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Analysis of Students' Pro-Environmental Awareness and Behavior with the AQAL Quadrant at SMA Negeri 1 Medan

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Abstract
Generation Z demonstrates a high level of concern for environmental issues, yet their pro-environmental behavior remains inconsistent. SMA Negeri 1 Medan is recognized as a leading school with adequate facilities, though the level of environmental awareness and behavior among its students is not yet well understood. The use of the AQAL quadrant in analyzing these aspects remains limited, even though this approach can offer a comprehensive analysis across internal and external, as well as individual and collective dimensions. This research aims to analyze the environmental awareness and pro-environmental behavior of students at SMA Negeri 1 Medan. A mixed-methods approach with a sequential explanatory strategy was employed, involving 72 students from grades X and XI. Data were collected through questionnaires, interviews, and observations, then analyzed using the AQAL quadrant approach to integrate quantitative and qualitative findings. The students demonstrated a very high level of environmental awareness (level 5), while their pro-environmental behavior was at a moderate level (level 3), often driven by instructions or competitive activities. The school culture reached a good level (level 4), and the school's policies strongly supported sustainability (level 5), although consistent implementation by all members of the school community still needs improvement. This indicates that high environmental knowledge, a sustainability-oriented culture, and supportive school policies have not yet significantly translated into consistent pro-environmental behavior among students.

Keywords: Awareness, Behavior, Pro-enviromental, Student, AQAL quadrants.

INTRODUCTION

Human life is heavily dependent on the environment. However, rapid development has also led to negative impacts such as environmental degradation and declining quality of life (Rustam et al., 2020). The environment encompasses physical and biological factors that influence the lives of organisms, while the living environment involves essential elements for the well-being of living beings. In middle- and low-income countries, pollution and environmental degradation have become serious due to poverty, lack of regulation, weak law enforcement, and low public awareness of the impacts (Khan et al., 2022; Ford et al., 2021).

Environmental damage has caused an imbalance in the living environment, which some communities no longer consider a fundamental issue (Ukaogo et al., 2020). The negative impacts of environmental degradation continue to increase, such as floods, landslides, deforestation, and pollution. These various disasters further worsen the condition of the Earth. According to a report by the Indonesian Ministry of Environment 2023, Indonesia's Environmental Quality Index (IKLH) increased compared to 2022, which was 72.54 points. This figure exceeds the set target of 69.48 points. However, it is still

recorded that water quality in Indonesia, especially in major cities, has been polluted.

To confront this phenomenon, efforts are needed to reduce environmental damage. One way is to implement the eco-friendly concept of "go-green" (Hermawan et al., 2023). Building ecological awareness is a crucial step in realizing eco-friendly behavior. This conscious action aims to minimize the negative impacts of various human activities on the environment and strives to improve environmental conditions directly or indirectly (Naura et al., 2022).

Human behavior, including behavior towards the environment, is generally formed through stages of knowledge, attitude, and real behavior. Environmental awareness is crucial as a bridge between expertise and eco-friendly behavior (Sugiarto & Gabriella, 2020). This awareness is a primary requirement in preserving nature, as it reflects individual concern and knowledge of the impact of their behavior on the environment (Fu et al., 2020). Individuals with high awareness tend to be more ecologically responsible, while a lack of understanding leads to passive attitudes and dependence on government policies (Yuso et al., 2020).

Environmental awareness is a key factor in shaping pro-environmental behavior, which must be instilled early through school education (Jumirah et al., 2021). As formal learning environments, schools play a role in creating a competitive and environmentally conscious generation. A clean, safe, and green learning environment requires active participation from all school members, especially students. However, ecologically unfriendly behaviors such as littering and damaging school facilities are often encountered, even though cleanliness facilities are available (Hamidah et al., 2023). If left unchecked, these habits can negatively impact students' comfort, school image, and cognitive, affective and impairing psychomotor development (Munawar et al., 2019).

Schools serve as agents of change in shaping students' environmental awareness and pro-environmental behavior through effective education (Hasnidar, 2019). Inadequate environmental education risks fostering apathy, while intensive education can build students' mental readiness and tendency to behave in an environmentally friendly manner. Generation Z, including current high school students, has quick access to environmental issues but has not shown consistency in their pro-environmental behavior (Hernandez-de-Menendez et al., 2020).

Findings from the Pew Research Center in 2021 indicate that Generation Z has quick access to environmental issues. Still, their eco-friendly behavior is inconsistent due to a gap between critical understanding and real action in protecting the environment (Ardhiyansyah et al., 2023). Sarsavati (2024) outlines that several factors, such as a consumptive lifestyle, lack of environmental education, social media pressure, and economic challenges, are the leading causes of low ecological awareness and pro-environmental behavior among the younger generation. School policies that support environmental concern are crucial in shaping students' environmental awareness and behavior, although their implementation in many schools is still suboptimal and inconsistent (Ginting, 2024; Rahmah, 2018; Nur et al., 2023).

SMA Negeri 1 Medan, one of the most favored schools with adequate educational facilities, has implemented environmental policies to the fullest. Good infrastructure support is expected to encourage students to have environmental awareness and eco-friendly behavior. However, the extent to which students truly possess awareness and apply pro-environmental behavior is still not definitively known, necessitating further research to examine this matter.

Many studies highlight the urgency of environmental awareness and students' pro-environmental behavior. Nevertheless, approaches integrating various perspectives through the AQAL Quadrant (All Quadrants All Levels) are rarely undertaken. The AQAL Quadrant, developed by Ken Wilber in his Integral Theory, can serve as a bridge in understanding how students comprehend environmental issues individually (internal-individual quadrant) and assess collective behavior and school culture in supporting environmental awareness (external-collective quadrant).

This research offers an approach to understanding students' environmental awareness and pro-environmental behavior through the application of the AQAL Quadrant, which has not been widely used. This quadrant emphasizes the balance between internal and external aspects influencing students' environmental behavior and awareness. Research exploring how environmental awareness is formed through personal (internal), behavioral (external), cultural, and school system dimensions is still limited.

The AQAL Quadrant can analyze students' environmental awareness and pro-environmental behavior due to its ability to examine aspects of awareness from various comprehensive perspectives. This research is expected to address the application of the AQAL Quadrant in understanding the formation of students' environmental awareness and eco-friendly behavior at SMA Negeri 1 Medan.

RESEARCH METHODS

Location and Time of Research

This research was conducted from February to March 2025 at SMA Negeri 1 Medan, Jalan Teuku Cik Ditiro No. 1, Madras Hulu Subdistrict, Medan Polonia District, Medan, North Sumatra. The school is one of the most prestigious in the city and has a strong reputation.

Population and Sample

The population of this research consists of all active students at SMA Negeri 1 Medan during the 2024/2025 academic year. The sample was selected using the cluster random sampling technique because the population was already naturally divided into classes, allowing for random selection of these clusters. Cluster random sampling was used because this research involved a large population, so the choice was made based on groups or classes randomly. Based on the draw results, two classes were selected as samples in this research, namely class X8 and XI3, totaling 72 students.

Data Collection Techniques

The data collection techniques used in this research are divided into three, namely:

1. The observation was carried out through direct observation of the objects and documented in written notes. It aimed to examine the school's environmental facilities.
2. Interviews were conducted with the Geography teacher at SMA Negeri 1 Medan to obtain information regarding the teacher's role and perspective on students' concern for environmental issues.
3. Questionnaires, or closed-ended questionnaires, were used in this research because respondents only needed to mark one of the answers they deemed correct. The questionnaires were distributed both in hard copy and via Google Form. The Quadrants of Awareness, Behavior, and School Culture questionnaires were given to the students. In contrast, the School Policy Quadrant questionnaire was given to the Vice Principal for Curriculum Affairs. The analysis guide used in the questionnaire applied the Likert scale and the Guttman scale (specifically for knowledge indicators).

Data Analysis Techniques

This research used a mixed-methods approach, which combines quantitative and qualitative methods through a sequential explanatory strategy. In this strategy, the research begins with the collection and analysis of quantitative data as the first stage. Afterward, qualitative data collection and analysis are carried out based on the initial findings from the quantitative data. In this approach, quantitative data is prioritized or given greater weight in the research process.

Quantitative analysis

The data was processed using SPSS 25.0 for validity and reliability tests, then analyzed through frequency tabulation for further interpretation. To group the research results into various levels, interval calculations were used with the formula:

$$Interval = \frac{maximum - minimum\ score}{Number\ of\ classes}$$

$$Interval = \frac{60 - 15}{5} = 9$$

Based on the results of interval calculations, the level of students' pro-environmental awareness and behavior is categorized as follows:

Table 1. Interval Interpretation Category

No	Interval	Percentage	Interpretation
1	51 – 60	85% – 100%	Very High
2	42 – 50	70% – 84%	High
3	33 – 41	55% – 69%	Moderate
4	24 – 32	40% – 54%	Low
5	15 – 23	25% – 39%	Very Low

(Source: Primary Data Processing, 2025)

After the interval value for each level is obtained, the value obtained from the questionnaire is then expressed as a percentage according to the score obtained using the formula:

$$P = \frac{F}{n} \times 100\%$$

Information:
P = Percentage
f = Total responses for all items
n = Total ideal score per item

To determine the respondent's score category position, the average formula is used:

$$\bar{X} = \frac{\sum X}{n}$$

Information:
$\bar{X}$ = Average score
$\sum X$ = Total overall score of respondents
n = Number of respondents

The calculation of the environmental awareness quadrant in this research takes a different approach due to the various types of measurement scales. The knowledge indicator uses the Guttman scale (0–1), while attitudes and actions use a 4-point Likert scale, unlike the other three quadrants, which all use the Likert scale. To equalize the scale and maintain consistency between quadrants, the scores are normalized into percentages, then interpolated linearly into a scale of 15–60, so the results remain accurate and comparable. The formula used is.

$$\bar{X} = \left(\frac{P - P_{min}}{P_{max} - P_{min}}\right) x\ (S_{max} - S_{min}) + S_{min}$$

Information:
P : Percentage of calculation results from indicators
P_{min} : Lower limit of percentage in category (85%)
P_{max} : Upper limit of percentage in

category (100%)

S_{min} : AQAL quadrant score at lower limit of category (51)

S_{max} : AQAL quadrant score at upper limit of category (60)

Plotting AQAL quadrants

The quantitative data is then analyzed using the AQAL (All Quadrants All Levels) quadrant model. Data from the questionnaire and observation results are processed into four quadrants. The AQAL quadrant in this study was designed using Wondershare EdrawMax to visualize data distribution. In this quadrant, there are five levels used, namely:

Table 2. Balance Classification in the AQAL Quadrant

Quadrant	Level
Individual Interior (Awareness)	Very Low Awareness Low Awareness Moderate Awareness High Awareness Very High Awareness
Collective Interior (Culture)	Unconcerned Culture Emerging Awareness Culture Participatory Culture Sustainable Culture Pro-Environmental Culture
Individual Exterior (Behavior)	Very Passive Behavior Passive Behavior Moderate Behavior Active Behavior Very Active Behavior
Collective Exterior (School System)	No System Minimal System Developing System Supportive System Pro-Environmental System

(Source: Data Processing, 2025)

RESULTS AND DISCUSSION

Quadrant of Awerness

The awareness quadrant's measurement includes three leading indicators: knowledge, attitude, and action, as shown in Table 3.

Table 3. Awareness Quadrant Measurement Results

Indicator	Percentage
Knowledge	97,59
Attitude	88,89
Action	76,91

(Source: Data Processing, 2025)

Based on Table 3, the level of students' knowledge about environmental issues is in the very high category (97.59%), followed by attitudes that are also high (88.89%) but have not been fully reflected in actions, which obtained a lower score (76.98%). This pattern of decline from knowledge to attitude to action shows a gap between cognitive understanding and real implementation, where even though students have positive knowledge and attitudes towards environmental conservation, their application in daily behavior still needs to be improved. Each indicator of the awareness quadrant consists of several dimensions, namely:

1) Knowledge Dimension
   - Now has a score of 99.31%, meaning that almost all respondents recognize the recycling symbol and understand human activities such as fossil burning as a cause of air pollution.
   - Comprehension has a score of 95.83%, meaning that most students understand the cause-and-effect relationship in environmental issues, such as the impact of electricity, waste, and tree planting.
   - The application has a score of 99.07%, meaning that students can apply environmental knowledge in everyday life, such as carrying a tumbler and utilizing used goods.
   - Analysis has a score of 97.92%, meaning that students can identify the causes and impacts of environmental problems such as deforestation and excessive electricity consumption.
   - Synthesis has a score of 94.91%, meaning that students can design creative solutions such as greening programs and environmental education in schools.
   - Evaluation has a score of 100%, meaning that students can assess and support environmentally friendly actions (Table 4).

Table 4. Knowledge Dimension Measurement Results

Dimension	Percentage
Know	99,31%
Comprehension	95,83%
Application	99,07%
Analysis	97,92%
Synthesis	94,91%
Evaluation	100%

(Source: Data Processing, 2025)

2) Attitude Dimension
   - Receiving has a score of 93.63%, meaning that most students are open to environmental information and values and are aware of the impact of their actions on the environment.
   - Responding has a score of 84.14%, meaning that students show concern by providing positive responses and participation in environmental issues.
   - Valuing has a score of 90.45%, meaning that students respect sustainability values and support school environmental conservation efforts.
   - Responsible has a score of 87.33%, meaning that students are aware of their active role in maintaining the cleanliness and sustainability of the surrounding environment, such as throwing trash in its place without being asked or inviting friends to save electricity in class (Table 5).

Table 5. Attitude Dimension Measurement Results

Dimension	Percentage
Receiving	93,63%
Responding	84,14%
Valuing	90,45%
Responsible	87,33%

(Source: Data Processing, 2025)

3) Action Dimension
   - Perception has a score of 81.94%, which means that most students understand the impact of their actions on the environment, such as maintaining school cleanliness, because they believe that small actions, such as waste management, can have a positive impact.
   - Guided response has a score of 73.73%, which means that students are willing to follow the teacher's instructions in environmental activities, such as turning off lights when not in use.
   - Mechanism has a score of 80.73%, meaning that students can carry out pro-environmental actions automatically without being reminded, such as using a tumbler and throwing trash in its place.
   - Adoption has a score of 71.35%, which means that students have independently integrated environmentally friendly habits into their daily lives, such as using paper (Table 6).

Table 6. Action Dimension Measurement Results

Dimension	Percentage
Perception	81,94%
Guided response	73,73%
Mechanism	80,73%
Adoption	71,35%

(Source: Data Processing, 2025)

Of the three indicators of awareness, knowledge scored 97.59%, attitude 88.89%, and action 76.91%. These three values are averaged to obtain the student's level of environmental awareness by calculating:

$$Mean = \frac{97{,}59 + 88{,}89 + 76{,}91}{3} = 87{,}80\%$$

Based on the calculation above, the average value of students' environmental awareness level is 87.80%. This value is used to calculate the awareness quadrant score with the following formula.

$$\bar{X} = \left(\frac{P - P_{min}}{P_{max} - P_{min}}\right) x\ (S_{max} - S_{min}) + S_{min}$$

$$\bar{X} = \left(\frac{87{,}80 - 85}{100 - 85}\right) x\ (60 - 51) + 51$$

$$\bar{X} = 0{,}1867x\ 9 + 51$$

$$\bar{X} = 1{,}6803 + 51 = 52{,}68 \text{ or } 53$$

Based on the calculation results, the average student awareness score is 52.68 or 53, which is included in the level 5 category (Very High). This score is visualized in the AQAL quadrant to see the following distribution of environmental awareness levels.

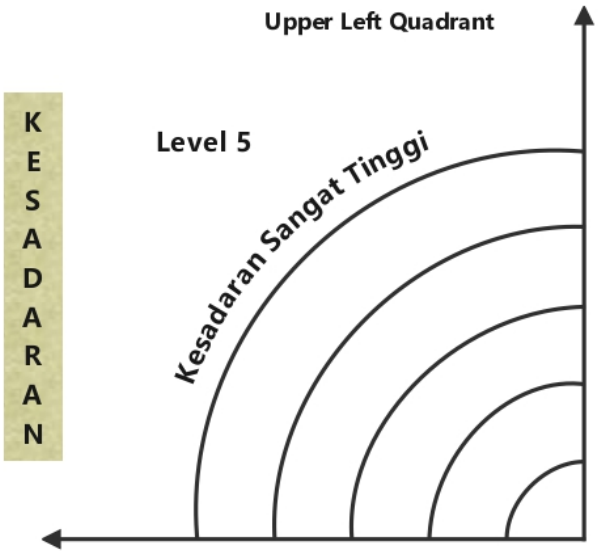

Figure 1. Plotting the Quadrants of Awareness (Source: Data Processing, 2025)

Behavior Quadrant

In this research, the behavioral quadrant reflects students' real actions in implementing pro-environmental behavior, which includes six main indicators

Table 7. Behavior Quadrant Measurement Results

Indicator	Percentage
Energy conservation	72,45%
Mobility and transportation	62,04%
Waste avoidance	72,57%
Recycling	65,63%
Consumerism	65,97%
Vicarious behaviors toward conservation	70,49%

(Source: Data Processing, 2025)

Based on the measurement results above, six indicators show that students have demonstrated awareness in several aspects of environmental behavior. The description per indicator is explained as follows.

- Energy conservation with a score of 72.45% shows that students have good habits in saving energy, such as turning off lights and electronic devices after use. However, excessive use of electricity, such as charging cellphones during learning and turning on the AC continuously, is still a challenge.
- Mobility and transportation, with a score of 62.04%, most students still rely on private fossil-fueled vehicles, although some walk or cycle for short distances. The choice of transportation mode is

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potentially driven more by convenience than environmental considerations.

- Avoiding waste with a score of 72.57% shows that students are quite good at reducing waste, such as bringing their drinking bottles and using cloths. However, many food and beverage products in the canteen are still packaged in single-use plastic.
- Recycling, with a score of 65.63%, shows that students have started to practice simple recycling practices, such as reusing paper for notes. However, more complex recycling practices are rarely done and are limited to group activities.
- Consumerism with a score of 65.97% shows that students' awareness of sustainable consumption is still low, although some have started to choose products with environmentally friendly packaging. Unfortunately, purchasing decisions are potentially more influenced by preference, price, and availability than environmental reasons.
- Vicarious behaviors toward conservation, with a score of 70.49%, students actively support conservation indirectly through participation in environmental activities and self-education. This contributes to building a culture of environmental care in schools.

To find out the level of student behavior in the AQAL quadrant, the average score of pro-environmental behavior is calculated using the formula:

$$\bar{X} = \frac{\sum X}{n}$$

$$\overline{\mathrm{X}} = \frac{2.953}{72}$$

$$\bar{X} = 41{,}01 \text{ or } 41$$

Based on the calculation results, the average value of student behavior is at a score of 41.01, which is included in the level 3 category (Moderate). This score is visualized into the AQAL quadrant as follows.

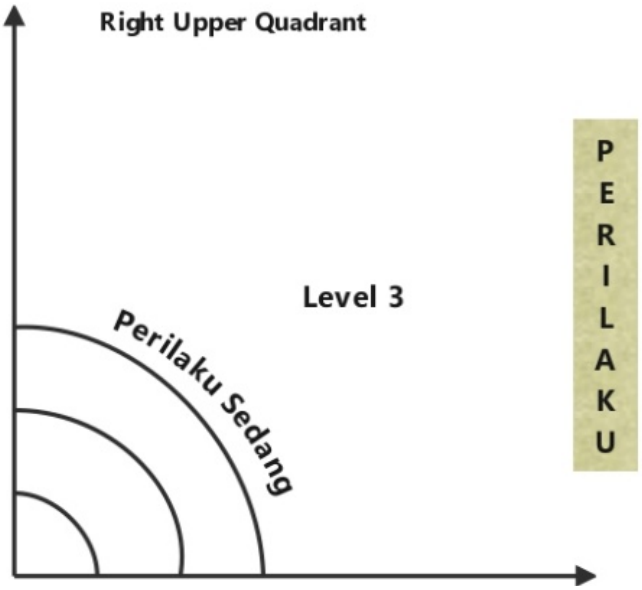

Figure 2. Plotting the Behavior Quadrant (Source: Data Processing, 2025)

Cultural Quadrant

The cultural quadrant is measured based on the cultural dimension theory developed by Hofstede. The measurement results are described in the following Table 8.

Table 8. Cultural Quadrant Measurement Results

Indicator	Percentage
Individualism vs collectivism	83,33%
Time orientation	80,90%
Uncertainty avoidance	80,09%
Masculinity vs feminity	80,56%
Power distance	82,29%

(Source: Data Processing, 2025)

- Individualism vs collectivism, with a score of 83.33% shows that students prioritize cooperation in protecting the environment, and feel comfortable working in groups rather than individually. Concern for friends and a sense of responsibility towards the group encourage their active participation.
- Time orientation with a score of 80.90% shows that students have a high awareness of the long-term impact of their actions on the environment. They are more motivated by sustainable programs and tangible results that encourage long-term commitment.
- Uncertainty avoidance with a score of 80.09% shows that students prefer clear rules and organized structures in protecting the environment. They feel uncomfortable in situations without direction, although some are open to new approaches.
- Masculinity vs femininity with a score of 80.56%, student culture tends to be masculine, marked by a competitive spirit in maintaining the environment. The cleanliness competition between classes triggers their enthusiasm.
- Power distance with a score of 82.29% shows that students accept hierarchy and are more active in environmental activities when directed by authority figures such as teachers. However, they still feel entitled to provide input on school environmental policies.

To determine the level of school culture in the AQAL quadrant, the average score of pro-environmental behavior is calculated using the formula.

$$\bar{X} = \frac{\sum X}{n}$$

$$\bar{X} = \frac{3.518}{72}$$

$$\bar{X} = 48{,}86 \text{ or } 49$$

Based on these calculations, students' pro-environmental culture is at level 4, which is included in the Sustainable Culture category and is visualized in the AQAL quadrant.

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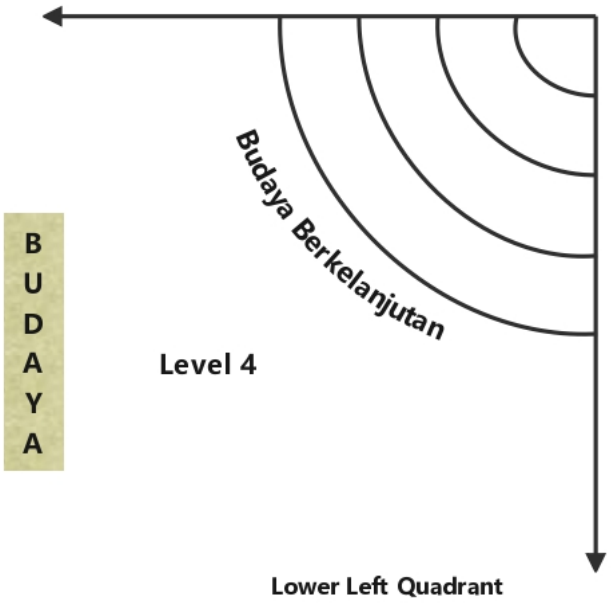

Figure 3. Plotting the Cultural Quadrant (Source: Data Processing, 2025)

System and Structure Quadrant

The system and structure quadrant reflects how the policies implemented at SMAN 1 Medan support environmental awareness among students.

Table 9. System and Structure Quadrant Measurement Results

Indicator	Persentase
Curriculum	80%
Management of resources	95%
Management of school grounds	95%

(Source: Data Processing, 2025)

a) Curriculum

A score of 80% indicates that the integration of environmental education in the curriculum of SMA Negeri 1 Medan is very good. School policies promote environmental care through cross-subject learning and regular internal communication, with teachers encouraging students to clean up before class. Geography classes use green spaces for outdoor learning, which Mr. Juanda, S.Pd, sees as an effective way to build environmental awareness.

"*Yeah, in Geography class, there is much material we can connect directly to the surrounding environment. One example is when we talk about different types of rocks. Since there are some natural stones around the school yard, I asked the students to observe their physical features directly. It's really beneficial because the kids become more active when they can actually see the objects they are learning about.*"

b) Management of resources

In the management of resources indicator, a value of 95% was obtained. A very high value on this indicator indicates that SMA Negeri 1 Medan has a clear policy in managing the use of resources, such as water and electricity for daily activities. The school also minimizes use of harmful materials like single-use plastics, opting for eco-friendly alternatives.

c) Management of school grounds

With a score of 95%, management of school grounds at SMA Negeri 1 Medan

is classified as very high, marked by optimal land utilization and green open spaces that support a learning atmosphere. The school maintains green areas, supports environmental clubs like PALH, and provides one trash can per class but lacks separate bins for proper waste sorting.

To assess the system dimension in students' pro-environmental behavior through the AQAL quadrant model, data from one respondent was used, namely the Vice Principal for Curriculum. The scores obtained were:

$$\bar{X} = \frac{\sum X}{n}$$

$$\bar{X} = \frac{54}{1} = 54$$

The score of 54 indicates that the school system is at level 5, which is included in the Pro-Environmental System category.

The visualization of the system and structure section quadrants is shown as follows.

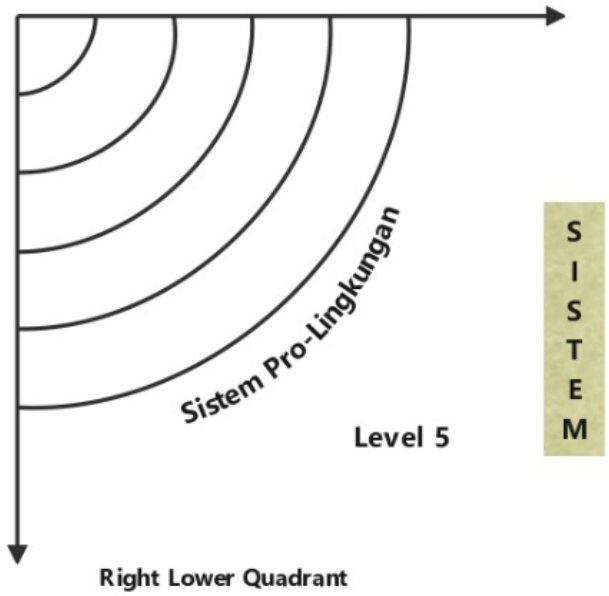

Figure 5. Plotting System and Structure Quadrants (Source: Data Processing, 2025)

Interpretation of AQAL Quadrant

After obtaining the measurement results above, it was found that each quadrant showed development towards different levels.

Table 10. Recapitulation of AQAL Quadrant Values at SMA Negeri 1 Medan

Quadrant	Value	Percentage	Level	Information
Awareness	53	88%	5	Very High Awareness
Behavior	42	70%	3	Moderate Behavior
Cultural	49	82%	4	Sustainable Cultural
System and Structure	54	90%	5	Pro-Environmental System

(Source: Data Processing, 2025)

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Based on Table 10, the Awareness and System and Structure quadrants are at a very high level. Meanwhile, the Behavior and Culture quadrants do not reach the optimal level as visualized below.

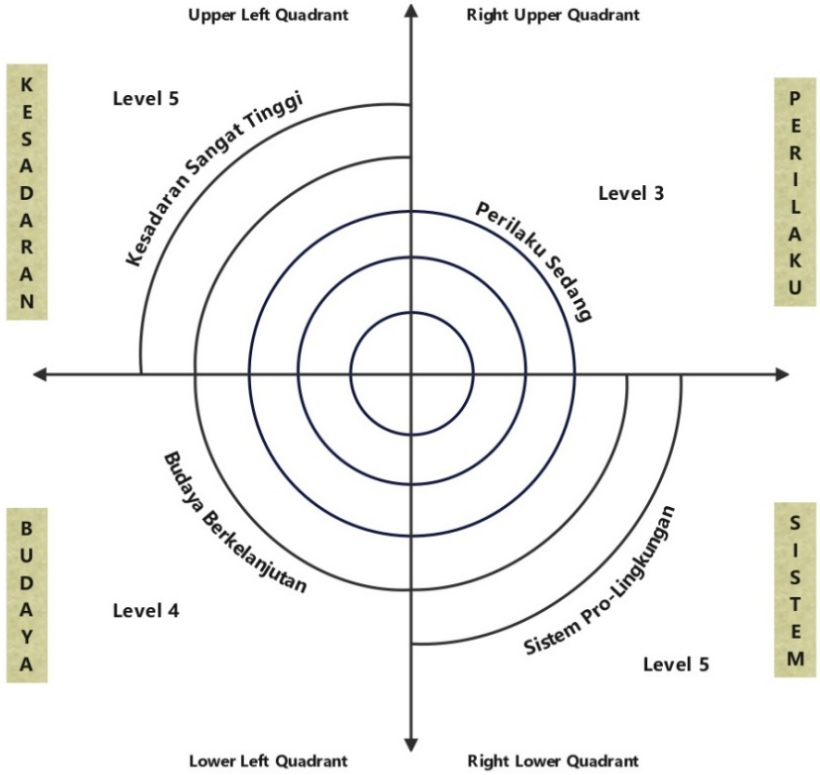

Figure 6. Plotting the AQAL Quadrant (Source: Data Processing, 2025)

Based on the image above, the level of each quadrant develops differently with the following details.

a) The Awareness Quadrant is at Level 5, indicating a very high level of awareness. This reflects a strong knowledge of environmental issues, where students of SMA Negeri 1 Medan not only know, but also internalize and apply pro-environmental principles in their daily lives. Programs and policies that support environmental awareness have been effectively integrated into the curriculum and school activities, making students feel responsible for environmental sustainability.
b) The Behavior Quadrant reaches Level 3, indicating that students' environmental behavior is still moderate. Although students' environmental awareness is quite good, the real implementation in the form of pro-environmental actions is not yet fully consistent. Students are involved in environmental activities, but the application of environmentally friendly behavior in daily life is still limited.
c) The Culture Quadrant is at Level 4, meaning that pro-environmental culture has begun to be accepted and applied well by students. Awareness of the urgency of environmental issues has grown rapidly among students, and there is active participation in various activities that support sustainability. However, this environmental culture has not yet fully taken root as a daily habit throughout the school community, but it has shown progress towards a sustainable culture.
d) The System and Structure Quadrant reaches Level 5, indicating that the existing systems and policies support sustainability comprehensively. The school has a strong and integrated policy in supporting pro-environmental

actions. Implementing policies and programs effectively encourages all aspects of school activities to focus on sustainability, thus creating an environment that supports pro-environmental actions.

The results of the AQAL quadrant measurement at SMA Negeri 1 Medan show an imbalance between awareness, behavior, culture, and system. In the awareness quadrant, students have a very high understanding (level 5) of environmental issues, while in the behavior quadrant, the application of pro-environmental behavior is still at a moderate level (level 3). This indicates that although students have good knowledge, the application of consistent behavior in everyday life has not been fully realized.

This lower behavior quadrant indicates a gap between existing knowledge and actions. On the other hand, the culture quadrant shows a higher value (level 4), indicating that a pro-environmental culture is starting to form and is accepted in schools. However, to achieve balance, further efforts are needed to strengthen this culture so that it can be applied consistently by all students. The system and structure quadrant also recorded high values (level 5), indicating that school policies and structural support are good at encouraging environmentally friendly practices.

Environmental Awareness of Students at SMA Negeri 1 Medan

The environmental awareness of students at SMA Negeri 1 Medan demonstrates a positive outcome. Based on measurements using the AQAL quadrant, students' awareness level is at Level 5, indicating a "Very High Awareness" of environmental issues. This reflects a firm understanding that extends beyond mere knowledge, encompassing the application of pro-environmental principles in daily life. Students not only possess knowledge but also exhibit active awareness in preserving and conserving their surrounding environment. This high level of awareness is driven by integrating environmental policies into the curriculum and school activities.

At SMA Negeri 1 Medan, environmental-based learning is implemented across various subjects, facilitating students' comprehension of the relationship between their actions and environmental impacts. This finding aligns with the research Hamid et al. (2024), which states that students' ability to engage in environmentally friendly behavior is influenced by the ease or difficulty of such actions, depending on available resources and their confidence. For instance, the availability of well-organized waste segregation facilities motivates students to adopt sustainable behaviors. Moreover, moral support from teachers and peers, along with the incorporation of sustainability principles in various subjects, reinforces their belief in making tangible changes.

Additionally, measuring cultural variables contributes to students' environmental awareness levels. A dominant collectivist culture, with a score of 83.33%, indicates that students prefer working in groups to achieve common goals, including maintaining environmental cleanliness. When there is collective awareness in environmental preservation, students feel a shared responsibility to protect nature and participate in pro-environmental activities like school clean-ups. According to Hofstede (2011) collectivist cultures emphasize social bonds and a sense of responsibility toward the group. In such societies, individuals tend to prioritize group interests over personal ones. These values are reflected in students' behavior, as they are more actively involved in environmental activities when conducted collectively. The success in enhancing environmental awareness is also evident from students' time orientation, reaching 80.90%.

Students at SMA Negeri 1 Medan exhibit concern for the long-term impacts of their actions. They understand that environmental preservation requires collective efforts and prefer programs with long-term effects. Findings by Susilawati et al. (2024) also indicate that students with a long-term time orientation are more active in environmental activities compared to those who only engage in spontaneous or ceremonial actions. Time orientation or long-term orientation reflects the extent to which a society values long-term planning, perseverance, and thrift in facing future challenges. In this research, the high time orientation score among students indicates an awareness that pro-environmental behavior is not merely a temporary obligation but a continuous responsibility for the planet's future.

School policies also play a crucial role in supporting students' environmental awareness. This is evident from the high scores achieved in resource and school environmental management, each scoring 95%. These policies include water and electricity management and reducing non-environmentally friendly single-use plastics. Research Jannah et al. (2022) found that clear and integrated policies support students' tangible actions in implementing environmentally friendly behavior at school and inspire them to apply such practices daily. While students' awareness of environmental issues is high, there remains a gap in pro-environmental behavior. In the behavior quadrant, a score of 70% indicates that environmental knowledge has not been fully translated into daily actions. This finding aligns with research by Alshehri (2024) in Saudi Arabia, which shows that students who understand environmental issues, such as climate change, still opt not to use public transportation, walk, or cycle. Only a small fraction of students genuinely demonstrate environmental responsibility through eco-friendly habits.

Students at SMA Negeri 1 Medan possess strong academic capabilities but tend to be apathetic toward environmental issues. Their environmental awareness is more influenced by external factors, such as teacher directives or cleanliness competitions, rather than internal motivation to care and act independently. This aligns with research Carducci et al. (2021) that explains that students tend to show concern for environmental issues but do not always follow through with concrete actions. Health risk perceptions and environmental health literacy affect attitudes but not necessarily behaviors. The internet and social media serve as primary information sources that encourage pro-environmental behavior.

Pro-Environmental Behavior of Students at SMA Negeri 1 Medan

The level of pro-environmental behavior among students at SMA Negeri 1 Medan shows significant results, although it does not yet fully reflect the high awareness possessed by the students. Based on the assessment using the AQAL quadrant model, the students' pro-environmental behavior remains at Level 3 (Moderate Behavior). Some aspects of pro-environmental behavior have been implemented well by students, but there are still challenges in improving awareness and consistency across various indicators. Regarding energy conservation, students are accustomed to turning off lights when leaving a room, but electricity usage for charging mobile phones during class time remains relatively high. Regarding mobility and transportation, private vehicles and online motorcycle taxis (ojek online) are preferred due to convenience, with little consideration for environmental impact. Waste-avoidance habits are evident in personal drinking bottles, but the school canteen still offers many single-use plastic packages. Meanwhile, recycling practices are still limited to simple actions, such as reusing paper for notes.

In the aspect of consumerism, some students have begun to consider

environmentally friendly products, but their purchasing decisions are more influenced by price and availability. On the other hand, involvement in conservation activities shows a pretty good level of commitment, especially in participating in environmental programs at school and within the community. One factor influencing students' pro-environmental behavior is the inconsistency in implementing eco-friendly practices outside school. Although the existing environmental policies at school are supportive, students face challenges in maintaining sustainable habits outside the school environment. For instance, while they are used to disposing of waste properly at school, this habit is often neglected at home or in public spaces. This condition indicates a gap between awareness and real action that must be addressed.

Another factor influencing students' pro-environmental behavior is the collective habits in their social environment. At SMA Negeri 1 Medan, a strong collectivist culture encourages students to participate in group environmental activities, such as school clean-ups and greening projects. However, in more personal aspects, such as reducing the use of single-use plastics or conserving water and electricity at home, this collective awareness is not yet firmly established. Students at SMA Negeri 1 Medan also show enthusiasm in participating in school-initiated activities, such as garbage clean-up programs. Nevertheless, applying pro-environmental behavior outside of school is still limited to temporary and unsustainable actions.

One positive example of pro-environmental behavior among students at SMA Negeri 1 Medan is their initiative to use reusable items such as personal drinking bottles. This behavior is often associated with increased environmental awareness. However, there is a possibility that the decision to use such bottles is more influenced by trends or lifestyle factors rather than sustainability concerns. This is in line with the findings that Rapada et al. (2021) state that the use of personal water bottles has become part of the modern lifestyle driven by social media, brand promotions, and aesthetic preferences. Many students use these bottles not out of environmental consciousness but because they are seen as more practical, stylish, or part of their social identity.

Additionally, SMA Negeri 1 Medan students prefer private or online ride-hailing services rather than public transportation. This habit contributes to increased carbon emissions and air pollution around the school. Research Haqqia et al. (2023) found that students' preference for private transportation in major Indonesian cities is influenced by comfort and time flexibility, even though their awareness of environmental impact is relatively high. A similar pattern is observed at SMA Negeri 1 Medan, where many students still opt for private or online transportation over public transit. The main reasons behind this decision are the distance from home to school and convenience.

Most students at SMA Negeri 1 Medan show enthusiasm for environmental activities. However, their concern for environmental issues tends to depend on direct instructions from teachers and the existence of school-based cleanliness competitions. Students tend to be more active in activities guided by teachers or those involving rewards, such as inter-class cleanliness competitions with a competitive element. Research by Khalid et al. (2024) shows that competition-based systems implemented in schools can increase students' motivation to behave more environmentally consciously, especially when rewards or recognition are given to the best-performing class. This also aligns with Hofstede (2011) cultural dimension theory, particularly the masculinity versus femininity dimension. In societies with higher masculinity scores, achievement, rewards, and competition are major

motivating factors. Rewards for cleanliness achievements serve as effective triggers to increase student engagement in pro-environmental activities.

However, outside these structured activities, many students demonstrate apathy toward environmental issues. They lack personal initiative to maintain cleanliness or reduce environmental harm unless there is external motivation. This condition shows that their environmental awareness is still situational and not yet fully internalized as a daily habit. According to Jufri et al. (2024), students' concern for the environment remains low and is perceived as not their responsibility. Many students feel powerless in preventing environmental damage. The belief that individual actions do not create change makes them increasingly apathetic.

CONCLUSION

The conclusion indicates that students possess a very high level of environmental awareness (level 5), particularly in terms of knowledge, although their attitudes and actions remain relatively lower. Students' pro-environmental behavior is at a moderate level (level 3) and tends to be influenced by instructions or competitions. The environmental culture at school has developed well (level 4), as shown by students' active participation in various activities. The school's policies strongly support sustainability (level 5), evident in its environmental management and extracurricular activities such as PALH. The support from school culture and systems has provided a strong foundation for students' environmental awareness. However, consistent behavioral change has not yet been fully achieved among students.

Based on the research findings, students are expected to be more consistent in applying environmentally friendly behavior, starting from simple habits and actively participating in sustainability initiatives. The school has demonstrated excellent support, but it could further enhance student motivation through reward systems, collaboration with NGOs, and the provision of separated waste bins in every classroom. The role of parents is also crucial in setting an example and supporting environmentally friendly habits at home. Parents should actively involve their children to foster independence and responsibility toward the environment. This research also highlights that high awareness does not necessarily translate into consistent behavior. Future researchers are advised to explore affective and experiential approaches to cultivate a stronger sense of personal environmental awareness.

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