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Knowledge, Attitudes, and Behavior of High School Students in Banjarmasin Towards Water Resources and Pollution

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Abstract

The rivers in Banjarmasin are polluted due to people's behavior. Changing behavior to be more positive towards the environment can be done through environmental education that can be integrated into the high school curriculum. High school students in Banjarmasin City are very appropriate to study their attitudes, knowledge, and behavior towards the environment, especially water resources and pollution because they are considered agents of change and their changes are an important sign of long-term social change. This study aims to describe the attitudes, knowledge, and behavior of high school students in Banjarmasin towards water resources and pollution. This study used descriptive survey research. The sample in this study was 236 students selected using two-stage random sampling from a population of all high school students in Banjarmasin City, South Kalimantan. Students' knowledge about water resources and pollution was explored using tests, while students' attitudes and behaviors were explored using non-tests, all of which were analyzed descriptively quantitatively. The average score of students' knowledge about water resources and pollution reached 56%, which is included in the medium criteria. The average value of students' attitudes towards water resources and pollution reached 71% which is included in the positive criteria. The average value of student behavior towards water resources and pollution reached 67%, including medium criteria. However, it is still necessary to continuously improve the knowledge, attitudes, and behaviors of secondary school students to be more positive and better.

Keywords: attitude, behavior, knowledge, pollution, water resources

A. Introduction

Banjarmasin is known as the city of a thousand rivers. This designation is attached because, in every corner of the city, you can find a river. These rivers have vital functions for their citizens, including as a means of transportation, drainage channels, washing and bathing places, raw water sources for clean water treatment, and tourism (Putro & Putra, 2022). However, over time, these rivers have shown many problems (Wardani, 2019).

Rivers in Banjarmasin City: Martapura River (Safrie & Abdi, 2022), Kuin River (Harish et al, 2020), and Teluk Dalam River (Muzaidi et al, 2018), showed pollution. The water pollution parameters used in these studies are chemical parameters and biological parameters.

From year to year, the quality of Banjarmasin's rivers, the main source of clean water for the city's residents, continues to decline. This is not only the responsibility of citizens as individuals, but also the responsibility of the government. Through Banjarmasin City Regional Regulation No.

5/2014, the government hopes to increase the awareness and concern of the government itself, the business world, and the community in efforts to conserve water resources. Regulations are not only about sanctions but also about education. The government of Banjarmasin City can educate its citizens, including the government itself, the business world, and the community to be more concerned about the environment.

The most appropriate and most important way to educate people about environmental issues at all levels of education is through environmental education. Based on the results of research by Kose and colleagues (2011) only individuals who have literacy, awareness, and sensitivity will contribute to addressing environmental issues. Littedlyke (2006) added that environmental education can develop a person's sensitivity to the environment which may be shown by behaviors that support the environment. The knowledge that is expected to be embedded in the target will affect his attitude towards the environment which will be realized in an action. Human attitudes can lead to behavior.

Humans who are at the adolescent stage of developmental psychology are active agents of change (Lake et al, 2010). High school students are humans at this stage. Lake et al (2010) added that adolescent opinions are important to study because according to the theory of "generational replacement" changes in attitudes, values, and behavior are important signs of long-term social change. This trend among teenagers can be used as a barometer of social change. High school students as members of the national and global community cannot be separated from the issue of environmental conservation. These teenagers will become leaders in maintaining and preserving the environment. So changing the knowledge of students, as humans, can change attitudes, and changing attitudes is expected to also change behavior.

This study offers a new perspective in understanding the relationship between knowledge, attitude, and behavior of high school students in Banjarmasin towards water resources and pollution. The city of Banjarmasin, known as the City of a Thousand Rivers, faces serious challenges related to the declining quality of river water, which is the main source of clean water for the community. In contrast to previous studies that focused on chemical and biological parameters to measure river pollution levels (Safrie & Abdi, 2022; Muzaidi et al, 2018), this research shifts attention to the human dimension, namely the younger generation as agents of environmental change.

This research integrates an adolescent developmental psychology approach and the 'generational replacement' theory (Lake et al., 2010) to explain how knowledge can influence attitudes and behaviors that support environmental conservation. By focusing on the role of environmental education in shaping students' environmental awareness and literacy, this research also supports the Banjarmasin government's efforts through Regional Regulation No. 5/2014 which emphasizes the importance of education in water resources conservation. This holistic approach provides an original contribution to education and engagement strategies for the younger generation to address environmental issues sustainably.

However, before researching how to improve knowledge about the environment, attitudes towards the environment, and pro-environmental behavior in high school students, it is important to have clear information about the current pictures of knowledge, attitudes, and behavior. Later, this detailed picture can be used to help design a more effective and efficient learning process to realize humans who care about the environment, The purpose of this study was to determine the description and level of knowledge, attitudes, and behavior of high school students in Banjarmasin towards water resources and pollution. Therefore, this research is very necessary and important to do.

B. Literature Review

1. Environmental Education

The primary aim of environmental education was to enhance global awareness of environmental issues and to inspire and equip individuals with the motivation and skills needed to safeguard or improve the natural environment (Van De Wetering, et al 2022). Over time, environmental education programs have been implemented in formal school-based environments either integrated with certain subjects (Amalia, 2023) or standing alone in a separate subject (Adela et al 2024). Effective environmental education is more than a one-way transfer of information: rather, it develops and enhances environmental attitudes, values, and knowledge, and builds skills that prepare individuals and communities to collaboratively take positive environmental action (Ardoin et al, 2020).

2. Water Resources and Pollution

Freshwater ecosystems are essential for human survival and environmental health, providing drinking water, supporting agriculture, and maintaining biodiversity. Despite covering most of the earth, only a small fraction of the water is accessible and suitable for consumption. Population growth and increased demand are intensifying pressure on these limited resources (Jackson et al, 2001).

Climate change, pollution, and human activities like dam construction and groundwater depletion are affecting the global water cycle. Climate change, in particular, is expected to intensify the water cycle, increasing rainfall and evaporation in some areas and potentially reducing water availability in others, especially arid regions. This imbalance affects both water quality and accessibility (Jackson et al, 2001).

Human consumption of water has risen significantly, with agriculture being the largest consumer, followed by industrial and municipal uses. Large-scale irrigation, damming, and pollution disrupt natural waterways, impacting aquatic species and habitats. Additionally, groundwater depletion poses risks for long-term water availability, especially in regions heavily reliant on non-renewable sources (Jackson et al, 2001).

C. Methodology

1. Research Design

This research uses a type of descriptive survey research which is solely to provide an overview of a matter (Maidiana, 2021). This research was conducted in 5 senior high schools or equivalent in Banjarmasin City, South Kalimantan. Using two-stage random sampling, the school was randomized, and then 236 students were taken as samples. The data in this study are students' knowledge, attitudes, and behaviors on water resources and pollution, and also the source of the information. All of these data are sourced from students as primary data sources.

2. Instruments

Data collection in this study was carried out by tests using instruments that had been developed by Linda & Yusup (2020) to capture students' knowledge of water resources and pollution. Students' knowledge of water resources and pollution was measured using a true or false test consisting of 6 questions about water resources and 6 questions about water pollution material. The reliability value of that instrument is 0.71.

To capture students' attitudes and behaviors towards water resources and pollution, as well as students' sources of this information by non-test that had been developed by (Raharjo & Yusup, 2020). Students' attitudes towards water resources and pollution were measured using a non-test in the form of statements of Strongly Agree, Agree, Disagree, and Strongly Disagree consisting of 6 statements related to attitudes towards water resources and 6 questions related to attitudes towards water pollution.

Students' behavior towards water resources and pollution was measured using non-test statements in the form of Always, Often, Rarely, and Never statements consisting of 6 statements related to behavior towards water resources and 6 questions related to behavior towards water pollution. The reliability value of that instrument is 0.66.

3. Technique of Data Analysis

The results of student answers were corrected by matching them with the answer key. The results of student answers are then calculated on average, then converted into percent (%). The percentage is obtained from the sum of all student answers divided by the maximum score and then multiplied by 100%. Table 1 shows the criteria for classifying student knowledge.

Table 1. Student Knowledge Criteria

Value Range	Criteria
0% - 33,33%	Low
33,34% - 66,67%	Medium
66,68% - 100%	High

The results of the questionnaire on students' attitudes towards water resources and pollution were analyzed descriptively and quantitatively to present the results. This questionnaire sheet was prepared using a Likert Scale assessment with scoring guidelines presented in Table 2.

Table 2. Scoring Guidelines for Student Attitude Answers

Positive Statement Answer Options	Score	Negative Statement Answer Options	Score
Strongly Agree	4	Strongly Agree	1
Agree	3	Agree	2
Disagree	2	Disagree	3
Strongly Disagree	1	Strongly Disagree	4

The scores were then analyzed using the following formula :

$$Attitude\ Percentage = \frac{Attitude\ \ Scpre}{Maximum\ Attitude\ Score} \times 100\%$$

The percentage results are then interpreted using the criteria in Table 3.

Table 3. Attitude Criteria

Percentage Range	Attitude Criteria
85% - 100%	Very Positive
70% - 84%	Positive
55% - 69%	Negative
0 – 54%	Very Negative

The results of the questionnaire on students' behavior towards water pollution were analyzed descriptively and qualitatively to explain the results. The results of students' answers were corrected by matching them with the answer key. This questionnaire sheet was prepared using a Likert Scale assessment with scoring guidelines as shown in Table 4.

Table 4. Scoring Guidelines for Student Behaviour Answers

Positive Statement Answer Options	Score	Negative Statement Answer Options	Score
Always	4	Always	1
Often	3	Often	2
Rarely	2	Rarely	3
Never	1	Never	4

The scores were then analyzed using the following formula:

$$Behaviour\ Percentage = \frac{Behaviour\ \ Scpre}{Maximum\ Behaviour\ Score} \times 100\%$$

The percentage results are then interpreted using the criteria in Table 4.

Table 4. Behavior Criteria

Percentage Range	Behavior Criteria
71% - 100%	High
40% - 70%	Medium
10% - 39%	Low

(McBeth et al dalam Haske 2015)

D. Findings and Discussion

1. Findings

Environmental Knowledge of Students

A total of 236 students from Senior High School (SMA) and Madrasah Aliyah (MA) filled out a questionnaire on students' knowledge of water resources and pollution. Research data on the environmental knowledge of high school students can be seen in Figure 1.

Students' knowledge of water resources and pollution was measured using a true or false test consisting of 6 questions about water resources and 6 questions about water pollution material which had previously been tested and tested for validity and reliability. Data from the research results of students' knowledge of water resources and pollution in the form of an average score on a scale of 0 - 1 which is then presented.

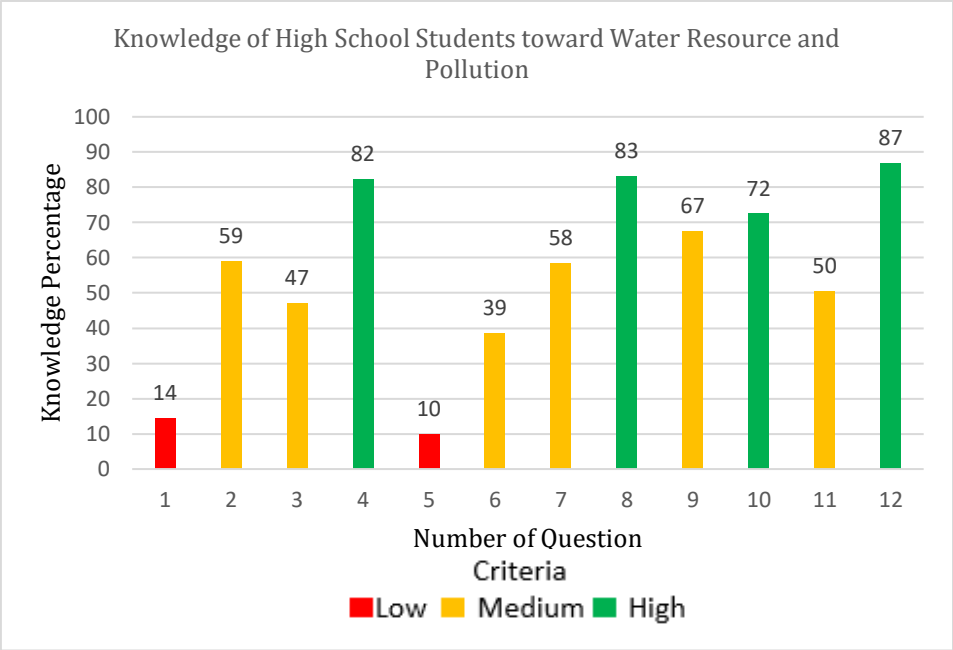

Figure 1. Knowledge of High School Students toward Water Resources and Pollution

From Figure 1, it can be seen that there are still 2 statement items that have low scores, namely statements no. 1 and no. 5. This shows that student's knowledge of the reaction of water formation is low and students also do not understand the types of water resources. The average score of students' knowledge of water resources and pollution reached 56%. According to the criteria of McBeth et al in Haske (2015), it is medium.

Environmental Attitude of Students

Students' attitudes towards water resources and pollution were measured using a non-test in the form of statements of Strongly Agree, Agree, Disagree, and Strongly Disagree consisting of 6 statements related to attitudes towards water resources and 6 questions related to attitudes towards water pollution which had previously been tested and tested for validity and reliability. Data on the results of research on student attitudes towards water resources and pollution in the form of an average score on a scale of 1 - 4 is then presented.

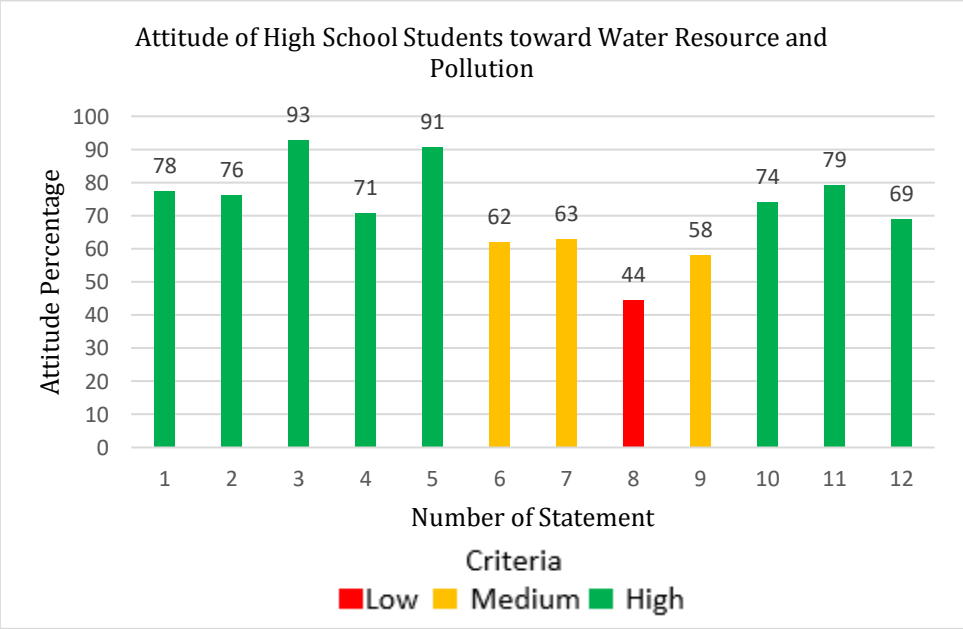

Figure 2. The attitude of High School Students toward Water Resources and Pollution

A total of 236 students from Senior High School (SMA) and Madrasah Aliyah (MA) filled out the questionnaire on student attitudes towards water resources and pollution. Figure 2. The Attitude of High School Students toward Water Resource and Pollution. It can be seen in Figure 1 that no. 8 is of low value. This shows that students are less able to understand that fishing businesses in rivers can pollute river water with fish waste and fish waste itself. Students are less able to understand that fishing in rivers can pollute river water with fish waste and fish waste itself, so they are supportive of these activities. The average score of students' attitudes towards water resources and pollution reached 71%. According to the criteria for scoring attitudes, it is included in the positive criteria, which means that high school students in Banjarmasin City have a positive attitude towards water resources and pollution.

Environmental Behavior of Students

Students' behavior towards water resources and pollution was measured using non-test statements in the form of Always, Often, Rarely, and Never statements consisting of 6 statements related to behavior towards water resources and 6 questions related to behavior towards water pollution which had previously been tested and tested for validity and reliability. Data on the results of research on student behavior towards water resources and pollution in the form of an average score on a scale of 1 - 4 is then presented.

A total of 236 students from Senior High School (SMA) and Madrasah Aliyah (MA) filled out the questionnaire on student behavior toward water resources and pollution. Data on students' behavior towards water resources and pollution can be seen in Figure 3.

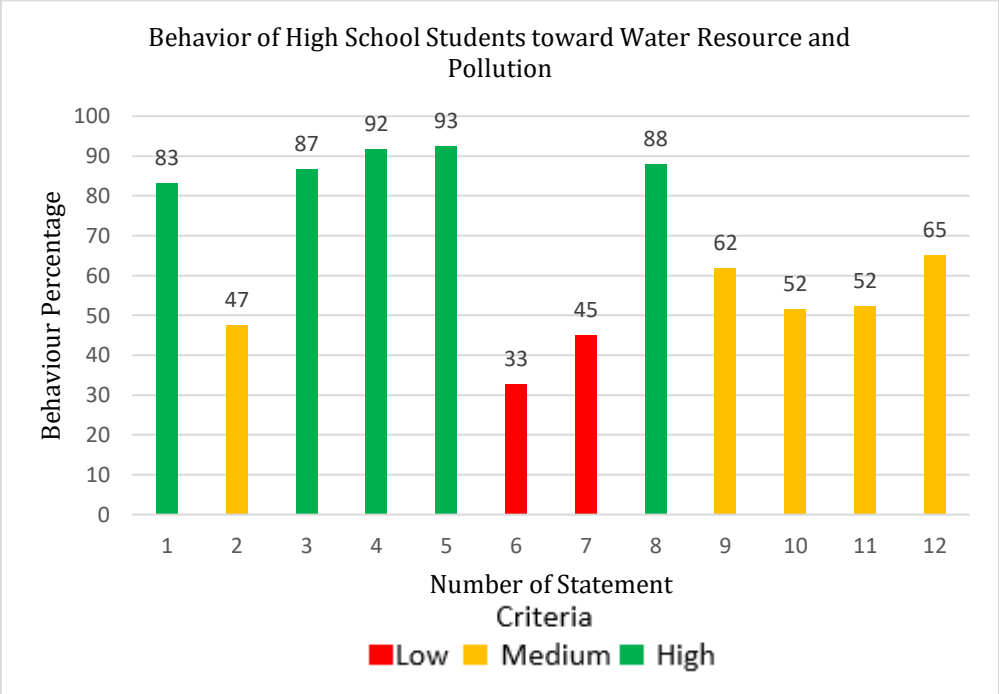

Figure 3. Behavior of High School Students Toward Water Resources and Pollution

Based on Figure 3, students have not played an active role in recycling rice washing water waste and have not actively reforested mangroves in the river. The average value of student behavior towards water resources and pollution reached 67%. According to the criteria of McBeth et al in Haske (2015), it is considered moderate.

2. Discussion

The findings of this study indicate that while students exhibit moderate environmental knowledge and behavior, their attitudes toward water resources and pollution are generally positive. However, this does not directly translate into strong pro-environmental actions. This gap between knowledge, attitudes, and behavior aligns with previous research highlighting that environmental education must be designed to bridge this disconnect effectively (Liu et al, 2020, Kollmuss & Agyeman, 2022).

Although, the research results for knowledge, attitude, and behavior towards water resources and pollution are not bad, learning to improve each of these components of environmental literacy needs to continue. Through learning environmental education, environmental knowledge, positive attitudes and behaviors towards the environment can be improved (Ardoin

et al, 2020; Yusup, et al, 2021). Studies suggest that experiential learning approaches—such as field visits, citizen science projects, and hands-on conservation activities—can significantly enhance students' understanding and engagement in environmental issues (Steg & Vlek, 2021). For example, direct exposure to polluted river sites and engagement in water quality monitoring programs have been found to instill a stronger sense of responsibility and action-oriented behavior among students (Heimlich & Ardoin, 2023). Implementing such approaches in Banjarmasin's high schools may be a strategic way to foster deeper environmental commitment.

Things that affect knowledge, attitudes, and behavior toward the environment, especially towards water, need to be studied further. These factors need to be considered when implementing learning that aims to improve knowledge, attitudes, and behavior towards the environment, especially towards water. Sources of water-related information that may influence knowledge, attitudes, and behaviors towards the environment, especially towards water, also need to be studied further.

Not all schools implement special subjects for environmental education. Environmental education can be integrated with the subjects of IPA (Nugraha et al, 2021). IPS (Adela & Permana, 2020), biology (Suryaningsih & Aripin, 2020), physics (Gustria & Fauzi 2020), chemistry (Purwanto & Ula, 2020), geography (Efendi et al, 2020), Islamic education (Prihatmoko, 2020).

Beyond education, cultural and social norms play a crucial role in shaping environmental behavior. In many communities, waste disposal and water usage habits are inherited through generations, making behavioral change complex (Van der Werff et al., 2022). Research has shown that when environmental actions are reinforced through social influence—such as peer discussions, family engagement, and community-led initiatives—individuals are more likely to adopt sustainable behaviors (Whitmarsh et al, 2021).

Banjarmasin's designation as the "City of a Thousand Rivers" presents an opportunity to leverage local identity in environmental campaigns. Community-based interventions that highlight traditional water conservation practices and involve local leaders can further reinforce positive behavioral shifts. For instance, involving students in public awareness programs that celebrate local river traditions while promoting sustainable practices can enhance both environmental literacy and civic responsibility (Nisbet & Gick, 2022).

While education and social influence are crucial, institutional support is also a key determinant of environmental action. Banjarmasin's Regional Regulation No. 5/2014 provides a policy framework for water conservation, but effective implementation requires active collaboration between schools, government agencies, and non-governmental organizations (Ardoin et al., 2020). Establishing partnerships for school-based environmental programs—such as waste reduction initiatives and river restoration projects—can provide students with real-world applications of their knowledge and skills.

Additionally, integrating environmental education into various school subjects, such as biology, geography, and civic education, can reinforce environmental concepts holistically (Amalia, 2023). Schools that implement interdisciplinary environmental education programs tend to produce students with higher ecological awareness and a stronger commitment to sustainability (Yusup et al., 2021).

Future research should explore the long-term impact of environmental education interventions in Banjarmasin's schools. Longitudinal studies tracking changes in students' knowledge, attitudes, and behaviors over time can provide valuable insights into the effectiveness of various educational strategies. Moreover, examining the role of digital and social media in promoting environmental awareness among students may offer innovative avenues for engagement (Schultz et al., 2023).

E. Conclusion

Based on the results of the study, the average score of students' knowledge about water resources and pollution reached 56%, which is included in the medium criteria. The average value of students' attitudes towards water resources and pollution reached 71% which is included in the positive criteria. The average value of student behavior towards water resources and pollution reached 67%, including medium criteria. It is concluded that the knowledge, attitudes, and behavior of high school students on water resources and pollution are classified as moderate. However, it is still necessary to continuously improve the knowledge, attitudes, and behaviors of secondary school students to be more positive and better.

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