical standard deviation (SD) value, around 0.49-0.50. Table 5 indicates that the distribution of respondent scores for each question is relatively consistent, and no indicators that have a very different variation of answer from the others.

**Table 5**  
The Achievement of the Mastery of Ecosystem Concept Indicators

Dimension	Indicator	$\Sigma$	$\bar{X}$	SD	(%)
C1	Remembering the concept of ecosystem components	391	65.17	0.49	58.18
C2	Understanding and classifying types of interaction	354	59.00	0.50	52.68
C3	Methods of pest control in improving food production	230	57.50	0.50	51.34
C4	Criticizing the impact of increasing levels in carbon dioxide gas in the atmosphere originating from human activities.	207	51.75	0.49	46.20
C5	Evaluating the causes of the growth of algae and other nuisance plants that thrive in slow-flowing rivers	196	49.00	0.49	43.75
C6	Developing and formulating several organisms to form food chain	348	49.71	0.50	46.52

Students' answers were consistent in each of the six dimensions of critical thinking. The percentage of the achievement of each indicator was in a narrow interval, with only a 3.57 percentage point difference between the highest and the lowest scores. This suggests a balanced critical thinking skills profile among respondents. There were no dimensions that became their strength nor weakness; therefore, students have critical thinking skills that tend to be evenly distributed across all lines;

however, the scores gained were within the moderate category. The main conclusion is that students have an even and balanced profile of critical thinking skills, but at a moderate level. They are not significantly superior in one dimension and do not indicate a significant weakness in other dimensions.

**Table 6**

The Achievement of Critical Thinking Skills Indicators

Dimension	Indicator	$\Sigma$	$\bar{X}$	SD	(%)
Interpretation	Interpreting and grouping food chain into food webs	784	58.33	1.09	58.33
Analysis	Analyzing interactions occurred between organisms	1071	59.77	1.11	59.77
Conclusion	Making conclusions from a case that occurred in food webs	1109	61.88	1.13	61.88
Evaluation	Evaluating the cause of ecosystem damage	803	59.74	1.10	59.74
Explanation	Explaining biogeochemical cycle	809	61.90	1.12	61.90
Self-regulation	Responding to conservation efforts for endangered biodiversity	817	60.78	1.10	60.78

The environmentally responsible behavior dimension with the highest achievement was in the eco-management and consumerism. This result indicates that students are active in managing the impact of the environment and are responsible for selecting their consumer needs. There were legal action and persuasion dimensions in the moderate achievement. The results show that students' participation is decreasing, thus requiring interaction with other people in a formal regulation. Further, the lowest achievement in the political action dimension indicates low involvement among students in fighting for environmental issues with the authorities. Respondents' environmental awareness and responsibility were very strong at the level of concrete and direct individual actions. The awareness is weaker if it is manifested in the form of broader actions, including social actions, such as influencing other people, participating in organizations, and politics that affect policies.

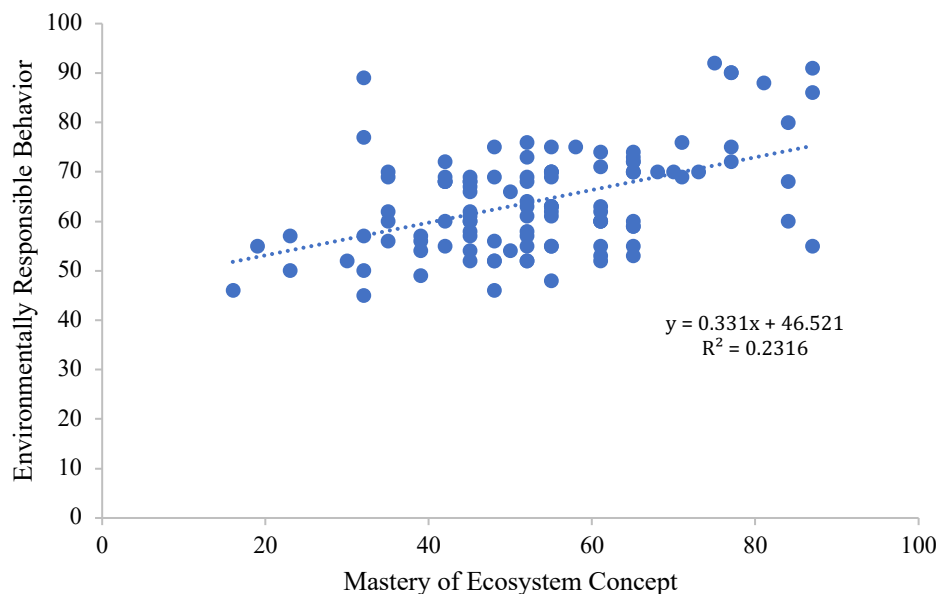
**Table 7**

The Achievement of Environmentally Responsible Behavior Indicators

Dimension and Indicator	$\Sigma$	$\bar{X}$	SD	(%)
<b>Eco-management:</b>				
- Avoiding air pollution	857	76.51		
- Recycling goods	743	66.33		
- Maintaining the sustainability of animals and plants' life	848	75.71	1.33	71.07
- Energy saving	1160	69.05		
- Throwing garbage in its place	1566	69.91		
<b>Consumerism</b>				
- Rejecting overuse of plastic	1070	63.70		
- Replacing plastic shopping bag with shopping bag	1198	65.00	1.40	67.33
- Environmental socialization	1100	63.40		
- Active in environment-related activities	1192	70.95		
<b>Persuasion</b>				
- Informing the danger of imbalanced environment	1158	68.92		
- Reprimanding Environmental Destroyers	1133	67.44	1.23	61.25
- Promoting recycling program	887	52.79		
- Promoting healthy and clean living	930	55.36		
<b>Legal Action</b>				
- Taking real action for the environment	1017	60.53		
- Imposing fine on those who damage the environment	1041	62.00	1.28	61.13
<b>Political Action</b>				
- Participating in environmentally awareness organization	1053	62.70		
- Forest and marine conservation	445	40.00		
- Saving energy use	652	58.20	1.37	55.73
- Providing recommendations to the government regarding environmental issues	659	58.84		

## Relationship between Mastery of Ecosystem Concept and Environmentally Responsible Behavior

Figure 3 illustrates that every increase in the mastery of the ecosystem concept will increase environmentally responsible behavior. Figure 3 also explains that the mastery of ecosystem concept contributes 23.1% to students' environmentally responsible behavior, and the remaining 76.9% was affected by other factors that require further identification. These other factors include skills, personality, or the external aspect of the students.



**Figure 3.** Simple Linear Regression of the Mastery of Ecosystem Concept and Environmentally Responsible Behavior.

Ecological competencies, including ecological understanding, are one of the predictors to shape environmentally responsible behavior along with awareness, attitudes, and social norms (Kaiser et al., 2003). The norms that prevail in schools affect the formation of students' environmentally responsible behavior (Wu et al., 2022). In Table 5 of the measurement results, the mastery of the ecosystem concept resulted in the C1-C3 dimensions having higher results than the C4-C6 dimensions. The results indicate that students have more mastery of lower-order thinking skills.

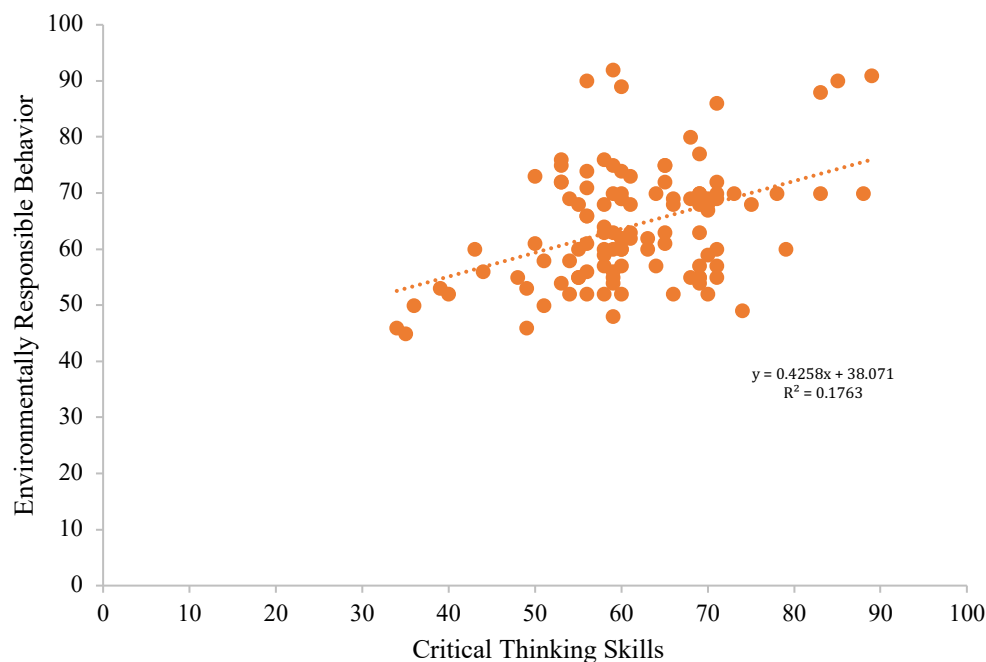
The low mastery of concept affects students' critical thinking skills as indicated by its contribution of merely 17.6% to the environmentally responsible behavior in Figure 3. This is a benchmark that students' high understanding will influence the formation of their critical thinking skills. Students with a low-level of C4-C6 cognitive mastery tend to show low understanding of the ecosystem concept (Table 5). Students will be easier to understand the mastery of concepts in the C1-C3 domains. This is due to these aspects that are within the domain of low-order thinking skills that emphasize the basic concept of a material (Ramdani et al., 2021). This concept understanding contributes significantly to critical thinking to develop students' responsible behavior (Wals, 2011).

Students indicate the highest score in the dimension of eco-management behavior (71,07%), including direct action, such as throwing garbage in its place and saving energy. These actions are based more on procedural knowledge and familiarity (basic knowledge) than on a complex critical evaluation process. On the contrary, behaviors that require high-order critical thinking, such as political action, actually show the lowest achievement. The mastery of ecosystem concepts in this knowledge domain provides a positive contribution to environmentally responsible behavior. The stages taken by students from knowing to creating solutions to ecosystem problems can be used as a basis to shape environmentally responsible behavior not only in the school environment, but also in their community environment.

### Relationship between Critical Thinking Skills and Environmentally Responsible Behavior

Figure 4 indicates that every increase in critical thinking skills will increase environmentally responsible behavior. The graph also explains that critical thinking skills have a contribution of 17.6% to students' environmentally responsible behavior. The remaining 82.4% was affected by other factors. Whereas, concept understanding specifically contribute 23.1% of the total contribution. The low

contribution of the critical thinking skills was affected by low concept understanding of the students, among others.



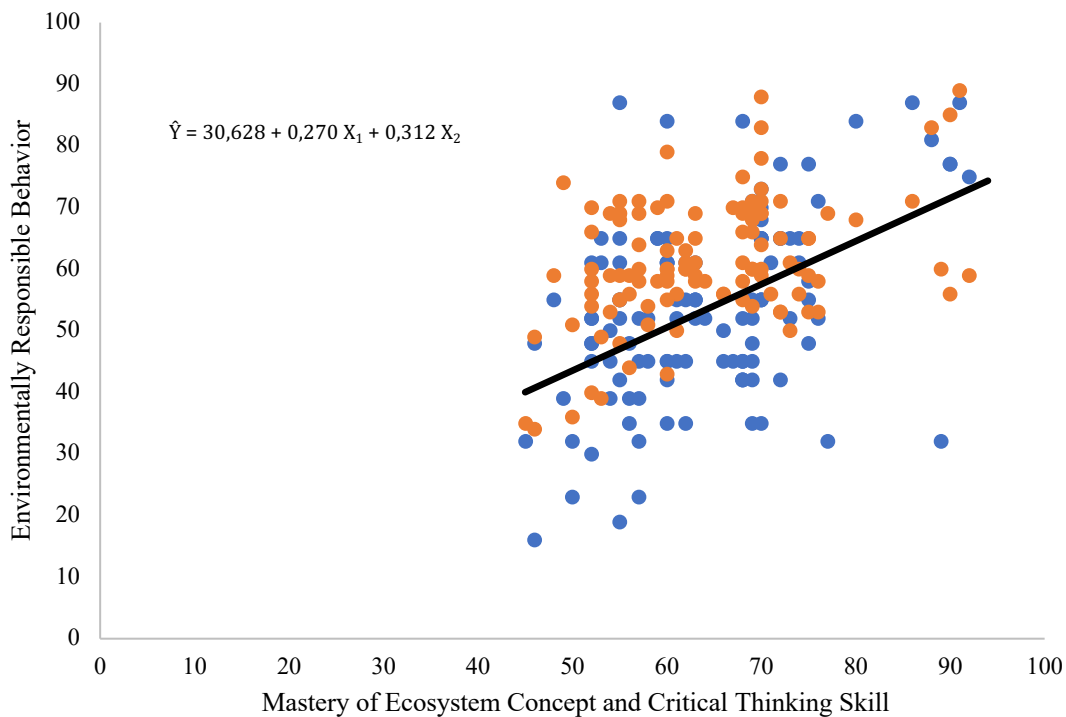
**Figure 4.** Simple Linear Regression of the Critical Thinking Skills and Environmentally Responsible Behavior

Students who have low critical thinking skills will have low environmental awareness, and it affects their environmentally responsible behavior (Wibowo et al., 2024). Sharpening these skills from an early age is vital, considering that critical thinking skills in problem solving are paramount in the student curriculum, even from an early age, to form solution-oriented behavior in problem solving (Changwong, 2018). An inquiry model in the ecosystem material is effective in improving critical thinking skills and fostering environmentally aware behavior (Utami, 2019). Critical thinking skills are students' capital to solve problems and generate solutions to their problems (Soendjoto, 2018). Based on the research results, the interpretation of self-regulation dimensions received a similar percentage ranging from 58,33 to 61,90% (Table 6). The fact that students' critical thinking skills are still not optimal can be connected to one of them, their low literacy in understanding the questions. Other factors could include self-efficacy, time management, and self-motivation (Fridayani et al., 2022). These low results could also be caused by learning that only focuses on content, other than process and context; therefore, students have difficulty developing their critical thinking skills (Aufa et al., 2021).

Learning methods are also crucial to improving students' critical thinking skills. Integrating problem-based curriculum and inquiry learning model could enhance critical thinking skills and create an adaptive ecosystem for students' needs in the 21st century (Darminto et al., 2025). Aside from the curriculum and learning model used, teachers as educators need to be considered in the learning management. Teachers' lack of understanding and experience in applying problem-based learning will hinder students in developing their responsible behavior through critical thinking skills (Tommasi et al., 2023). Hence, schools play a crucial role in forming these skills, which are aligned with the problem-integrated curriculum.

### **Relationship between Mastery of Ecosystem Concept and Critical Thinking and Environmentally Responsible Behavior**

Based on Figure 5, a positive relationship existed between the mastery of ecosystem concept and critical thinking skills, and environmentally responsible behavior. The strength of the relationship was 31.8 %. The results suggest that 31.8% variance occurred in the mastery of ecosystem concept and critical thinking skills simultaneously have a contribution of 31,8 % to environmentally responsible behavior.



**Figure 5.** Multiple Linear Regression between the Values of Mastery of Ecosystem Concept and Critical Thinking Skills and the Environmentally Responsible Behavior.

Students who have good knowledge and literacy have values, attitudes, and skills that enable knowledge to be transformed into actions. These actions include environmentally responsible behaviors (Goleman et al., 2012). The high score in the eco-management dimension of 71.07% in Table 9 indicates that students have taken actions such as saving energy, reducing waste and pollution, and choosing environmentally-friendly products. This suggests that students emphasize personal behaviors instead of general behaviors, such as creating regulations and policies (legal action). Students who have a good eco-management will have awareness and solution-oriented behaviors to the environment (Lestari et al., 2024). Environmental management has a significant relationship with environmentally responsible behavior, such as waste management, energy conservation, water conservation, transportation, and biodiversity (Meitayani et al., 2022).

Environmentally responsible behaviors can be formed in a good environment where society implements sustainable development in its life (Hamilton, 2021). Therefore, students' responsible behavior is affected by their basic knowledge concept, including ecosystems, and their critical thinking skills are built with support from external factors in the community and school curriculum. Sustainable learning must be emphasized in school with good management to produce responsible educators, such as the implementation of study tours to rural communities to gain the values of environmental education applied in the area (Chen et al., 2022).

Environmentally responsible behavior aims to protect the environment, or it is a form of reward to the healthy environment by reducing the negative impact on the environment (Kollmuss & Agyeman, 2002). Conceptual knowledge of ecosystem and personality simultaneously has a positive relationship with environmentally responsible behavior. Students who master the basic concept of this environment will impact their behavior towards the environment (Khasani et al., 2021). This is the education that will form behavior and personality. A good education is in line with good behavior and personality (Malik et al., 2012). We can conclude that the mastery of ecosystem concepts and critical thinking skills has a positive relationship with environmentally responsible behavior. Another factor is the learning process students undergo at school. Good learning will produce students who have demonstrated environmentally responsible behavior.

## CONCLUSION

A positive and significant relationship between the mastery of ecosystem concept and critical thinking skills, and students' environmentally responsible behaviour, simultaneously. The research

results affirm that in-depth knowledge of ecosystems and critical thinking skills are essential predictors in developing environmentally responsible behavior.

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