

Perceptions of Grade XI Mathematics and Science Students Regarding Environmental Cleanliness at a Public Senior High School in Pandeglang, Indonesia

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Abstract

The study aimed to ascertain the perceptions of Grade XI science students about environmental sanitation in one of the public high schools in Pandeglang Regency and what factors affect such perceptions. The research methodology used was descriptive quantitative with data gathering instrument being a questionnaire for Grade XI science students in 2026/2027 academic year. The study population was 153 students at a public secondary school in Pandeglang District, Indonesia, with a sample determined using the Slovin formula and obtained 89 respondents who filled out the questionnaire. Data were analyzed using descriptive analysis techniques by calculating scores, percentages, and average values for each research indicator. The results showed that students' perceptions of school environmental cleanliness were generally in the good category with a percentage of around 70–75%. The learning environment comfort indicator obtained the highest percentage of 55.8%, while the school environmental cleanliness condition indicator obtained the lowest percentage of 40.5%. The results also showed that school environmental cleanliness plays a role in creating comfort and increasing students' enthusiasm for learning, although there are still several problems related to waste management, toilet cleanliness, and school community participation in maintaining environmental cleanliness. Thus, it can be concluded that students have a good perception of the cleanliness of the school environment, but more optimal efforts are needed in managing cleanliness and increasing the participation of all school residents to create a cleaner, healthier and more conducive learning environment.

Keywords: Student Perception, Environmental Cleanliness, School Environment, Waste Management

INTRODUCTION

A Good and Healthy Environment A good and healthy environment is the right of every Indonesian citizen, as stipulated in Law of the Republic of Indonesia Number 32 of 2009 concerning Environmental Protection and Management. The law explains that the environment is a unified space with all objects, forces, conditions, and living creatures, including humans and their behavior, which affect the continuity of life and the well-being of humans and other living creatures (Astuti et al., 2023). Therefore, efforts to maintain environmental cleanliness and sustainability need to be implemented from an early age, including through the school environment as a means of character education and the formation of caring behavior.

A clean school environment is a crucial aspect in creating a comfortable, healthy, and conducive learning environment. Environmental awareness and concern can be increased through environmental education, which encourages individuals to actively participate in maintaining environmental cleanliness and sustainability. This is in line with research (Utari et al., 2022), which states that environmental education plays a role in shaping

environmentally conscious behavior through proper waste management. Besides, studies conducted by Utari et al., 2026 show that positive perceptions of the environmental management program such as the waste banks could be used for improving the environmental quality alongside promoting environmental awareness in educational institutions.

Moreover, having a clean and healthy environment within a school is an important element of enhancing effective learning in schools. Environmental cleanliness does not only concern the health of the community members within the school but also affects the level of comfort, attention and motivation of students participating in learning processes. A well-kept school environment can create a good atmosphere for learning, hence helping to achieve educational objectives. As shown by studies, the role of students' environmental awareness is critical in ensuring the quality of school environment and sustainability (Utari et al., 2026). Poor maintenance of the environment can cause stress and lack of concentration among students, decrease motivation for learning and cause health issues (Reyes et al., 2024).

In efforts to maintain a clean school environment, student perception is a crucial factor to consider. The term "perception" comes from the English word "perception," meaning a view, response, or assessment of an object. In the Big Indonesian Dictionary (KBBI), perception is defined as a person's direct response or acceptance of something through the sensory process. Perception is formed after an individual receives and processes information obtained through the five senses, resulting in an impression, image, or assessment of the observed object. Maintaining a clean school environment is closely related to how students perceive and assess the conditions of their surroundings. Therefore, perception is a crucial aspect that needs to be studied. According to (Neesha, 2022), perception is a mental process that enables an individual to assign meaning to various stimuli received through the five senses, thus forming an understanding of the object or environment being observed. This process plays a role in shaping an individual's opinions, values, attitudes, and feelings, which in turn influence their behavior.

The above opinion is supported by Pandit (2017), who defines perception as the process whereby an individual processes and interprets information received via the five senses in order to make meaning out of it. This is done by selecting information that is considered relevant, arranging it in such a way that it makes sense to the person receiving it, and finally interpreting it in light of his/her experiences and knowledge. Otara (2011) goes further to define perception as the understanding of experiences in order that such perceptions form the basis of any decision that people make. According to Sharma (2019), selection, organization,

and interpretation of information will always lead to making of judgment concerning some objects or situations and hence affecting the attitude and actions of people.

In relation to the school environment, the perceptions of cleanliness of students affect environmentally aware attitudes and behaviors among the students. Students who have positive perceptions about school cleanliness are expected to be responsible individuals who maintain cleanliness, make proper use of cleaning facilities, dispose of wastes well, and participate in school environmental conservation activities. On the other hand, the perceptions will decrease student participation in maintaining clean school environment (Laure et al., 2024).

Various previous research studies have found that the perceptions and concern of students towards school cleanliness are good ones. As an example, a study by Laure et al. (2024) showed that perceptions of environmental cleanliness of students at GMIT Paliboo Elementary School were good ones, physically and mentally. Similarly, research conducted by Nazirah & Mustika (2024) found that the perceptions of students concerning the policy to prohibit the use of plastics in schools were very good with average percentage of 91.12%. This is due to the good support from students in terms of having a clean school environment. In addition, Hasnadelni (2023) stated that clean school activities will increase students' participation and concerns towards school environmental cleanliness. These researches, however, only involved elementary school students.

From the above description, there is a research gap concerning the perception of the high school students about the cleanliness of the school environment especially that of the public high school in Pandeglang. Factors such as differences in the student's demographic characteristics, environmental conditions of the school, and the education level affect the student's perception about environmental cleanliness. Thus, this research is essential in gaining a more detailed perspective of the perception of environmental cleanliness of the school among the students. The objective of this research was to find out the perception of the students about the environmental cleanliness of the school.

METHOD

This study adopted a descriptive approach to describe and analyze students' perceptions of environmental cleanliness around their schools, using data collected from a questionnaire. The quantitative descriptive approach is applied to describe the condition or phenomenon which takes place on the basis of data collected from the respondents without testing any hypothesis.

The study was carried out in 2026, at a public secondary school in Pandeglang District, Indonesia. The subjects of the study were the 11th-grade students studying science in the academic year 2026/2027. The total population for this study was 153 students. The number of samples was determined using the Slovin formula with 5% of error as below:

$$n = \frac{N}{1 + N (e)^2}$$

Description:

- n = number of samples
- N = population
- e = error rate

According to this formula, the smallest number of samples was 111 students. Data collection was done using the distribution of questionnaires to 11th grade science students, where 120 students answered the questionnaires and so fulfilled the minimum number of samples.

The tools used for this study were questionnaires made from indicators of student perception regarding school environmental cleanliness. Some of these indicators were the state of the cleanliness of the school environment, facilities and infrastructure for cleaning, waste management, the comfort of the learning environment, and the involvement of the school community in environmental cleanliness. The research instrument was the Likert scale which had five possible answers: Strongly Agree (SS), Agree (S), Undecided (R), Disagree (TS), and Strongly Disagree (STS)..

The data collected through the questionnaires were analyzed through quantitative descriptive analysis method by scoring the answers of respondents, converting to percentage and determining the average value of their answers related to the indicators used in the research. The results of data analysis are shown in table and chart forms in order to give a clearer picture regarding the students' perceptions towards the cleanliness of the environment in a public high school in Pandeglang. Data analysis was done by using descriptive quantitative method with the data gathered through questionnaires of the respondents.

The data collected were analyzed through the process of scoring each answer in the Likert scale format and later converting it to percentage and averages to determine the trend of students' perceptions towards the cleanliness of the environment in school. The results of data analysis were then interpreted into specific categories to show the level of students' perceptions of cleanliness of the environment in a public high school in Pandeglang.

RESULTS AND DISCUSSION

This study aims to determine students' perceptions of environmental cleanliness at a public high school in Pandeglang Regency. Data were obtained through a questionnaire distributed to 11th grade science students in the 2026/2027 academic year (see Table 1).

Table 1. Respondent Characteristics

Characteristics	Number
Population	153
Respondents	120

Based on Table 1, data collection with a population of 153 students, 120 students participated as respondents in this study. The data obtained were then analyzed descriptively quantitatively to describe students' perceptions of various aspects of school environmental cleanliness, including the condition of school environmental cleanliness, the availability of cleaning facilities and infrastructure, waste management, the comfort of the learning environment, and the participation of school residents in maintaining environmental cleanliness. The results of the analysis are presented in the form in Table 2 and descriptions to provide a clearer picture of students' perceptions of environmental cleanliness around the school.

Table 2. Student Perceptions of General Cleanliness of the School Environment

Aspect	Percentage
Overall Perception of School Environmental Cleanliness	± 70–75% (good category)

The perceptions of the students regarding the cleanliness of the school environmental were from 70 to 75%, and they were regarded as being good based on Table 2. The findings are similar to the studies of Panoyo et al. (2019), who revealed that 70% of the students from Krian 1 State Senior High School perceived the school environment as being clean. Moreover, 76% of the students believed that the dirty classroom environment may distract from concentrating on the task. Overall, the students had a positive perception of the cleanliness of the school environmental.

The above high percentage of positive evaluation is an indication that the implementation of the school environment cleanliness has been done effectively. The clean environment can help in facilitating learning by providing a conducive environment that allows learners to learn with ease. According to Jasper et al. (2012), provision of appropriate WASH (Water, Sanitation, and Hygiene) services like provision of adequate clean water,

adequate toilets and hand washing facilities contributes to enhancing comfortability and efficiency of learning. In addition, a clean school environment can contribute to creation of positive learning environment and also improve attendance and concentration of learners (Moelyaningrum et al., 2023).

Nevertheless, several areas still require some improvements, such as inefficient use of trash cans, inadequate maintenance of toilet facilities, and sometimes blocked drainages. These results are congruent with studies conducted by Sharma et al. (2024), which found that insufficient WASH facilities may affect students' attendance, especially those who are menstruating. According to Adegoke et al. (2022), in developing countries, only 51% of schools have sufficient access to water and 45% of them provide sufficient sanitation facilities. Hence, despite the students' positive perceptions of the school cleanliness, some improvements in hygiene and sanitation management are still required. Reyes et al. (2024) suggest the development of a strategy that would help improve school cleanliness and student satisfaction. Therefore, it is hoped that the school environment will keep getting better in terms of cleanliness.

Table 3. Conditions of Cleanliness of School Environment

Indicators	Percentage
My school environment looks clean and well-maintained every day.	40,8%
My classroom is always clean before and after learning activities.	33,3%
There is still a lot of trash scattered around the school environment.	47,5%
The school toilets are often dirty and unfit for use.	45,8%
The drainage in the school environment is often clogged.	35,0%

According to Table 3, 40.8% of the respondents expressed that the school environment looks clean and well-kept every day. From this result, one can conclude that some of the students perceive the school environment positively. A clean and well-kept school can facilitate a comfortable learning environment and encourage environmentally aware characters in the learners.

Knowledge about the importance of the maintenance of cleanliness should start developing at an early stage so that learners could grow fond of the environment. Clean and comfortable environment is important for an effective learning process because it creates a comfortable learning environment that makes learners more engaged in the process (Cambay & Paglinawan, 2024). It is consistent with the fact that environmental quality in terms of air quality, thermal comfort, visual and acoustic conditions is crucial for the satisfaction and well-being of learners during learning activities (Afifi et al., 2025).

Additionally, 33.3% of the respondents claimed that classrooms are always clean before and after learning. While this indicates a concern for classroom cleanliness, this percentage is still relatively low. Classroom cleanliness is a crucial factor in creating a comfortable learning environment and supporting student concentration. A clean learning space can increase comfort and help students maintain focus during learning (Kanda & Agustin, 2024). This finding is supported by research that identified cleanliness as the most dominant factor in influencing students' learning comfort in the classroom, namely 27.7%, in addition to air circulation, quietness, and the availability of supporting facilities (Widiastuti et al., 2020).

On the other hand, 47.5% of respondents stated that there is still a lot of trash scattered around the school environment. This percentage indicates that cleanliness remains a significant issue that needs to be addressed. Waste that is not properly disposed of can reduce the cleanliness and comfort of the school environment. This also indicates that students' behavior in waste management still needs to be improved through habituation and strengthening of environmental awareness. Students' waste management behavior is related to their attitudes and motivation to maintain school cleanliness (Kanda & Agustin, 2024). Similarly, environmental awareness programs in secondary schools have been able to change students' attitudes and habits towards more responsible waste disposal (Anthonia et al., 2025).

45.8% of respondents stated that school toilets are often dirty and unsuitable for use. This finding indicates that school sanitation still requires serious attention. Good sanitation is a crucial part of creating a healthy school environment. Sanitation facilities that do not meet health standards need to be repaired and continuously improved (Fatria et al., 2023). Toilet cleanliness is also a major factor influencing elementary school students' toilet use behavior, along with the condition of the facilities, hygiene practices, relationships with peers, and previous experiences (Shao et al., 2021).

Moreover, 35.0% of the respondents stated that the drainage channels of the school get clogged very often. This clearly demonstrates that there are difficulties in handling the issue of the sanitation at school. The wastewater drainage channels are an important element which should be managed in order to ensure their effective operation. The drainage systems which are not up to the mark from the point of view of the environmental health standards should be managed accordingly (Anggraini et al., 2019). Improvement in access to the drinking water has not led to better sanitation and drainage facilities automatically (Pereira et al., 2024). Hence, the drainage channels should be cleaned and maintained on a regular basis to prevent clogging.

Overall, the research findings have proved that the cleanliness of the school environment is suboptimal. Even though some of the respondents claimed that the environment and the classrooms of the school are clean, the fact that a large number of the students noted scattered garbage (47.5%), dirty toilet rooms (45.8%) and clogged drains (35.0%). To address these issues, collaboration between schools, teachers, and students is needed through increased awareness, discipline, and routine and continuous maintenance of cleaning facilities.

Table 4. Sanitation Facilities and Infrastructure

Indicators	Percentage
There are sufficient trash bins available on school grounds.	39,2%
School trash bins are often not used properly.	45,8%
School restrooms are often dirty and unsuitable.	43,3%

In accordance with Table 4, 39.2% of respondents claimed that there were enough trash cans at the school premises. This information reveals the existence of school sanitation facilities; however, not all students find them enough. It is known that the presence of accessible and well-placed trash cans can be crucial for ensuring proper waste disposal since easy access is one of the factors that influence the formation of appropriate waste disposal habits in the school environment (Cruz et al., 2025).

However, 45.8% of respondents claimed that trash cans at schools are often used improperly. This percentage indicates that cleanliness issues are influenced not only by the availability of facilities but also by the attitudes of the school community regarding their use. This study aligns with the findings of Onde et al. (2025), who revealed that although infrastructure such as segregated trash bins are available in many schools, the challenge of ensuring students use them consistently and in a disciplined manner remains a recurring issue. This finding is further supported by Johannes et al. (2021), who found that the unattractive or inadequate design and placement of trash bins contribute to the persistence of littering despite the provision of facilities.

Furthermore, 43.3% of respondents believed that school toilets were often dirty and unsuitable. This indicates that sanitation in schools requires greater attention. Clean and well-maintained toilets are a key indicator of a healthy school, as they directly impact student comfort and health. The physical quality of toilets and handwashing facilities is a key determinant of whether and how these facilities are used by students, as found in a study of dozens of primary schools in New Zealand, which showed that most schools had toilets in conditions that were unsuitable for children's use (Sharma et al., 2024).

Overall, the results presented in Table 4 indicate that students have a fairly positive view of the availability of sanitation facilities at school, particularly regarding trash cans. However, the high number of respondents who reported that trash cans are often not used properly (45.8%) and that toilets are still unclean (43.3%) indicate that the effectiveness of sanitation facilities is not yet optimal. These findings indicate that improving school environmental cleanliness requires the provision of adequate facilities and increased awareness and responsibility among school residents in using and maintaining existing sanitation facilities. This is evidenced by a study in Nepal that found that poor school sanitation facilities can hinder student attendance, so the provision of facilities needs to be balanced with ongoing maintenance and the involvement of the entire school community (Sharma et al., 2024).

In addition to the availability of facilities, the effectiveness of sanitation facilities and infrastructure is also influenced by the management and maintenance systems implemented by the school. The provision of trash cans, toilets, handwashing facilities, and clean water needs to be balanced with regular maintenance to ensure optimal use of all facilities. Sugita (2022) explained that the successful implementation of the Water, Sanitation, and Hygiene (WASH) program in schools is greatly influenced by the condition of sanitation facilities, their ongoing maintenance, and the involvement of the entire school community in maintaining environmental cleanliness. Similarly, Crocker et al. (2025) emphasized that the provision of adequate facilities must be supported by an integrated management system to foster sustainable clean living behaviors.

The findings of this study also indicate that some students still believe that trash bins are not being used properly and that school toilets are still in poor condition. This situation indicates that the provision of facilities needs to be balanced with increased awareness and discipline among school residents in utilizing facilities according to their intended function. Schools, as educational environments, play a crucial role in fostering healthy living habits, therefore, consistent maintenance of sanitation facilities must be carried out to support a healthy school environment (Crocker et al., 2025).

Furthermore, the quality of school facilities and infrastructure not only influences cleanliness and health but also impacts student comfort during the learning process. A learning environment supported by adequate facilities can increase learning motivation, student engagement in learning activities, and create a more positive learning experience (Miao et al., 2024). Consistent with this, Li & Xue (2023) stated that a quality learning environment contributes to increased student engagement and learning outcomes.

Table 5. Waste Management

Indicators	Percentage
The cleaning staff performs their duties well.	40,8%
There is still a lot of trash scattered around the school grounds.	47,5%
The school's trash cans are often not used properly.	45,8%
The school's drainage channels are often clogged.	35,0%

From the analysis of the results provided in Table 5, about 40.8% of respondents indicated that the janitors did an excellent job in performing their responsibilities. The result is a clear reflection of the students' perception of the role of janitors in the maintenance of the school environment. Nevertheless, the cleanliness of the school is not the responsibility of the janitors alone; other school members have to be actively involved in the process (Suandri et al., 2025).

This can be observed from the results indicating the very high number of respondents (47.5%) who said there were lots of garbage in the school premises. The results clearly show that waste disposal in schools is not yet effective. The results correspond with those of Mubarak et al., 2025, in that students' habit of littering is the main cause of deterioration in the school environment cleanliness.

As for the indicator of frequently using inappropriate bins for trash disposal, it obtained a relatively high percentage, amounting to 45.8%. The existence of such an indicator means that there should be a further improvement of student awareness regarding the maintenance of environmental cleanliness through education and habit formation. As Safitri states, "behaviors related to cleanliness and healthy lifestyle in school settings are affected by awareness and environment".

On the other hand, 35.0% of the students indicated that the drainage channels in the area of the educational institution are frequently clogged. Although it can be seen that this indicator obtained less percent compared to others, this is also an important issue that needs further attention due to its potential negative impacts on the quality of sanitation in the school environment (Amin et al., 2021).

As can be seen from the data provided in Table 5, it seems that there are still some difficulties associated with waste management in schools. Even though the survey revealed that 40.8% of respondents evaluated janitors' activities positively and found them satisfactory, a high rate of students who witnessed litter on the school territory (47.5%) and inappropriate

use of trash bins (45.8%) shows that waste management is far from being effective. From this perspective, waste management is dependent not only on janitors but on all school members (Suandri et al., 2025).

Apart from the contribution made by the janitors, the success of waste management in the school setting largely depends on the participation of all the stakeholders in the school, mainly the students. The findings from this research show that some students feel that garbage tends to be littered, the use of the garbage containers is not optimal, and the drains are clogged. All these prove that the process of waste management cannot simply rely on the provision of facilities but should also instill in the students the consciousness of keeping their surroundings clean. Studies by Buthelezi et al. (2025) revealed that environmentally sustainable education can help to make students more aware of the significance of waste management.

Proper waste management will also require adequate and sustainably managed sanitation facilities. As per Crocker et al. (2025), environmental management at schools is affected by the presence of sanitation facilities, management of such facilities, and the management systems in place. Thus, in addition to provision of trash bins and maintenance of the drainage channels, there needs to be a way of supervising such processes and making sure that the right culture is inculcated in the learners for efficient use of the available facilities to ensure cleanliness.

In addition, Debrah et al. (2021) state that formal education is a good way of creating awareness in regard to sustainable waste management. The point is supported by the findings of Mkhonto & Mnguni (2021), which indicate that adoption of waste management programs at schools could enhance awareness, knowledge and attitude towards recycling activities among learners. Thus, sustainable waste management at schools will involve the cooperation of all the above factors.

Table 6. Comfort of the Learning Environment

Indicator	Percentage
I feel comfortable in a clean school environment.	58,3%
A clean environment increases enthusiasm for learning.	53,3%

Based on the results in Table 6, 58.3% of respondents agreed that they feel comfortable in a clean school environment, and 53.3% of respondents also agreed that a clean environment will increase enthusiasm for learning. This suggests that most students perceive the clean school environment as one of the factors that make them comfortable and facilitate the learning process. A clean school environment makes learning conducive, minimizes any

possible distractions in the learning process, and makes the learners feel safe and comfortable when in school.

This is consistent with the results of Brink et al. (2021), which revealed that the indoor environmental quality (IEQ) positively influences the quality of learning, comfort, and academic performance of students. In a comfortable school environment, students get an opportunity to concentrate more on learning activities.

Apart from making the students feel comfortable, the clean school environment also helps motivate the students. 53.3% shows that more than half of the respondents understand that a clean environment can increase enthusiasm for learning. The clean environment makes learners minimize any distraction in the learning process.

These findings are supported by research by Barrett et al. (2015) found that the quality of the physical classroom environment significantly influences the development of elementary school students' learning outcomes. Factors such as classroom cleanliness, natural lighting, air quality, and the layout of the learning space have been shown to contribute to increasing the comfort and effectiveness of the learning process.

The results of this study are also supported by research by Edgerton & McKechnie (2023), which shows that students' positive perceptions of the school environment are associated with increased well-being, engagement, and academic achievement. A safe, comfortable, and well-organized school environment can create a conducive learning environment, encouraging students to focus more, actively participate, and have a more positive learning experience. Therefore, a clean school environment not only plays a role in maintaining physical health but also supports student well-being and the effectiveness of the learning process (Edgerton & McKechnie, 2023).

These results are supported by research explaining that the school environment is one of the external factors influencing student learning motivation. A comfortable physical environment, including a clean school environment, has been shown to increase student engagement in learning, foster a sense of enjoyment in learning activities, and enhance academic motivation. When students feel comfortable with the school environment, they tend to demonstrate better learning participation than students in less supportive learning environments (Manda & Darmayanti, 2025).

Furthermore, various international studies have shown that the quality of the school environment is closely related to student well-being and academic achievement. A study conducted by Toyinbo (2023) explains that school environmental cleanliness is part of indoor environmental quality, which influences student health, comfort, well-being, and academic

performance. A clean environment helps create healthier learning conditions, allowing students to concentrate better during the learning process. This finding reinforces research findings that students' positive perceptions of school environmental cleanliness are not only related to comfort but also have the potential to support improvements in the overall quality of learning.

Research on standards for safe and healthy learning environments confirms that schools that provide a clean, healthy, and comfortable physical environment can improve student well-being while supporting the quality of the learning process (UNESCO, 2021). Therefore, research results at a public high school in Pandeglang indicate that school environmental cleanliness is perceived not only as an aesthetic aspect but also as a crucial factor supporting comfort, learning motivation, and overall learning quality (UNESCO, 2021).

Table 7. School Community Participation

Indicators	Percentage
I help maintain a clean school environment.	42,5%
Teachers set a good example in maintaining a clean school environment.	40,8%
Students at this school are less concerned about environmental cleanliness.	45,8%
There are no routine activities that support school cleanliness.	39,2%
School cleanliness regulations are rarely enforced.	37,5%

Based on Table 7, the participation of school residents in maintaining environmental cleanliness is still at a suboptimal level. 42.5% of respondents stated that they participate in maintaining the cleanliness of the school environment, while 45.8% of respondents assessed that students still lack concern for environmental cleanliness. This low level of student concern for environmental cleanliness indicates that student awareness and involvement in maintaining the school environment have not been developed evenly. This condition may be influenced by the suboptimal instillation of environmentally conscious behavior through activities that directly involve students.

This finding aligns with research by O'Brien et al. (2024), which shows that student participation will increase if schools provide opportunities for students to be actively involved in various aspects of school life, such as in the classroom, extracurricular activities, and decision-making processes. A school environment that consistently provides opportunities for student participation can foster a sense of ownership, responsibility, and involvement in the school. Iqbal et al. (2025) explain that student participation in environmental management can be increased through various routine activities, such as waste sorting, composting, recycling, and the Clean Friday program. Activities carried out on an ongoing basis not only increase

student engagement, but also help form positive habits in maintaining a clean school environment.

Students' lack of concern for environmental cleanliness can also be linked to the suboptimal implementation of school cleanliness programs. As many as 39.2% of respondents stated that there were no routine activities that supported school environmental cleanliness. The scenario shows that the involvement of students in environmental conservation activities remains very low. According to Iqbal et al. (2025), the existence of environmental programs plays an important role in encouraging the community within the school to engage in environmental conservation activities. The participation of students in environmental activities will not only enable them to acquire more information but will also help them become responsible about the cleanliness of the school environment. Anderson et al. (2019) stated that participation of students in school activities was multidimensional and it was not only confined to participation in school activities but included collaboration, expression of opinions, decision-making, and making choices in different activities in school. Thus, implementation of programs related to cleanliness that involve the participation of students will increase their involvement and enhance their sense of responsibility regarding the environment at school.

Besides the implementation of ongoing programs, the role of teachers as role models also matters greatly. A total of 40.8% of respondents assessed that teachers have set a good example in maintaining a clean school environment. However, this percentage indicates that the role of teachers as role models still needs to be strengthened to be able to reach all school members. Ardianti et al. (2024) explained that the formation of environmentally conscious character is not only done through the delivery of learning materials, but also through the process of habituation and role models demonstrated by teachers in everyday life. Teachers' consistent behavior in maintaining environmental cleanliness can serve as real examples for students, making environmental values more easily instilled and applied in daily activities. In addition to examples provided by teachers, a school culture that encourages participation is also a key element in developing positive attitudes in students. According to Rahayu et al. (2024), schools that create a democratic culture, provide space for student involvement, and generate mutually respectful relationships will be more effective in encouraging student involvement in daily school activities.

A culture of environmental stewardship in schools is also influenced by the implementation of rules that support environmentally friendly behavior. As many as 37.5% of respondents stated that school cleanliness regulations are rarely enforced. This situation

indicates that efforts to foster a culture of cleanliness are not supported by a consistent monitoring system and rule implementation. Ardianti et al. (2024) explain that cultivating environmentally conscious behavior requires strong school cultural support, including consistent implementation of rules by all school members. When environmental rules are implemented sustainably, environmentally conscious behavior will more easily develop into a school culture that is ingrained in students. This finding is reinforced by Ela et al. (2023), who state that school involvement can be effective if supported by efficient school management, a detailed work plan, clear division of tasks, and regular evaluation. Without solid systems and policies, school program implementation is often less successful in increasing participation by all school members.

Teachers' roles as catalysts of environmental consciousness cultures are further highlighted by Najiyah et al. (2025), who pointed out that teachers play a strategic role in boosting environmental consciousness through education and waste management programs in schools. Teachers who have adequate knowledge of environmental management are capable of motivating their students to get involved in many cleaning and waste management exercises. In addition, program structures, school support, and involvement of all school stakeholders are factors that determine the success of environmental management initiatives in schools. Similarly, Bandhesa et al. (2024) indicated that community involvement, parental involvement, and involvement of different education stakeholders provide support in terms of resources, ideas, and strengthening of school culture. Such involvement is crucial in the construction of student characters, including an environmental consciousness attitude. Increasing school community involvement in environmental management, therefore, should not only focus on awareness but should include the development of programs, role modeling by teachers, and school policies to create a culture of environmental consciousness (Najiyah et al., 2025).

In general, the involvement of school communities in keeping the environment clean must be further enhanced through the conduct of regular environmental activities, strengthening of teacher role modeling, implementation of regulations, and conducting of environmental programs participated by the whole school community. In addition, Yunita et al. (2023) pointed out that enhancing the involvement of school community must have a principal who has the ability to communicate effectively, engage parents and the community, and work with different parties. This will enhance the school culture so that various environmental programs will be implemented in a better way and on a sustainable basis. This

will improve the consciousness of students regarding environmental cleanliness as well as creating an environment that cares about environmental sustainability (Iqbal et al., 2025).

Table 8. Comparison between Indicators

Indicators			Percentage
School Environmental Cleanliness			40,5%
Cleanliness	Facilities	and	42,8%
Infrastructure			
Waste Management			42,3%
Comfortable Learning Environment			55,8%
School Community Participation			41,2%

Based on Table 8, the indicator of Learning Environment Comfort scored the highest percentage of 55.8%, whereas the indicator of School Environment Cleanliness scored the lowest percentage of 40.5%. The findings suggest that despite the existence of problems concerning school environment cleanliness, such as scattered trash, unclean toilets, and occasionally blocked drains, the students recognize the importance of the impact of a clean environment for their comfort and enthusiasm to learn. Therefore, the student perceptions about the influence of environmental cleanliness on the learning process are greater than their actual assessment of school cleanliness.

The high percentage of the indicator of Learning Environment Comfort corroborates the findings of Reyes et al. (2024), according to which the student satisfaction from the school cleanliness level affects their comfort during the learning process. The findings prove that the school environment cleanliness can help increase the students' satisfaction and provide a more comfortable atmosphere for the learning process. The finding is consistent with the findings obtained in the public high school in Pandeglang, where the school environment cleanliness was proven to be connected to the students' comfort and motivation to learn.

In addition, the findings of the study also indicate that the indicators of Sanitation Facilities and Infrastructure (42.8%), Waste Management (42.3%), and School Community Participation (41.2%) have similar percentages. It means that the perception of the students about the three aspects mentioned is almost the same. The students think that the sanitation facilities are present, but its use is not yet optimal and needs more involvement from the school members. The above finding supports the idea that the success of environmental management in schools is not only based on the presence of the facilities, but also with the involvement of school members in using and maintaining them (Reyes et al., 2024).

The low percentage of the school environmental cleanliness indicator indicates that several aspects still need improvement, particularly regarding classroom cleanliness, toilets,

waste management, and school drainage. Nevertheless, the overall research results indicate that students have a fairly good perception of school environmental cleanliness, with a general percentage of around 70–75%. This indicates that students recognize the importance of school environmental cleanliness and understand that a clean environment can support comfort and increase learning motivation. This finding is supported by research by Abe & Hayashi (2023), which explains that school environmental quality has a positive relationship with student learning motivation. The better students' perceptions of the school environment, the higher their motivation to participate in the learning process.

Based on the research results, student perceptions of environmental cleanliness at a public high school in Pandeglang are generally in the good category, with a percentage of around 70–75%. This result indicates that the majority of students have a positive view of the importance of school environmental cleanliness as a factor supporting comfort and the learning process. But some other issues such as cleanliness of the environment, waste management, and community participation score relatively low. The above findings point out that the positive perception of students cannot be seen in the optimal school environment. This means that there is need for continued improvement in these areas.

The above findings conform to the findings of Laure et al. (2024), where the perception of students concerning the cleanliness of the school environment was found to be positive both physically and mentally. In the same vein, Hasnadelni (2023) argued that a clean school program improved the awareness and involvement of the students in keeping the school clean. This finding conforms to the findings of a systematic review by Zynuddin et al. (2023). The findings show that a positive school climate leads to the development of non-cognitive skills of the students, such as responsibility, caring, and involvement in different school activities. Clean school environment is a critical element in ensuring positive school climate.

Nonetheless, the findings of this study are contrary to those of Nazirah & Mustika (2024), who discovered that 91.12% of students perceived the policy against the use of plastic in schools very well. This contradiction could be because of the different areas of focus in the studies. Nazirah and Mustika's study focused on students' perception of an environmental policy in schools only, while this study focused on the perception of students regarding different aspects of school environmental cleanliness, which include cleanliness, facilities and infrastructure, waste disposal, learning comfortability, and school community involvement. Respondent attributes, school environmental conditions, and cleaning facilities quality can also have an impact on the different research findings. This is according to the research by Barrett et al. (2015), which indicates that the quality of the learning environment is affected

by many factors associated with the physical environment, which include cleanliness, lighting, ventilation, space arrangement, and facility maintenance. Thus, the perception of students concerning the school environment is not only dependent on the presence of policy but also on the physical environment they experience every day.

Moreover, it is clear from the findings that even though the students have a positive perception regarding the significance of the school environment cleanliness, problems related to waste management and the participation of the school community exist. It can be seen that only the provision of facilities for hygiene is not enough if there is no school environment that encourages environmental consciousness. These findings are in accordance with the conclusions of Manca et al. (2020), who claimed that the design and physical environment of a school have a significant effect on the comfort, satisfaction, health, and behavior of school users. Also, according to the systematic review conducted by Jamal et al. (2013), it can be stated that a healthy school environment is created due to the interaction of the school physical environment, culture, and participation of all the members of the school in making it a comfortable place.

According to the implications of this research, the improvement of the quality of school environmental cleanliness will require the involvement of a comprehensive approach that includes sanitation, waste management, teacher role models, and the creation of a culture of environmental stewardship by engaging the whole school community in related activities. Such an approach is believed to not only contribute to the enhancement of the school environmental cleanliness but also ensure the comfort and character development of learners. This claim is further supported by the study by Edgerton & McKechnie (2023), according to which students' perceptions about school environment have been identified as a contributing factor to good learning engagement and academic performance. In addition, Nguyen et al. (2020) reveal that the success of sustainable school development depends not only on the presence of physical facilities in schools but also on the involvement of the whole school community, implementation of related policies and environmental education in the learning process. Thus, the improvement of the quality of school environmental cleanliness will require a sustainable approach to be developed through the cooperation of school administrators, teachers, students, and all members of the school community.

There are several weaknesses in this research as well. This is because the research data has been gathered through the use of questionnaires, therefore still presenting subjective views of the respondents and not based on any actual observation on the situation in terms of school environmental cleanliness. Also, since the study was conducted among the 11th grade

science students in a public senior high school in Pandeglang, the findings cannot be generalized to other schools which have different circumstances. Hence, future studies are suggested to include survey as well as field observation and interview methodologies.

CONCLUSION

From the research findings, the perceptions held by the science students in the eleventh grade at a public high school in Pandeglang on the cleanliness of the school environment can be considered as relatively favorable. This is due to the fact that the percentage is relatively high at 70-75%. In this regard, it shows that most students have positive perceptions about the importance of cleanliness of the school environment.

However, there are some areas that should be improved such as the cleanliness of the environment, waste disposal, and the involvement of the school community in ensuring cleanliness. Thus, it calls for greater measures to be taken through proper management of the cleaning facilities and environmental consciousness amongst others.

SUGGESTIONS

Given the research results, schools are encouraged to enhance the level of management of environmental hygiene, especially in terms of waste disposal, cleanliness of toilets, and drainage systems. In addition, there is a need to incorporate activities within the school community that involve all members of the community, for example, community services, Clean Fridays, and environmental education to encourage the participation of the students in keeping the school environment clean.

It is highly recommended for future researchers to explore the factors that influence the perception and behavior of students toward environmental cleanliness.

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