

Assessing the Validity and Reliability of Environmental Awareness Measurement Tools in Agricultural Area School

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ABSTRACT

Pangalengan as one of the agricultural centers and vegetable producers in West Java is inseparable from the use of chemical fertilizers and pesticides. This research aims to develop and validate an instrument to measure environmental awareness in high school students (SMA) towards agricultural activities carried out by the Pangalengan community. The development process is carried out through a literature review, preparation of indicators and statement items, validation by experts, and field trials. To measure students' environmental awareness, valid and reliable instruments are needed. The instrument that has been compiled consists of 46 Likert scale question items with a sample of 110 students of Class X SMAN 1 Pangalengan. The statistical test used was the Pearson Product Moment and Reliability Correlation Test with SPSS 25. The Product Moment r value with a significance level of 5% for the number of 100 respondents was set at 0.195 and the significance level of 1% was set at an r value of 0.256. All items were declared valid with the lowest r value of 0.368 and the highest r of 0.795. The test results also stated that the instrument tested was reliable with a reliability Alpha Cronbach coefficient of 0.752. This instrument is expected to be a reliable measuring tool to evaluate students' environmental awareness and support the integration of environmental education in agricultural areas.

Keywords: agricultural area; environmental awareness; reliability; validity.

INTRODUCTION

Environmental awareness is one of the important aspects of 21st century education, especially in the context of climate change and environmental degradation that are increasingly alarming. Students as the next generation have a strategic role in preserving the environment through understanding, attitudes, and concrete actions on environmental issues. In agricultural areas, environmental challenges arise due to the less sustainable use of chemical fertilizers, pesticides, land clearing, and agricultural waste management. The Pangalengan area, which is located in the southern part of Bandung Regency, as a vegetable production center in West Java, is also inseparable from chemical fertilizers and pesticides. The test results (G. Fizulmi, 2022) stated that the level of organophosphate pesticide residues in fresh cow's milk was carried out in Pangalengan District, with samples of fresh cow's milk from each village, showing that pesticide residues from the organophosphate group (OP)

were detected with values above the maximum limit. The results of Utami, R (2022) show that there are 31 types of pesticides used by farmers in the UCRB (Upper Citarum River Basin), consisting of 58% insecticides, 26% fungicides, 7% herbicides, 3% rodenticides, and 7% PGR. It was also stated that Promolish and Mancozeb are the most widely used pesticides in UCRB. Reporting from ICL (2023), the global food agriculture system is estimated to account for 31% of all global greenhouse gas emissions caused by humans. The agricultural sector is also one of the main sources of water pollution with the widespread use of pesticides. (MB Hidayat, .2021). Therefore, it is important to have a valid and reliable instrument to measure the level of environmental awareness of students living in the Pangalengan area.

Environmental awareness has received increasing attention since 2015, with research focusing on research development among youth. The study

highlights the importance of character education and structured efforts across families, schools, and communities in building environmental awareness (Zahrah & Rahmat, 2023; Narwal, 2022). A 2015 PISA study revealed that science learning in schools is strongly linked to environmental awareness, with similar levels observed between 2006 and 2015 (List et al., 2020). Recent research shows a persistent lack of environmental awareness among many individuals, caused by a weak environmental culture and low levels of education (Lamdjad et al., 2024). To address this, its recommendations include increasing trust in technology and promoting environmental participation among various stakeholders. Overall, these studies emphasize the important role of education and collaborative efforts in developing environmental awareness and addressing global environmental challenges (Narwal, 2022; Zahrah & Rahmat, 2023; List et al., 2020; Lamdjad et al., 2024).

This research aims to develop an environmental awareness measurement instrument that is tailored to the agricultural context, as well as test its validity and reliability. Environmental awareness is a multidimensional aspect that involves the interaction between individual knowledge, attitudes, emotions, motivations, and behaviors in responding to environmental issues. This concept develops in a wide range of cross-disciplinary studies, including sociology, environmental psychology, and sustainability studies. Dantas and Gomes (2024) developed an environmental awareness dimension instrument that has been developed by Sanchez and Lafuente that divides environmental awareness into four main dimensions, namely: (1) general belief, which is a general belief in the importance of protecting the environment; (2) personal attitudes, which emphasize personal attitudes and norms; (3) knowledge, or knowledge of environmental issues; and (4) active, which refers to real involvement in environmental protection efforts. Dantas & Gomes develops the dimension of environmental awareness into affective, cognitive, dispositional, and active dimensions. The affective dimension deals with emotions and personal relationships with nature, while the cognitive dimension deals with knowledge and understanding. The dispositional dimension represents the attitudes and intentions of individuals, and the active dimension reflects tangible actions taken to support sustainability. Their findings suggest that the affective dimension has a positive effect on cognition, which in turn influences dispositional, and ultimately impacts active behavior. Environmental awareness and reuse, recycled, organic, and biodegradable dimensions. These factors reflect consumer behaviors such as considering waste reuse, purchasing recycled materials, purchasing organic products, and choosing biodegradable cleaning items. ((Silva et al., 2017)). Sayfullayeva (2022) divides the dimension of environmental awareness into three dimensions: environmental awareness, which reflects residents' recognition of environmental problems; environmental knowledge, which includes specialized knowledge relating to

environmental protection; and environmental values, which represent the emotions and intentions of the population towards environmental protection issues. (Sayfullayeva, 2022)

The research of Baltodano Nontol et al. (2024) adopts a similar model, but with the addition of a conative dimension that emphasizes intention and willingness to act. This multidimensional approach allows for a more thorough evaluation of the level of public awareness of environmental issues, especially in the context of agriculture.

In practice, environmental awareness is manifested through behaviors such as recycling, reducing energy consumption, using environmentally friendly transportation, and participation in environmental conservation activities. According to Silva et al. (2017), concrete indicators of consumer environmental awareness include waste reuse, purchase of recycled products, consumption of organic goods, and preference for biodegradable products.

Thus, understanding the multidimensional structure of environmental awareness is an important basis for the development of measurement tools, environmental education, and public policies that encourage collective behavior change towards ecological sustainability.

METHOD

This research is a Developmental Research to produce a measuring tool to determine the level of environmental awareness of students. The measurement tools developed are related to students' awareness of problems that arise in agricultural practices in the school environment, such as the use of pesticides, chemical fertilizers, land use and their relationship with climate change adaptation and mitigation in agricultural areas. The instrument was developed by the researchers, by referring to and adapting the dimensions of environmental awareness according to (Nontol et al., 2024), namely: cognitive dimension, affective dimension, conative dimension and active dimension. Nontol has developed an environmental awareness measurement tool in urban areas. Murzi et al. (2022) have developed an instrument on sustainability awareness that includes environmental, social and economic awareness (Kaur J., Kaur K. (2022,)) around environmental and sustainability issues. Because the environmental context of the research location is in an agricultural area, the instrument developed in this study raises environmental issues in agricultural areas which include the issue of land clearing for agriculture, the use of pesticides and chemical fertilizers, with information indicators about environmental problems, causes and effects of environmental problems and information about environmentally friendly activities. Clearing agricultural land (5 items) questions, while the use of pesticides and chemical fertilizers is 7 question items. For the affective dimension or attitude, emphasis is placed on indicators of concern for the environment, both

land clearing and chemical pesticides, as many as 11 question items. For the active dimension with indicators of active participation in protecting the environment as many as 11 items and the conative dimension or pro-environmental attitude as many as 6 items. For the active dimension, actions to adapt and mitigate climate change in the agricultural sector are integrated. The instrument consists of a number of statements in a 5-point Likert scale format, namely: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree. Before being used in the research, this instrument has gone through a content validation process through expert

judgment and was tested by 101 respondents in class X of SMAN 1 Pangalengan located in the southern region of Bandung Regency. Validity test using product moment test and reliability test with Cronbach alpha. From the preparation of this instrument, it is hoped that it can answer the question "What is the feasibility of the instrument from the environmental awareness measurement tool that has been prepared?"

RESULTS AND DISCUSSION

Demographic responden

The demographic profile of the study is presented in Table 1 below.

TABLE 1: Demographic Profile Respondent.

Demographics	Respondent	%	Total
Gender	Male	46	45,54%
	Female	55	55,46%

Student Answer Percentage

The results of the questionnaire for Cognitive Dimension can be seen in the Table 2 below:

TABLE 2: Distribution of Student Answers on The Cognitive Dimension.

No	Statement	Percentage					Total Value
		5 (VA)	4 (A)	3 (M)	2 (NA)	1 (VNA)	
1	I know that forest land is decreasing because it is used for agricultural and plantation activities	23.76	38.61	30.69	4.95	1.98	100.00
2	I know that clearing forest land for agricultural land will lead to biodiversity loss	15.84	44.55	32.67	4.95	1.98	100.00
3	I understand the importance of maintaining forests to store water	34.65	39.60	19.80	1.98	3.96	100.00
4	I understand the water cycle and the importance of maintaining the availability of clean water.	23.76	53.47	17.82	1.98	2.97	100.00
5	I understand that preserving forests is important to maintain ecosystem balance	22.77	56.44	16.83	1.98	1.98	100.00
6	I know of the use of pesticides and chemical fertilizers in the agricultural area where I live	15.84	28.71	50.50	2.97	1.98	100.00
7	I learned that vegetables exposed to chemical pesticides are harmful to human health	13.86	42.57	36.63	3.96	2.97	100.00
8	I understand that vegetable waste containing chemical pesticides should not be used for animal feed	10.89	34.65	47.52	5.94	0.99	100.00

No	Statement	Percentage					Total Value
		5 (VA)	4 (A)	3 (M)	2 (NA)	1 (VNA)	
9	I know that the use of chemical pesticides can cause soil and water pollution	20.79	28.71	44.55	2.97	2.97	100.00
10	I realize that the continuous use of pesticides will damage the health of the soil/agricultural land	19.80	34.65	41.58	1.98	1.98	100.00
11	I know that the preservation of biodiversity is important to maintain the balance of the ecosystem	9.90	39.60	40.59	7.92	1.98	100.00
12	I understand that the use of pesticides and chemical fertilizers will result in a higher carbon footprint that can increase agricultural greenhouse gas emissions	14.85	33.66	47.52	2.97	0.99	100.00
13	I understand that the agriculture carried out by the community should be environmentally friendly agriculture	27.72	42.57	24.75	1.98	2.97	100.00
14	I learned that vegetable waste can be used as compost and eco enzymes as organic fertilizer materials	28.71	42.57	23.76	1.98	2.97	100.00
15	I know that the use of biochar can restore soil health	11.88	30.69	50.50	4.95	1.98	100.00
16	I understand that the use of biopesticides will maintain food safety, soil health and environmental balance	11.88	41.58	44.55	0.99	0.99	100.00
17	I understand that the utilization of biopores can be used for water storage and the provision of organic fertilizers	13.86	42.57	40.59	1.98	0.99	100.00
18	I know the benefits of mulch in maintaining soil health	13.86	26.73	56.44	1.98	0.99	100.00

TABLE 3: Distribution of Student Answers on The Affective Dimension.

No	Statement	Percentage					Total Value
		5 (VA)	4 (A)	3 (M)	2 (NA)	1 (VNA)	
1	I feel that nature is a source of wealth, and its resources should be explored regardless of the damage it causes to the ecosystem	23.76	41.58	25.74	6.93	2.97	100.99
2	Soil and water conservation are a topic that interests me because it is very important for agriculture	22.77	47.52	25.74	2.97	0.99	100.00

No	Statement	Percentage					Total Value
		5 (VA)	4 (A)	3 (M)	2 (NA)	1 (VNA)	
3	I am aware that the use of pesticides and chemical fertilizers that occur in my environment may not directly affect my life or that of my family and relatives	12.87	34.65	49.50	1.98	0.99	100.00
4	It is important to promote environmentally friendly agriculture.	18.81	47.52	30.69	0.99	1.98	100.00
5	I am worried about my health, my family, and consumers with the use of pesticides in agriculture.	17.82	42.57	36.63	1.98	0.99	100.00
6	I felt interested in carrying out eco-friendly farming activities in my community.	16.83	41.58	36.63	2.97	1.98	100.00
7	I was worried when I saw farmers spraying plants with chemical pesticides	16.83	35.64	41.58	3.96	1.98	100.00
8	I am worried that in the next few years, we will not have healthy soil and food to live on because of human actions.	20.79	46.53	28.71	2.97	0.99	100.00
9	I feel that the news about the impact of chemical pesticides on the environment is too exaggerated.	15.84	28.71	49.50	4.95	0.99	100.00
10	I am very interested when there are institutions that run campaigns about environmentally friendly farming	12.87	38.61	40.59	5.94	1.98	100.00
11	I love it when eco-friendly agriculture is promoted in schools, institutions, and society in general.	14.85	48.51	31.68	3.96	0.99	100.00

TABLE 4: Distribution of Students' Answers on The Active Dimension.

No	Statement	Percentage					Total Value
		5 (VA)	4 (A)	3 (M)	2 (NA)	1 (VNA)	
1	I don't throw garbage into the river and do my own waste management.	18.81	31.68	30.69	11.88	6.58	100.00
2	I have sorted waste and recycled organic waste into compost	11.88	23.76	50.80	10.89	2.97	100.00
3	I've done the 3 Rs (Reuse, Reduce and Recycle)	8.91	28.71	47.82	11.88	2.97	100.00
4	I set up the water faucet and turn it off when not in use to save water	37.62	38.61	20.79	1.98	0.99	100.00
5	To save electricity, I turn off the lights and unplug the power cord when not in use	10.89	25.74	51.49	10.89	0.99	100.00

No	Statement	Percentage					Total Value
		5 (VA)	4 (A)	3 (M)	2 (NA)	1 (VNA)	
6	I always carry a shopping bag with me when shopping to reduce the use of single-use plastics	28.71	33.66	27.72	7.92	1.98	100.00
7	To reduce CO2 levels, I plant plants around the house	12.87	19.80	49.90	12.87	4.95	100.00
8	I recycle organic waste into compost or eco-enzyme	8.91	24.75	48.51	12.87	4.95	100.00
9	I use public transport or cycling to reduce air pollution	10.89	20.79	44.55	13.81	4.95	100.00
10	I avoid using products that contain harmful chemicals	13.86	35.64	40.29	3.96	5.94	100.00
11	To save on the use of electrical energy, I always turn off lights and electronics that are not in use	36.63	37.62	22.77	1.98	0.99	100.00

TABLE 5: Distribution of Students' Answers on The Conative Dimension.

No	Statement	Number of Answers					Percentage					Total Value
		5(SS)	4(S)	3(N)	2(TS)	1(STS)	5(SS)	4(S)	3(N)	2(TS)	1(STS)	
1	I invite friends and family to care about the environment.	22	55	21	2	1	21.78	54.46	20.79	1.98	0.99	100.00
2	I am ready to provide information about the dangers of pesticides to family, friends and relatives at home	13	53	32	2	1	12.87	52.48	31.68	1.98	0.99	100.00
3	I agree with the sanction of environmental destruction	21	54	24	2	0	20.79	53.47	23.76	1.98	0.00	100.00
4	I agree with the sanction of the perpetrators who litter	27	49	21	1	3	26.73	48.51	20.79	0.99	2.97	100.00
5	I am ready to invite family, friends and friends to do environmentally friendly activities	19	51	27	3	1	18.81	50.50	26.73	2.97	0.99	100.00
6	I'm ready to switch to a more environmentally friendly farm	24	50	25	1	1	23.76	49.50	24.75	0.99	0.99	100.00

Environmental Awareness based on cognitive, Affective, Active, and Conative

With the results, all statements from Q1-Q46 show positive and significant correlation values. This means that there is a fairly strong and statistically meaningful relationship between each statement and the variable being tested. The correlation value ranges from 0.523 to 0.644, which falls into the medium to strong category. A double asterisk (**) indicates that the relationship is significant at a high confidence level (usually $p < 0.01$). This means that it is likely that this relationship did not happen by chance.

Environmental awareness of the cognitive dimension

Based on the results of Pearson Correlation analysis between each statement (Q1 to Q18), the value of the correlation coefficient was obtained which ranged from 0.573 to 0.759. All correlation values displayed

are marked ** (two stars), indicating that the correlation is significant at a significance level of 0.01 (2-tailed). This means that there is a strong and significant relationship between each statement and the variable being measured.

In more detail, the highest correlation value is found in the Q14 statement with a value of 0.759, followed by Q10 (0.749), Q5 (0.742), and Q17 (0.728). This suggests that these statements have a very strong relationship with the variables being studied. Meanwhile, the lowest correlation value was found in the Q18 statement with a value of 0.573 but remained in the category of strong and significant relationships. Overall, these results indicate that all statements in the questionnaire have good validity because they are able to show a significant relationship with the variables being measured. Thus, the instrument used in this study can be declared valid based on the results of the Pearson correlation test. Shown in Table 6.

TABLE 6: Environmental Awareness of The Cognitive Dimension.

Question	Pearson Correlation	Question	Pearson Correlation
	Sig. (2-tailed)		Sig. (2-tailed)
Q1	.674**	Q10	.749**
Q2	.606**	Q11	.697**
Q3	.717**	Q12	.720**
Q4	.610**	Q13	.701**
Q5	.742**	Q14	.759**
Q6	.636**	Q15	.618**
Q7	.630**	Q16	.616**
Q8	.648**	Q17	.728**
Q9	.664**	Q18	.573**

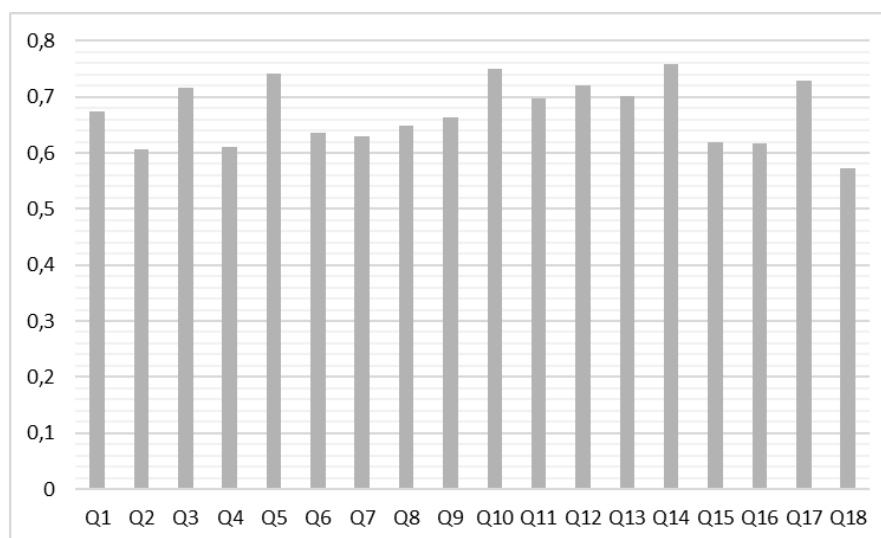


FIGURE 1: Environmental Awareness of The Cognitive Dimension.

Environmental awareness for affective dimensions

The results of the preparation of environmental awareness instruments for the affective dimension are as follows: Based on the results of Pearson correlation analysis between several statements (Q19–Q29), a correlation coefficient value (Pearson Correlations) was obtained which shows that there is a strong to very strong relationship between the variables studied. All correlation values displayed are also marked ** (two stars), indicating that the relationship is statistically significant at a 99% confidence level ($p < 0.01$). In detail, the Pearson correlation values for each of the statements written in Table 7, are as follows: Q19 has a correlation value of 0.466, which indicates a moderate relationship.

Q20 and Q21 have correlation values of 0.662 and 0.678, respectively, which fall into the strong category. Q22 showed a correlation value of 0.610, also belonging to the strong category. Q23 and Q24 have very strong correlation values, which are 0.742 and 0.719. For the next group, Q25 and Q26 show very high correlation values, which are 0.763 and 0.795. Q27 and Q28 have correlation values of 0.600 and 0.555, which belong to the strong category. Lastly, Q29 shows a correlation value of 0.703, which also belongs to the very strong category. Overall, these results indicate that there is a significant and strong relationship between the statements tested in this study. Thus, it can be concluded that the variables measured are positively and significantly correlated with each other.

TABLE 7: Environmental Awareness for Affective Dimensions.

Question	Pearson Correlation	Question	Pearson Correlation
	Sig. (2-tailed)		Sig. (2-tailed)
Q19	.466**	Q25	.763**
Q20	.662**	Q26	.795**
Q21	.678**	Q27	.600**
Q22	.610**	Q28	.555**
Q23	.742**	Q29	.703**
Q24	.719**		

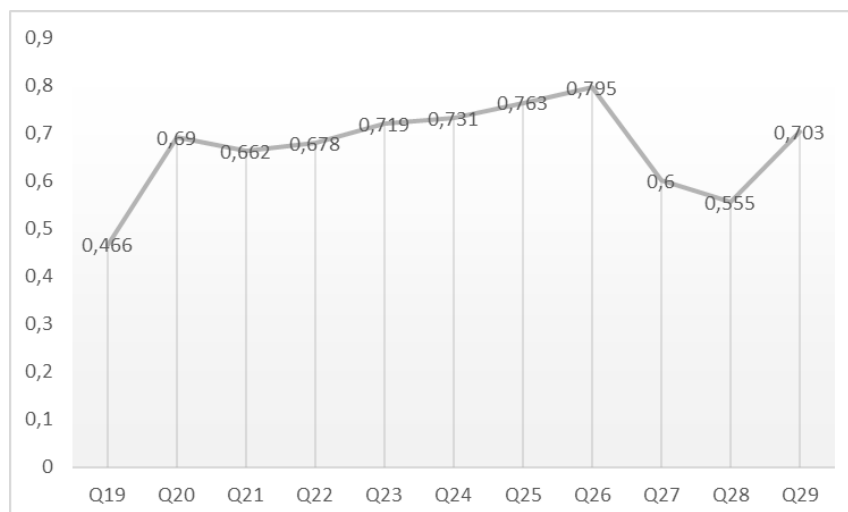


FIGURE 2: Environmental Awareness for Affective Dimensions.

Environmental awareness for the Active dimension

The results of the preparation of the environmental awareness instrument for the Active dimension in Table 8, based on the results of Pearson's correlation analysis, obtained several important findings related to the relationship between statements (Q30 to Q40) in this study. The Pearson Correlation value indicates the degree of correlation between each statement, where a double asterisk (**) indicates that the relationship is significant at a certain level of significance (usually $p < 0.01$).

In detail, the Q30 statement has a correlation value of 0.431**, which indicates a positive and significant relationship with the variables analyzed. Furthermore, Q31 shows a correlation of 0.494**, while Q32 has a slightly higher correlation value of 0.522**. The Q33 statement displayed the highest correlation value among all statements, with a figure of 0.725**, indicating a very strong and significant relationship. The Q34 and Q35 statements have correlation values of 0.492** and 0.579** respectively, which also indicate a fairly strong and significant positive relationship.

For the Q36 statement, the correlation value obtained is 0.540**, followed by Q37 with a value of 0.457**, and Q38 with a value of 0.368**. Although Q38 has the lowest correlation value among other statements, it still shows a significant relationship. Meanwhile, Q39 obtained a correlation value of 0.584**, and Q40 of 0.477**.

These two values also indicate a positive and significant relationship. Overall, all statements (Q30 to Q40) showed a positive and significant relationship with the variables analyzed, with correlation strengths varying from moderate to very strong. These findings indicate that there is a close relationship between these statements, which can be the basis for decision-making or drawing conclusions in this study.

TABLE 8: Environmental Awareness for The Active Dimension.

Question	Pearson Correlation	Question	Pearson Correlation
	Sig. (2-tailed)		Sig. (2-tailed)
Q30	.431**	Q36	.540**
Q31	.494**	Q37	.457**
Q32	.522**	Q38	.368**
Q33	.725**	Q39	.584**
Q34	.492**	Q40	.477**
Q35	.579**		

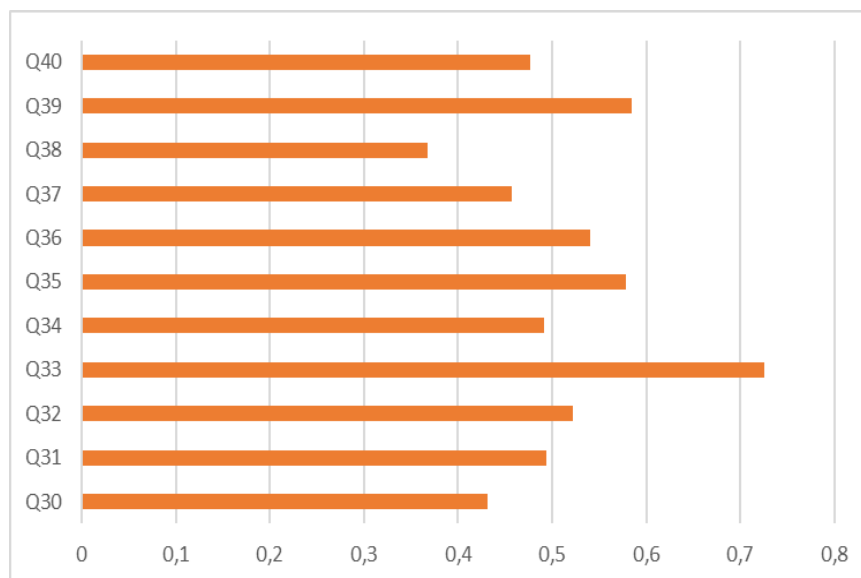


FIGURE 3: Environmental Awareness for The Active Dimension.

Environmental Awareness for the Conative Dimension

The results of the preparation of the environmental awareness instrument for the Conative Dimension are as follows:

TABLE 9: Environmental Awareness for The Conative Dimension.

Question	Pearson Correlation	Question	Pearson Correlation
	Sig. (2-tailed)		Sig. (2-tailed)
Q41	.553**	Q44	.589**
Q42	.627**	Q45	.605**
Q43	.523**	Q46	.644**

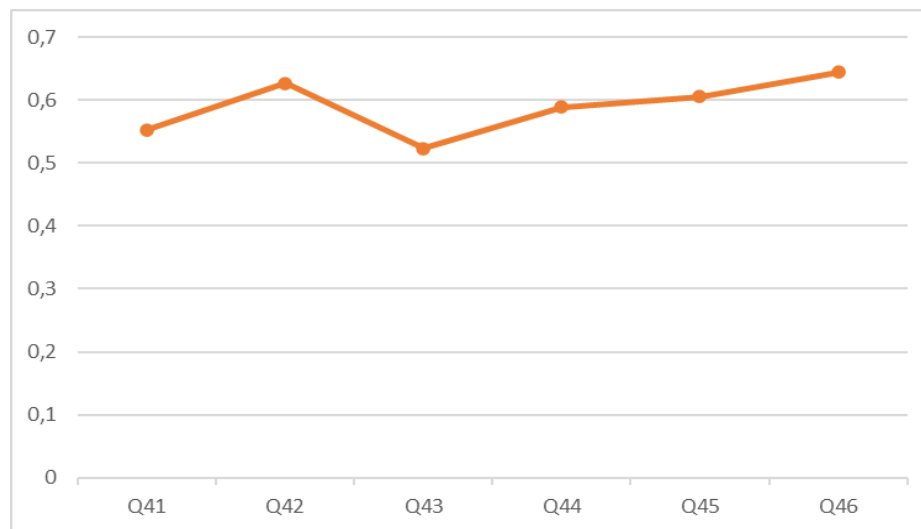


FIGURE 4: Environmental Awareness for The Conative Dimension.

Validation of measuring instruments is an important step in ensuring the accuracy and reliability of instruments used to measure the level of environmental awareness related to climate change in agricultural areas. In this case, a valid measurement tool will be able to accurately measure students' level of understanding, attitudes, and actions toward climate change that has a direct impact on agricultural businesses. Although students are not directly involved, they are expected to provide input, and suggestions or even become provisions when becoming agricultural business actors in the future. The validation process includes testing the validity of the content, construct validity, and reliability of the instrument through the statistical method of product-moment coefficient and reliability coefficient (*Cronbach's Alpha*). Previous research has shown that good validation of measurement tools can increase data confidence and help in designing more effective interventions to increase farmers' awareness and preparedness in the face of climate change (Hasan et al., 2017; Rahman & Sadikin, 2019).

After a statistical test was carried out on the results of the questionnaire, it was obtained that all the

items prepared were declared valid. For the cognitive dimension, it has the highest coefficient of 0.759 on the information indicator about environmentally friendly activities, the 14th statement is: "I know that vegetable waste can be used as compost and eco enzymes as organic fertilizers." In the affective dimension, the highest coefficient is in the 26th statement: "I am afraid that in the next few years, we will not have healthy soil and food to live on due to human actions. For the active dimension, the highest correlation coefficient is in the 33rd statement: "I set the water faucet and turn it off when not in use to save water. The conative dimension has the highest coefficient in the 42nd statement "I am ready to provide information about the dangers of pesticides to family, friends, and relatives at home". The reliability of the compiled methodology obtained an Alpha Cronbach reliability number of 0.752.

Analysis of Correlation Analysis Between Questions (cognitive, affective, active, and conative)

Based on the results of the Product correlation test at the moment using SPSS 25, the correlation data between the dimensions was obtained as follows:

TABLE 9: Correlation Between Cognitive, Affective, Active and Conative Dimensions.

		Cognitive Value	Affective Value	Active Value	Conative Value
Cognitive Value	Pearson Correlation	1	.833**	.543**	.498**
	Sig. (2-tailed)		0	0	0
	N	101	101	101	101
Affective Value	Pearson Correlation	.833**	1	.618**	.643**
	Sig. (2-tailed)	0		0	0
	N	101	101	101	101
Active Value	Pearson Correlation	.543**	.618**	1	.564**
	Sig. (2-tailed)	0	0		0
	N	101	101	101	101

		Cognitive Value	Affective Value	Active Value	Conative Value
Conative Value	Pearson Correlation	.498**	.643**	.564**	1
	Sig. (2-tailed)	0	0	0	
	N	101	101	101	101

** Correlation is significant at the 0.01 level (2-tailed).

Based on the results of Pearson's correlation analysis, it was found that all dimensions had a positive and significant relationship at a confidence level of 99% ($p < 0.01$). This shows that there is a close relationship between the four dimensions in the context of learning.

The Relationship between Cognitive Value and Affective Value

The value of the correlation coefficient between the cognitive and affective dimensions was $r = 0.833$ with a significance of $p = 0.000$, which indicates a very strong and positive relationship. This means that the higher the level of knowledge or understanding of the material (cognitive aspect), the more positive their attitude and feelings will be towards the learning process (affective aspect). This reinforces the importance of a learning approach that is able to build understanding while forming positive attitudes of students. A very strong relationship was found between cognitive and affective values ($r = 0.833$, $p < 0.01$).

The Relationship between Cognitive Value and Active Value

The correlation coefficient between cognitive and active values was $r = 0.543$ with $p = 0.000$, indicating a moderate positive relationship. This means that students who understand the material well tend to be more active in the learning process, such as participating in discussions, asking questions, and expressing opinions. Knowledge about eco-friendly agriculture and climate change is an important foundation in encouraging students' activeness in taking action to protect the environment. The relationship between cognitive and active values was moderate ($r = 0.543$). This is supported by research from Rahayu & Prasetyo (2018) which found that mastery of subject matter encourages students to be more confident in engaging in classroom activities such as discussions, presentations, and experiments. This finding is also in line with (Tanjung, A., Rachman, I. & Matsumoto, 2024) that to improve waste separation and recycling practices on campus, it is recommended to integrate environmental knowledge (EK) into daily life, students' critical thinking skills, which is an important indicator in shaping environmental awareness. (Pramuji, L., Permasari, A., & Ardianto, D. (2020). low-carbon education is one of the solutions to provide knowledge to students related to low-carbon behavior. (Rachman, I. & Hasibuan, F. 2019)

The Relationship between Cognitive Value and Conative Value

The correlation value between cognitive and conative dimensions was $r = 0.498$, with a significance level of

$p = 0.000$. This shows a moderate positive relationship, which indicates that cognitive mastery also influences students' willingness to act or behave. In other words, students who have a good understanding will tend to have a strong intention to apply their knowledge in protecting the environment and actions to prevent further climate change. This is in line with (Tanjung, A., Rachman, I. & Matsumoto, 2024) that waste separation and recycling intentions in pre-service teacher candidates are mainly influenced by five internal subjective factors and three external factors. Environmental education (EE), perceived behavioral control, and environmental knowledge (EK) showed the most significant relationships, with EE having the largest direct effect. According to a study from Suryani & Wulandari (2022) which revealed that understanding material can encourage students to apply this knowledge in their daily lives.

The Relationship Between Affective Value and Active Value

The relationship between the affective and active dimensions was obtained with a correlation coefficient of $r = 0.618$ with $p = 0.000$, indicating a strong and positive relationship. A good attitude and perspective on environmental conservation is proven to have an effect on the level of students' ability to act. The more positive the student's attitude towards learning, the higher the level of activity in taking action to protect the environment from further climate change. A strong correlation ($r = 0.618$) between affective and active showed that students' positive attitudes were directly proportional to their level of participation in the learning process. This is consistent with the findings from Kukuh (2018) which states that there is a positive relationship between attitudes and behaviors of caring for the environment in students.

The Relationship between Affective Values and Conative Values

The correlation coefficient of $r = 0.643$ with $p = 0.000$ shows that there is a strong and positive relationship between affective and conative values. Students who have a positive attitude towards learning also show a high intention to behave according to the values they believe. It emphasizes the importance of forming a pro-environmental sika with student behavior. This relationship was also quite strong ($r = 0.643$), suggesting that students' attitudes and values had an effect on their willingness to act. Research by Ningsih et al. (2016) shows that students who have empathy, responsibility, and internal motivation will show more consistent and directed learning behaviors.

The Relationship between Active Value and Conative Value

The relationship between active and conative values has a correlation value of $r = 0.564$ and $p = 0.000$, indicating a moderate to strong positive relationship. Students' activeness in learning is strongly correlated with their intention and willingness to take tangible action in learning. Active participation reflects not only physical involvement but also mental and emotional readiness to act. The relationship between active and conative values ($r = 0.564$) showed that students' active participation in learning contributed to the formation of positive willpower. This is in line with the results of a study by Putri & Ramadhan (2019) which states that students' active involvement plays a big role in forming independent and responsible learning habits.

CONCLUSION

From the results of the validation with the Product Moment Correlation test and the reliability test, an instrument containing 46 statement items containing cognitive, affective, conative, and active dimensions was obtained with a coefficient of Product Moment r value with a significance level of 5% for the number of 100 respondents set at 0.195 and a significance level of 1% with an r -value of 0.256. All items were declared valid with the lowest r value of 0.368 and the highest r of 0.795. The test results also stated that the instrument tested was reliable with a reliability Alpha Cronbach coefficient of 0.752. Hopefully, the instrument can be useful for research with a similar context in measuring the environmental awareness of high school students in agricultural areas.

The results of this study provide an idea that the four dimensions - cognitive, affective, active, and conative support and reinforce each other. Therefore, in learning planning, teachers should not only focus on the cognitive aspect (knowledge) but also pay attention to the formation of attitudes, active participation, as well as students' motivation and willingness to act to be more sensitive in protecting the environment so that good environmental awareness is formed. Learning not only makes students smart in terms of cognition but also has the attitude, intention, and willingness to act to be sensitive to the environmental conditions around them, so that they will act wisely and be more aware of the environment.

Learning that touches on these four aspects as a whole will be more effective in shaping the character of students who are not only intellectually intelligent, but also have positive and constructive attitudes, involvement, and learning behaviors.

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