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A Study of Student Behavior in Waste Management at SMA Negeri 1 Jayapura

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Abstrak

Penelitian ini mengeksplorasi perilaku siswa dalam pengelolaan sampah di SMA Negeri 1 Jayapura, Indonesia, dengan fokus pada bagaimana pengetahuan, sikap, norma sosial, dan faktor lingkungan memengaruhi praktik pengelolaan sampah yang berkelanjutan. Dengan menggunakan desain penelitian deskriptif kualitatif, data dikumpulkan melalui wawancara, observasi, dan analisis dokumen yang melibatkan 20 siswa dan 4 staf sekolah. Hasil penelitian menunjukkan adanya kesenjangan antara kesadaran siswa terhadap kebersihan lingkungan dan perilaku nyata mereka, yang terutama dipengaruhi oleh kurangnya infrastruktur, keterbatasan pengawasan, serta ketidakkonsistenan dalam peneladanan sosial. Temuan ini mengonfirmasi relevansi Theory of Planned Behavior dari Ajzen dan Social Cognitive Theory dari Bandura dalam menjelaskan bagaimana motivasi internal berinteraksi dengan konteks sosial dan lingkungan dalam membentuk tindakan pro-lingkungan. Penelitian ini menyimpulkan bahwa pendidikan lingkungan yang efektif perlu mengintegrasikan pembelajaran berbasis pengalaman, pengaruh teman sebaya, serta kontekstualisasi budaya. Implikasi praktisnya menekankan perlunya peningkatan fasilitas sekolah, program partisipatif, dan kebijakan pendidikan berkelanjutan untuk memperkuat praktik pengelolaan sampah di sekolah dan menumbuhkan tanggung jawab ekologis jangka panjang di kalangan siswa.

Kata kunci: pendidikan lingkungan, perilaku pengelolaan sampah, kesadaran siswa

Abstract

This study explores student behavior in waste management at SMA Negeri 1 Jayapura, Indonesia, focusing on how knowledge, attitudes, social norms, and environmental factors influence sustainable waste practices. Using a qualitative descriptive design, the research gathered data through interviews, observations, and document analysis involving 20 students and four school staff members. Results revealed a discrepancy between students' awareness of environmental cleanliness and their actual behavior, primarily influenced by inadequate infrastructure, limited monitoring, and inconsistent social modeling. The findings confirm the applicability of Ajzen's Theory of Planned Behavior and Bandura's Social Cognitive Theory in explaining how internal motivations interact with environmental and social contexts to shape pro-environmental actions. The study concludes that effective environmental education requires integrating experiential learning, peer influence, and cultural contextualization. Practical implications highlight the need for improved school facilities, participatory programs, and sustainable education policies to strengthen waste management practices in schools and foster long-term ecological responsibility among students.

Keywords: *environmental education, waste management behavior, student awareness*

Introduction

Environmental pollution, particularly waste mismanagement, has become a global issue that reflects both environmental and behavioral challenges within communities, including educational institutions. In Indonesia, schools are often faced with improper waste disposal habits among students, leading to unsanitary conditions around the school environment. SMA Negeri 1 Jayapura, one of the leading senior high schools in Papua, also experiences similar challenges. Despite the school providing proper waste facilities such as segregated bins and conducting regular cleanliness programs like "Clean Friday," many students still exhibit low awareness and responsibility in managing their waste properly. This reality indicates a significant gap between students' environmental knowledge and their actual waste management practices. The observed condition suggests that formal

education has not yet been entirely effective in shaping environmentally responsible behavior among students. Therefore, it becomes crucial to conduct an in-depth study to understand the behavioral patterns and influencing factors that shape students' waste management practices within the school setting.

Previous research has emphasized that environmental education plays a vital role in shaping sustainable behavior. Tilbury (1995) argued that environmental education aims to develop awareness, knowledge, and pro-environmental attitudes that lead to responsible actions. However, studies by Kagawa (2007) and Palmer (1998) revealed that understanding environmental issues does not always translate into environmentally responsible behavior. This inconsistency is often attributed to the weak internalization of environmental values in teaching, a lack of modeling from teachers, and inadequate institutional support for consistent waste management systems. These findings highlight a theoretical and empirical gap: while students may comprehend the concept of sustainability, their actual waste-related behavior often contradicts this knowledge. Thus, it becomes necessary to conduct a contextual study that investigates how students at SMA Negeri 1 Jayapura perceive, interpret, and act upon waste management practices in their daily school life. This research attempts to bridge the gap between environmental understanding and behavioral implementation in the educational context.

The main purpose of this research is to explore and describe student behavior regarding waste management at SMA Negeri 1 Jayapura. Specifically, the study seeks to identify the types of waste management behaviors students display, analyze the internal and external factors influencing such behaviors, and examine the extent to which environmental education values have been internalized and manifested in daily student practices. Through this investigation, the research aims to provide an empirical overview of the discrepancies between environmental awareness and behavior among high school students. The findings are expected to contribute theoretically to the development of behavioral and environmental education studies, while also offering practical insights for educators and policymakers. Furthermore, this study will serve as a reference for schools to design more effective environmental education strategies and sustainable school policies aligned with the principles of ecological responsibility and social learning.

The importance of this research lies in understanding waste management behavior from the students' perspective as key agents of environmental change within educational institutions. Based on the observed low participation in waste management activities and the stated research goals, this study aims to highlight how educational processes and social interactions influence environmental behavior formation. Theoretically, this study refers to Bandura's (1986) Social Cognitive Theory, which posits that behavior results from the dynamic interaction between cognitive processes, environmental influences, and individual actions. Therefore, students' waste management behavior should not be viewed as an isolated act but as an outcome of social learning within the school context. This argument emphasizes that education and school culture play a critical role in shaping pro-environmental behavior. Hence, this research is not only relevant for understanding the behavioral dynamics at SMA Negeri 1 Jayapura but also significant for improving the effectiveness of environmental education programs in promoting sustainable behavior among students.

Literature Review

Environmental education has evolved as a strategic effort to promote awareness, knowledge, and action toward sustainable living. According to UNESCO (1977), environmental education should enable individuals to acquire the knowledge, values, and skills needed to solve environmental problems. Later, Tilbury (1995) emphasized that environmental education for sustainability should not only focus on ecological understanding but also on developing critical thinking and decision-making skills that lead to responsible action. In the school context, environmental education plays a central role in fostering environmentally conscious behavior among students through curricular and extracurricular activities. However, the success of such programs often depends on how deeply environmental values are internalized by students and supported by school culture. Palmer (1998) noted that while schools may teach about the environment, transforming that knowledge into sustainable behavior requires active participation

and consistent reinforcement. Thus, environmental education becomes a multidimensional process—combining cognitive, affective, and behavioral aspects—that influences how students perceive and act toward environmental issues.

Student behavior in waste management represents a critical indicator of the effectiveness of environmental education. Behavior, as defined by Bandura (1986), is the result of reciprocal interactions among personal factors, environmental influences, and actual actions—known as reciprocal determinism. Applying this framework to waste management, student behavior is influenced by their knowledge of waste issues, the availability of proper facilities, peer influence, and institutional norms. Studies by Geng et al. (2015) and Taufik et al. (2019) demonstrate that environmental attitudes, subjective norms, and perceived behavioral control strongly predict pro-environmental behavior among students. However, behavioral gaps often occur when students understand the importance of proper waste disposal but fail to translate this knowledge into action. This phenomenon, referred to as the "value-action gap," highlights that cognitive awareness alone is insufficient to drive sustainable behavior. Instead, consistent behavioral reinforcement and contextualized environmental learning are needed to shape responsible waste management practices in schools.

Multiple factors influence how students manage waste in their daily school activities. Ajzen's (1991) Theory of Planned Behavior (TPB) explains that intention to perform a behavior is determined by attitudes, social norms, and perceived behavioral control. When applied to waste management, positive attitudes toward cleanliness, peer encouragement, and access to waste bins all contribute to shaping behavioral intentions. However, research by Kollmuss and Agyeman (2002) found that even strong environmental attitudes do not always lead to corresponding behavior due to situational and psychological barriers, such as laziness, lack of habit, or minimal institutional enforcement. In school environments, these barriers are often amplified by limited waste management systems, insufficient supervision, and a lack of consistent environmental policies. Therefore, understanding the interaction between psychological determinants and structural support is essential to promoting sustainable waste management behavior among students.

The school environment serves as a microcosm of society where values, norms, and behaviors are cultivated. According to Stevenson (2007), schools act as key agents in socializing environmental responsibility through formal learning and daily routines. The presence of environmental programs such as "eco-schools," waste segregation initiatives, and recycling competitions can positively influence student attitudes and practices. However, as noted by Evans et al. (2012), institutional commitment is often inconsistent, with environmental programs being treated as temporary projects rather than long-term behavioral development strategies. In the context of SMA Negeri 1 Jayapura, the school's physical environment, leadership commitment, and teacher modeling play crucial roles in shaping students' behavior. A strong school culture that promotes cleanliness, mutual responsibility, and ecological ethics can foster sustained positive behavior among students. Therefore, integrating environmental education into the daily ethos of the school is vital for long-term impact.

The study of environmental behavior has been guided by several theoretical frameworks. Apart from Bandura's (1986) Social Cognitive Theory and Ajzen's (1991) TPB, Stern's (2000) Value-Belief-Norm (VBN) theory provides a broader understanding of how personal values and moral obligations influence pro-environmental actions. The VBN model suggests that individuals who hold altruistic and biospheric values are more likely to engage in environmentally responsible behaviors. In the context of student waste management, these theoretical perspectives help explain how knowledge, attitudes, moral values, and perceived responsibility converge to influence action. Integrating these theories allows researchers to examine not only cognitive awareness but also emotional and moral motivations behind students' waste management practices. Consequently, understanding the theoretical underpinnings provides a foundation for interpreting behavioral patterns observed in schools and designing interventions that effectively target both internal and external behavioral determinants.

Although numerous studies have explored environmental behavior among students, most have been conducted in urban or resource-rich schools, with limited attention to geographically and culturally unique regions like Papua. Research by Sudarmadi et al. (2001) and Yusliza et al. (2020) highlights that local context, cultural values, and environmental infrastructure significantly affect student participation in waste management. However, there is still limited empirical evidence explaining how students in Eastern Indonesia, particularly Jayapura, interpret and engage in waste-related behavior within the framework of environmental education. This gap underscores the need for a contextualized analysis that reflects local socio-cultural dynamics. Thus, this study positions itself to fill that gap by investigating how students at SMA Negeri 1 Jayapura perceive, internalize, and practice environmental responsibility through waste management. The findings are expected to contribute to theory building in environmental education and to inform the development of locally grounded strategies for promoting sustainable behavior in schools.

Method

This study employed a qualitative descriptive research design aimed at exploring and interpreting students' waste management behavior at SMA Negeri 1 Jayapura. The qualitative approach was chosen because it allows for a deep understanding of human behavior and the contextual factors that shape it (Creswell, 2014). Rather than testing hypotheses, this study focused on revealing patterns, meanings, and motivations underlying students' actions in managing waste within their school environment. A descriptive design was considered appropriate since it provides a detailed account of existing phenomena without manipulating any variables (Miles, Huberman, & Saldaña, 2014). Through this method, the researcher sought to capture the authentic realities of students' attitudes, perceptions, and practices toward waste management. The design also allowed flexibility in interpreting data emerging from the field, enabling the researcher to connect findings with theoretical perspectives related to environmental behavior and education. By integrating these elements, the research design supported a comprehensive analysis of how environmental knowledge, social norms, and school culture converge to shape student waste management practices in SMA Negeri 1 Jayapura.

The research was conducted at SMA Negeri 1 Jayapura, one of the leading public senior high schools located in the provincial capital of Papua, Indonesia. The school was purposively selected based on its representative characteristics—namely, its diverse student body, its status as a model school for academic excellence, and its visible challenges related to waste management despite having environmental programs. The participants consisted of 20 students from grades X to XII, selected using purposive sampling to ensure variation in gender, grade level, and participation in environmental activities. In addition to students, three teachers and one school administrator were included as supporting informants to provide triangulation of perspectives. Participants were chosen based on their willingness and their direct engagement in school cleanliness and waste management initiatives. Prior to data collection, all participants were informed about the research objectives, and ethical clearance was obtained from the school authority to ensure voluntary participation and confidentiality. This sampling approach allowed the study to capture a comprehensive understanding of student behavior and the contextual dynamics that shape waste management practices within the school.

Data were collected through a combination of in-depth interviews, observations, and document analysis to ensure methodological triangulation and enhance data validity. Semi-structured interviews were conducted with 20 students and 4 school staff members to gather detailed information regarding their knowledge, attitudes, and behaviors toward waste management. The interview guide contained open-ended questions to allow participants to express their experiences freely while still aligning with the research objectives (Patton, 2015). Observations were carried out over four weeks, focusing on students' actual waste disposal practices during school hours, break times, and extracurricular activities. Field notes were taken to document students' interactions, waste disposal patterns, and environmental awareness initiatives. In addition, relevant documents such as school policies, environmental program reports, and student organization records were analyzed to provide contextual background. The combination of these techniques enabled the researcher to compare reported behavior with observed reality, ensuring

a more credible and holistic understanding of students' waste management practices.

The data analysis followed an interactive model as proposed by Miles, Huberman, and Saldaña (2014), which includes three concurrent activities: data condensation, data display, and conclusion drawing or verification. During data condensation, interview transcripts and field notes were coded and categorized to identify recurring themes related to student behavior, school culture, and environmental awareness. The coding process was both inductive and deductive, allowing new themes to emerge while maintaining alignment with theoretical frameworks such as the Theory of Planned Behavior (Ajzen, 1991) and Social Cognitive Theory (Bandura, 1986). Data display was performed using narrative matrices and thematic maps to visualize relationships between categories. The final stage involved drawing conclusions and verifying findings through cross-checking with participants and reexamining field data to ensure validity. The analysis aimed to uncover patterns that explain how cognitive understanding, institutional factors, and peer interactions contribute to waste management behavior among students. Through this rigorous analytic process, the study produced findings that are both empirically grounded and theoretically informed.

To ensure the credibility, dependability, and confirmability of the findings, the study adopted Lincoln and Guba's (1985) criteria for trustworthiness in qualitative research. Credibility was achieved through prolonged engagement, triangulation of data sources, and member checking, where participants verified the accuracy of interpretations. Dependability was established by maintaining detailed field notes and a transparent audit trail of the research process. Confirmability was ensured by maintaining objectivity through reflexive journaling, where the researcher continuously reflected on her positionality and potential biases during data collection and interpretation. Ethical considerations were strictly upheld throughout the study. Participants were informed of the research purpose and provided with the right to withdraw at any time. Anonymity and confidentiality were maintained by using pseudonyms and securing all data in password-protected files. These ethical and methodological safeguards strengthened the integrity and reliability of the research, ensuring that the study accurately represents the lived experiences of students regarding waste management behavior at SMA Negeri 1 Jayapura.

Result and Discussion

Overview of Findings

The findings of this study reveal that student behavior toward waste management at SMA Negeri 1 Jayapura is shaped by a combination of cognitive understanding, environmental awareness, institutional support, and peer influence. Data gathered from interviews, observations, and document analysis indicate that while most students possess basic knowledge about waste segregation and environmental cleanliness, only a fraction consistently practices responsible waste disposal. The majority of students demonstrated positive attitudes toward environmental care, yet their behavioral implementation remained inconsistent. This gap between knowledge and practice aligns with the "value-action gap" highlighted by Kollmuss and Agyeman (2002). Observational data showed that waste bins were frequently used incorrectly, with organic and inorganic waste often mixed. However, several student-led initiatives, such as recycling clubs and "Clean Friday" programs, reflected genuine enthusiasm among certain student groups. Overall, these findings underscore that waste management behavior at the school is not merely an issue of awareness but also of behavioral habit formation, environmental infrastructure, and school-wide reinforcement.

Students' Knowledge and Environmental Awareness

The study found that students demonstrated a moderate to high level of knowledge about environmental issues and waste management. Interview data revealed that most participants could articulate the difference between recyclable and non-recyclable waste, as well as the environmental consequences of improper waste disposal. However, despite this cognitive understanding, practical application was not always observed. Many students acknowledged that they knew the correct waste management practices but admitted to neglecting them due to convenience or time pressure. This pattern indicates that cognitive awareness alone does not guarantee environmentally responsible behavior, echoing Ajzen's (1991) assertion that attitudes must be supported by behavioral

intention and perceived control. Observation results also showed that while some students actively participated in school campaigns, others remained passive, demonstrating that knowledge diffusion within the school community was uneven. The findings suggest a need for continuous reinforcement of environmental education through experiential learning rather than theoretical instruction alone.

Observed Behavioral Patterns

Direct observation within the school revealed diverse behavioral patterns among students in managing waste. Some students consistently disposed of trash in designated bins, particularly those who participated in extracurricular environmental programs. Conversely, others exhibited careless behavior, often throwing waste into mixed containers or leaving plastic packaging on desks and open areas. Interestingly, behavioral consistency appeared to depend on group norms: students who associated with environmentally active peers tended to follow proper waste disposal habits. This observation supports Bandura's (1986) social learning theory, which emphasizes the role of modeling and peer influence in shaping behavior. Furthermore, moments of collective environmental action, such as "Clean Friday" programs, temporarily improved student compliance with waste management practices. However, these behaviors often diminished once the organized activity ended, suggesting that long-term behavioral internalization had not yet been achieved. These findings highlight the importance of sustained institutional engagement to transform environmentally responsible behavior from a situational act into a habitual practice.

Role of Teachers and School Administration

Teachers and school administrators were found to play a crucial yet underutilized role in shaping students' environmental behavior. Interviews revealed that while teachers occasionally integrated environmental topics into classroom discussions, such efforts were not part of a consistent or structured curriculum. Furthermore, students expressed that teacher modeling—such as correctly disposing of waste or participating in cleanliness campaigns—had a significant influence on their own actions. Administrative staff also acknowledged that although environmental programs exist, their implementation often depends on individual teacher initiative rather than an institutional mandate. This finding is consistent with Stevenson's (2007) argument that environmental education in schools often faces contradictions between policy and practice. The absence of clear policies and reward mechanisms for sustainable behavior reduces motivation among students and staff alike. Therefore, the findings suggest the need for a more systemic approach where environmental values are embedded into school policy, curriculum design, and daily routines to ensure behavioral consistency and institutional sustainability.

Peer Influence and Social Norms

Peer influence emerged as a strong determinant of waste management behavior among students. Data indicated that students were more likely to engage in proper waste disposal when such behavior was normalized within their peer group. Those who were members of student organizations, such as the environmental club or student council, tended to demonstrate greater responsibility in managing waste. This aligns with the Theory of Planned Behavior (Ajzen, 1991), particularly the role of subjective norms in shaping behavioral intention. Students reported that when peers actively reminded each other to use proper waste bins, compliance rates increased. Conversely, in the absence of social reinforcement, individual responsibility often declined. The influence of peer groups was also visible during collective events, where social pressure encouraged pro-environmental behavior. These results emphasize the significance of fostering collaborative and peer-based environmental initiatives to cultivate long-lasting sustainable practices among students.

Infrastructure and Facilities

The availability and quality of waste management facilities were found to significantly influence student behavior. Although SMA Negeri 1 Jayapura had installed waste bins for organic and inorganic materials, observations revealed that their placement and labeling were not always effective. Some bins were located too far from high-traffic areas, leading students to discard waste improperly. Additionally, the lack of regular monitoring resulted in bins overflowing with mixed waste. Teachers and staff acknowledged that while the school has attempted to implement a 3R (Reduce, Reuse, Recycle) approach, logistical and financial

constraints limited the program's sustainability. These findings align with the assertion by Kollmuss and Agyeman (2002) that structural barriers can undermine pro-environmental intentions. Therefore, behavioral interventions must be supported by adequate infrastructure to ensure that sustainable choices are convenient and accessible. Improving facilities, enhancing signage, and establishing a waste management monitoring system would likely enhance behavioral compliance among students.

Cultural and Contextual Influences

Cultural context also played an important role in shaping students' perceptions of waste and cleanliness. Many students expressed that environmental responsibility was often viewed as a collective rather than individual duty, reflecting Papuan cultural values of community and shared labor. However, this collective ethos sometimes led to diffusion of responsibility, where individuals assumed that others would handle cleanliness tasks. This dynamic corresponds to the social loafing phenomenon described in group behavior studies (Latane, Williams, & Harkins, 1979). On the other hand, cultural respect for elders and authority figures provided an opportunity for teachers and community leaders to model environmental discipline effectively. The contextual uniqueness of Jayapura—characterized by limited waste management infrastructure and diverse socio-economic backgrounds—also influenced behavioral outcomes. Thus, environmental programs in the school must be culturally sensitive and inclusive, integrating local values and community engagement to ensure their relevance and sustainability.

Student Initiatives and Environmental Programs

Despite the challenges, several student-led initiatives demonstrated growing environmental consciousness within the school. Programs such as "Green Class Competition," "Recycling Week," and "Eco Club Projects" encouraged creative engagement with waste reduction. Students who participated in these programs reported increased motivation to maintain cleanliness and promote environmental responsibility among peers. The initiatives also fostered leadership, teamwork, and problem-solving skills aligned with the principles of environmental education (Tilbury, 1995). However, sustainability of these programs remained limited due to insufficient institutional support and lack of long-term planning. Some projects were discontinued once key student leaders graduated, indicating a need for stronger institutional integration. Nevertheless, these initiatives exemplify the transformative potential of student agency when provided with the right support, reinforcing the idea that environmental education should empower students as active change agents within their school communities.

Summary of Key Findings

In summary, the findings indicate that students at SMA Negeri 1 Jayapura possess foundational knowledge of environmental issues but face challenges in consistently translating that awareness into behavior. The main determinants of waste management behavior include peer influence, teacher modeling, infrastructure quality, and institutional commitment. Positive practices were most evident in contexts with strong social norms and leadership support, while behavioral lapses were common in situations lacking reinforcement or convenience. These patterns affirm the interconnectedness of cognitive, social, and environmental factors in shaping pro-environmental behavior, as proposed by Bandura (1986) and Ajzen (1991). The findings also highlight the cultural and contextual specificity of waste management practices in Jayapura, suggesting that behavioral interventions should be adapted to local realities. Ultimately, improving environmental behavior among students requires an integrated approach—combining education, institutional policy, peer collaboration, and adequate infrastructure—to foster long-term sustainability in school-based waste management.

Interpreting Student Awareness and Attitude

The findings demonstrate that while students at SMA Negeri 1 Jayapura possess high cognitive awareness regarding environmental cleanliness, their actual waste management practices remain inconsistent. This gap between awareness and behavior supports Ajzen's (1991) Theory of Planned Behavior, which posits that knowledge alone does not guarantee behavioral change unless accompanied by strong behavioral intentions and perceived control. Many students articulated a sense of responsibility toward maintaining school cleanliness; however, external factors—such as insufficient facilities

and peer influence—undermined their actions. This suggests that positive attitudes toward waste management require reinforcement through supportive environmental cues and sustained modeling from teachers and peers. The results parallel the observations of Hines, Hungerford, and Tomera (1987), who found that environmental behavior is significantly shaped by situational factors, not merely by moral reasoning. Therefore, the challenge lies not in educating students about cleanliness, but in translating awareness into consistent behavioral habits, which depend on both individual intention and institutional reinforcement.

The Role of School Environment and Infrastructure

The physical and organizational environment of SMA Negeri 1 Jayapura plays a critical role in shaping waste management behavior. Despite having adequate knowledge, students often failed to segregate waste correctly due to the limited number of waste bins and poor signage. This condition aligns with Bandura's (1986) Social Cognitive Theory, which emphasizes the interplay between personal factors, behavior, and environmental conditions. A conducive environment acts as a behavioral cue, facilitating sustainable practices. When the infrastructure fails to support the desired action, behavioral intentions tend to decline. The observed data confirm that visible environmental cues—such as labeled bins, posters, and clean surroundings—enhance students' motivation to act responsibly. Conversely, the lack of consistent monitoring and limited access to proper waste facilities created a sense of learned helplessness among students. Thus, improving environmental infrastructure within schools can be an effective behavioral intervention strategy, reinforcing environmental responsibility through both accessibility and visual reminders that shape daily habits.

Influence of Peer Norms and Social Modeling

Social interaction among students emerged as a decisive factor influencing waste management practices. Peer norms shaped behavioral conformity, often determining whether waste disposal behaviors were positive or negative. Students were more likely to dispose of waste properly when peers did so, confirming Bandura's (1986) principle of observational learning. The social modeling process strengthened environmental norms through imitation and reinforcement. This finding is consistent with research by Cialdini, Reno, and Kallgren (1990), which highlights the power of social norms in directing pro-environmental behavior. When environmentally responsible students became role models within peer groups, the collective behavior improved significantly. However, when peer groups neglected cleanliness norms, individuals were more likely to follow such negative practices. Therefore, fostering positive social modeling through peer-led environmental programs and student ambassadors can be a transformative approach in sustaining environmentally conscious behavior within school contexts.

Linking Environmental Education and Behavioral Outcomes

The results underscore the need for an integrative environmental education model that bridges cognitive understanding and behavioral application. While SMA Negeri 1 Jayapura has embedded environmental topics in its curriculum, the delivery often emphasizes theoretical knowledge rather than experiential learning. This aligns with the critiques of Tilbury (1995), who argued that effective environmental education must involve participatory experiences that connect learners emotionally and practically to environmental issues. Students' limited engagement in hands-on waste management activities restricted their ability to internalize eco-friendly values as part of their identity. When education remains abstract, behavior change is temporary or symbolic. Therefore, integrating project-based learning, such as waste recycling competitions or student-led environmental audits, could significantly enhance behavioral outcomes. Such pedagogical innovations would enable learners to transform knowledge into lifelong sustainable habits through experiential and reflective practice.

Cultural and Contextual Dimensions in Waste Management

The behavioral patterns identified at SMA Negeri 1 Jayapura cannot be separated from broader cultural and contextual influences. Papua's communal culture, characterized by collective identity and mutual dependence, can serve as both a facilitator and barrier to environmental initiatives. On one hand, community-oriented values encourage shared responsibility for maintaining cleanliness; on the other, low levels of enforcement and contextual

challenges, such as inadequate municipal waste systems, weaken behavioral consistency. This observation aligns with Hofstede's (2001) cultural dimensions theory, which emphasizes that collectivist societies rely heavily on group norms to drive compliance. Therefore, school-based interventions should align with local cultural values by promoting collaborative environmental projects that reflect Papuan identity and social cohesion. Such context-sensitive strategies can enhance ownership, foster cultural pride, and ensure that waste management practices become part of students' collective environmental ethics rather than imposed behavioral obligations.

Implications and Theoretical Integration

The overall findings reinforce the significance of integrating psychological, social, and institutional dimensions in promoting sustainable waste management behavior. Ajzen's Theory of Planned Behavior and Bandura's Social Cognitive Theory jointly explain how attitudes, perceived norms, and environmental context shape behavioral outcomes. The results reveal that behavioral change requires not only knowledge and intention but also sustained reinforcement through peer modeling, environmental support, and culturally grounded education. This integration highlights the interdependence between internal motivation and external facilitation in forming pro-environmental habits. Therefore, policymakers and educators should move beyond awareness campaigns toward creating learning ecosystems that nurture environmental responsibility through practice, reflection, and collaboration. Ultimately, this study contributes to a deeper understanding of how behavior-oriented educational interventions can transform environmental awareness into concrete, habitual, and contextually relevant actions among students at SMA Negeri 1 Jayapura.

Conclusion

This study concludes that students' waste management behavior at SMA Negeri 1 Jayapura is influenced by a complex interplay between individual awareness, environmental infrastructure, and social norms. Although most students possess high levels of environmental knowledge and positive attitudes toward cleanliness, these have not consistently translated into sustainable behavioral practices. Factors such as limited waste facilities, weak monitoring systems, and inconsistent peer modeling contribute to the persistence of improper waste disposal behaviors. These findings affirm the propositions of Ajzen's Theory of Planned Behavior (1991), which states that behavioral intention alone is insufficient without supportive environmental and social factors. Similarly, Bandura's Social Cognitive Theory (1986) helps explain how modeling and reinforcement shape observable behavior in school settings. Overall, this study confirms that environmental education must move beyond cognitive development toward a more integrated approach that addresses behavioral, social, and infrastructural dimensions simultaneously to foster lasting pro-environmental habits among students.

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