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Evaluation of the Implementation of the Green Student Movement (GSM) Program by WALHI in the Governance of Plastic Use Reduction in Medan City

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Abstract

Background/purpose. The growing environmental issues in Medan City, particularly regarding plastic use and its detrimental effects, have prompted the Indonesian Forum for the Environment (WALHI) to launch the Green Student Movement (GSM) program. This program aims to raise awareness and involve youth in tackling environmental and humanitarian concerns.

Materials/methods. A descriptive qualitative approach was employed, utilizing data collection techniques such as in-depth interviews with WALHI and GSM organizers, direct observation, and documentation. The CIPP evaluation model (Context, Input, Process, Product), developed by Daniel L. Stufflebeam, was adopted to guide the evaluation.

Results. The findings indicate that GSM, as an environmental education program, has had a significant impact on students' behavior, particularly in reducing plastic bag usage and promoting eco-friendly alternatives. Involvement in campaigns, training, and community-based activities has proven effective in raising ecological awareness. Despite challenges such as limited policy support and funding, GSM has contributed to the creation of a more environmentally conscious youth generation. The program's focus on education and participation has been impactful, though its scope remains limited to educational institutions.

Conclusion. GSM has the potential to serve as a model for similar environmental education-based movements in other Indonesian cities. Strengthening institutional support, cross-sector collaboration, and expanding its reach beyond educational settings are essential for ensuring long-term success.

1. Introduction

Environmental issues in Indonesia have reached a critical point, demanding the involvement of all parties, including both the government and civil society (Aprilina, 2025; Sanders, 2025; Yori, 2025). The phenomenon of increasingly extreme climate change, global warming, ecosystem damage, and natural resource degradation is clear evidence that the environment is under threat. This situation is further exacerbated by the rising frequency of natural disasters such as floods, droughts, and forest fires, which have wide-ranging socio-economic impacts. Among these issues, one of the most prominent is the uncontrolled use of single-use plastics (Agustina, 2024; Ratnawati, 2023).

Plastic waste has become a global problem, with Indonesia ranking second among the world's largest contributors. The widespread use of plastics in daily life across household, industrial, agricultural, and commercial sectors has led to a buildup of plastic waste that is difficult to decompose. Plastics are non-biodegradable, meaning they require hundreds to thousands of years to break down naturally. The ecological impact of plastic not only threatens biodiversity on land and at sea but also poses risks to human health and contaminates the air, soil, and water (Conlon, 2021; Sahputra, 2024).

Although plastic offers various advantages in terms of efficiency and usability, such as being lightweight, inexpensive, and durable, in reality, plastic has become a serious threat to environmental sustainability. The widespread use of plastic in modern society highlights a structural dependency on this material. On the other hand, the inadequate plastic waste management system exacerbates this situation, especially when plastic is openly burned or improperly disposed of in water bodies.

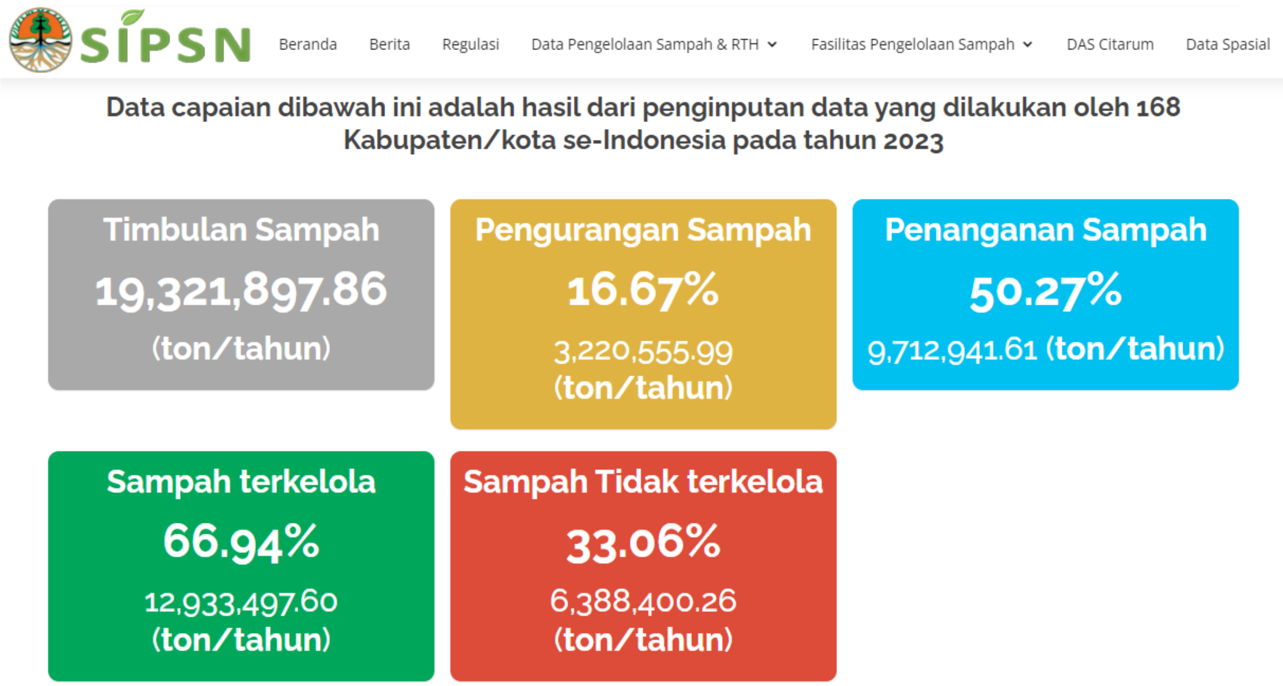

Figure 1. National Waste Management Information System Data (In Bahasa)

Data shows that plastic waste accounts for approximately 14 percent of the total domestic waste production in Indonesia, equivalent to 5.4 million tons per year. This figure has surpassed the amount of paper waste, which previously ranked second. In Medan City, one of the major cities outside Java Island, waste production reached a significant level, with an annual accumulation of 645,661.28 tons in 2023, making it the fourth-highest city in the country in terms of waste volume.

Figure 2. 10 Cities with the Highest Waste Production in 2023 (In Bahasa)

The composition of waste in Medan City shows that plastic waste ranks second, accounting for 18.81%. This aligns with data from the National Waste Management Information System (SIPSN), which indicates an increasing trend in plastic waste production in Medan City from 2019 to 2022. During this period, the percentage of plastic waste rose from 14% to 15.3%. This surge reflects weak collective awareness and a lack of effective policy interventions.

Table 1. Waste and Plastic Waste in Medan City for the Period of 2019-2022 (Source: Sistem Informasi Pengelolaan Sampah Nasional (SIPSN))

Year	Total Waste (Ton)	Total Plastic Waste (Ton)	Percentage Of Plastic Waste (%)	Increase (%)
2019	621.968, 76	87.075,6264	14%	-
2020	622.206,89	87.108,9646	14%	-
2021	645.012,56	96.751,884	15%	+1%
2022	628.749,22	96.198,63066	15,3%	+0,3%

Unfortunately, existing regulations in Indonesia, such as Government Regulation No. 81 of 2012 and Minister of Environment and Forestry Regulation No. P.75 of 2019, do not explicitly and comprehensively regulate plastic waste management (Rex, 2023; Sahputra, 2024). The term 'plastic' is only implicitly mentioned in the explanations, without a concrete elaboration on the mechanisms for reduction, recycling, or the involvement of local actors in its management. This lack of clarity in the regulations creates a gap for unsustainable plastic consumption practices. Amid weak regulations, the role of civil society organizations, such as the Indonesian Forum for the Environment (WALHI), becomes significant.

WALHI is an NGO engaged in environmental advocacy with networks across various provinces, including North Sumatra. Through the Green Student Movement (GSM) program, WALHI mobilizes youth participation to actively engage in environmental issues, particularly in reducing single-use plastic consumption. GSM is an ecological education initiative based on action, involving students from various universities in Medan City. The program promotes the principles of Reduce, Reuse, Recycle (3R), advocates for a zero-waste lifestyle, and promotes plastic-free diets (Damoah et al., 2023).

Activities carried out within this program include training, public campaigns, clean-up actions, and the distribution of tote bags to replace plastic bags. This initiative aims to foster sustainable behavioral change among the youth as agents of social change (MacDonald et al., 2021; Mathis et al., 2022; Oyinlola et al., 2022; Roy et al., 2021).

In its implementation, GSM serves not only as a medium for socialization but also as a social laboratory where students practice environmental management on a micro scale. Through active student involvement, the program aims to drive a transformation in the culture of plastic consumption and foster collective awareness that shapes environmental governance at the local level.

However, the effectiveness of this program in achieving its goals needs to be systematically analyzed. Therefore, an evaluation of the GSM implementation is conducted using Stufflebeam's CIPP model (Context, Input, Process, Product) (Bian, 2023; K.C. & Baral, 2023). This evaluation covers five aspects: program context, resource adequacy, implementation, activities, and program results or impacts. The evaluation results indicate that the GSM program achieved an average score of 68% across all evaluation aspects, which is categorized as 'very good'. However, there remains a significant 32% room for improvement.

The evaluation findings show that although GSM has contributed to raising student awareness of plastic issues, there are still several challenges regarding the program's sustainability, logistics, distribution, and the expansion of its reach. Therefore, it is important to reconsider the program's design to better adapt to evolving social and environmental dynamics at the local level.

In this context, this study positions the Green Student Movement (GSM) Program as an educational and participatory effort to shape the behavior and awareness of the younger generation regarding the dangers of single-use plastics. Unlike the studies by Abdel-Hameed and Satoto, which focus on technical innovations, GSM emphasizes the process of social organization and student empowerment through training, campaigns, and direct environmental actions.

Compared to Hassa and Kato's research, GSM faces similar challenges regarding message effectiveness and public reception, but its strength lies in its participatory model, which actively engages the educational community. Therefore, this study is essential to fill a gap in the literature, particularly in evaluating the implementation of community-based student programs using a holistic approach based on the CIPP model.

To clarify the study's theoretical position, the literature review has been systematically organized into three thematic dimensions: (1) environmental governance and plastic reduction, (2) participatory and youth-based environmental education, and (3) applications of the CIPP evaluation model in sustainability programs, thereby outlining the conceptual gap this study addresses. The GSM program integrates participatory, project-based, and peer learning methods, combining formal instruction with informal community-based activities to reinforce environmental understanding through experiential engagement.

With the increasing urgency of plastic waste issues and the suboptimal national regulations addressing them, the presence of GSM, a grassroots movement initiated by WALHI, becomes relevant for evaluation and development. This study aims to provide an in-depth understanding of the extent to which the GSM program has been effectively implemented in supporting plastic reduction governance in Medan City, as well as its strategic implications for community-based environmental movements.

2. Literature Review

2.1. Theoretical Framework

This study adopts Daniel L. Stufflebeam's *Context, Input, Process, and Product* (CIPP) evaluation model as its principal theoretical framework (Bian, 2023; K.C. & Baral, 2023). The CIPP model offers a holistic evaluative approach that goes beyond outcome measurement to examine the programme's relevance to its socio-cultural context, the adequacy of its resources, the quality of its implementation processes, and the tangible results it produces. Within the *context* dimension, the model facilitates the assessment of the GSM programme's alignment with Medan's youth's environmental awareness needs and the urgency of reducing plastic use.

In addition, this study draws on Bandura's (2023) Social Learning Theory, which posits that behavioral change occurs through observation, imitation, and reinforcement within social contexts, making it highly relevant to the GSM program where students learn sustainable practices through peer modeling and collective environmental action.

The *input* dimension evaluates the sufficiency and suitability of resources, organisational capacity, and strategic planning. The *process* dimension analyses the implementation fidelity, adaptability, and engagement strategies employed during programme delivery. The *product* dimension focuses on both immediate behavioural changes and long-term impacts on environmental governance. This comprehensive structure makes the CIPP model particularly suitable for assessing the GSM programme, which operates at the intersection of environmental education, youth activism, and policy advocacy.

This framework, therefore, situates the GSM program within the domain of environmental education, where participatory and experiential learning methods serve as core pedagogical strategies that foster students' cognitive understanding, affective engagement, and psychomotor involvement in sustainable action.

Complementing the CIPP framework, this study also draws on participatory education theory (MacDonald et al., 2021; Wu, 2024), which emphasises active learner involvement as a catalyst for transformative change. Rooted in the works on experiential learning and community-based environmental action, participatory education theory posits that individuals, particularly youth, develop stronger ecological awareness and sustained behavioural change when they are directly engaged in the planning, execution, and evaluation of activities. In the GSM programme, students are not passive recipients of information but active contributors to campaign design, environmental projects, and peer-to-peer education. This theoretical lens is crucial in explaining how educational interventions, when integrated with community activism, can foster critical ecological consciousness and long-term commitment to sustainable practices. Together, the CIPP model and participatory education theory provide a robust analytical foundation for evaluating the GSM initiative's effectiveness, challenges, and sustainability prospects.

2.2. Previous Research

Various previous studies have shown that campaigns to reduce plastic use have great potential to shape environmentally friendly behavior. However, their success is strongly influenced by social context, educational approaches, and policy support, as cited by Abdel-Hameed (2023). Emphasizing the importance of innovation in plastic recycling for industrial purposes, Satoto (2022) highlights the use of organic waste as an alternative to plastic, focusing on cost efficiency and environmental sustainability. A study by Kato (2024) reveals that consumer perceptions of environmental value significantly influence interest in plastic-free products; meanwhile, Hassa (2025) indicates that the success of plastic reduction campaigns is also determined by the alignment of the message with the community's sociolinguistic background. The four studies highlight different dimensions, ranging from technology and economics to culture and communication; however, they all suggest the need for an integrated approach to ensure that plastic reduction campaigns achieve widespread impact.

3. Methodology

3.1. Research Design

This study employed a descriptive qualitative design guided by Stufflebeam’s Context, Input, Process, and Product (CIPP) evaluation model. The design was selected to capture the multidimensional nature of the Green Student Movement (GSM) Program, focusing on both its implementation process and outcomes. The CIPP model provided a comprehensive framework for assessing the relevance of the program’s objectives (context), adequacy of resources (input), effectiveness of implementation (process), and observable behavioral outcomes (product). This design enabled the researcher to interpret complex social interactions and environmental learning experiences holistically, ensuring a systematic, contextually grounded evaluation of the GSM program’s educational and ecological impacts.

The informants in this study were selected through purposive sampling, with criteria based on their direct involvement and in-depth understanding of the GSM program implementation. The informants were classified into three categories: key informants (WALHI management), primary informants (GSM program managers), and additional informants (students or external parties familiar with the program implementation) (Creswell & Creswell, 2022). Three key informants participated in the study—Jaka (program coordinator), Lina (student participant), and Galang (WALHI field representative)—each representing different stakeholder roles in the GSM program.

3.2. Data Collection Procedure and Research Instruments

Data collection techniques included structured interviews with pre-prepared questionnaires, direct observation of field activities, and document review (Weyant, 2022). Interviews were conducted using open-ended questions that explored participants’ experiences, perceptions of behavioral change, and program challenges, each lasting 45–60 minutes and recorded with consent. Observations were carried out during campaign and training activities to capture engagement patterns and contextual influences, while supporting documents—such as reports, social media materials, and WALHI’s internal archives—were analyzed to triangulate findings. The research took place at the WALHI North Sumatra Office, located at Jalan Bunga Wijaya Kesuma XV, Padang Bulan Selayang II, and in the Medan Baru sub-district of Medan City. This integrated approach ensured data validity, methodological rigor, and replicability by combining verbal, behavioral, and documentary evidence.

3.3. Data Analysis

The data obtained were then analyzed using the Miles, Huberman, and Saldana model, which consists of three stages: data condensation, data presentation, and conclusion drawing (Miles et al., 2020). Data reduction was performed to filter important information, data presentation was organized in a narrative form, and conclusions were drawn systematically based on patterns in the findings. To ensure data validity, this study employed triangulation techniques, which included source triangulation, technique triangulation, and time triangulation (Flick, 2022). Source triangulation was conducted by comparing data from various informants; technique triangulation was carried out by combining the results of interviews, observations, and documentation; while time triangulation involved data collection at different times and situations to test the consistency of findings. The use of triangulation aimed to strengthen the validity and credibility of the research results, ensuring that the information obtained could be scientifically accountable in explaining the extent to which the GSM Program contributes to plastic reduction in Medan City (Edmonds & Kennedy, 2020).

3.4. Ethical Considerations

This research adhered to established ethical standards for qualitative studies, ensuring respect, confidentiality, and informed participation of all respondents. Prior to data collection, each informant received a clear explanation of the study's objectives, methods, and potential uses of the findings, followed by informed consent in either verbal or written form, depending on their preference (Edmonds & Kennedy, 2020). Participation was entirely voluntary, with the right to withdraw at any stage without consequence. All data were anonymised to protect participants' identities, and sensitive information was handled with strict confidentiality. The study avoided any form of coercion or manipulation, ensuring that participants' involvement was based on genuine willingness and understanding. Fieldwork procedures also followed cultural sensitivity protocols, particularly in engaging with student communities and civil society actors, to maintain mutual respect and trust throughout the research process (Flick, 2022).

4. Results

4.1. Evaluation of the Implementation of the Green Student Movement (GSM) Program by the Indonesian Forum for the Environment (WALHI)

The evaluation of the implementation of the Green Student Movement (GSM) Program initiated by the Indonesian Forum for the Environment (WALHI) in Medan City is conducted to assess the extent to which this program has succeeded in achieving its goals of raising awareness and fostering active participation among the younger generation on environmental issues, particularly in reducing plastic use (Ali et al., 2021; Chotimah et al., 2022; Sakti et al., 2021; Veiga et al., 2023). Using the CIPP evaluation model (Context, Input, Process, Product), this study explores the experiences and perspectives of key informants through in-depth interviews and direct observations. The evaluation results are then mapped to provide a comprehensive overview of the program's strengths, challenges, and future sustainability opportunities. The following diagram presents a map of the interview results, summarizing the key findings from each evaluation dimension.

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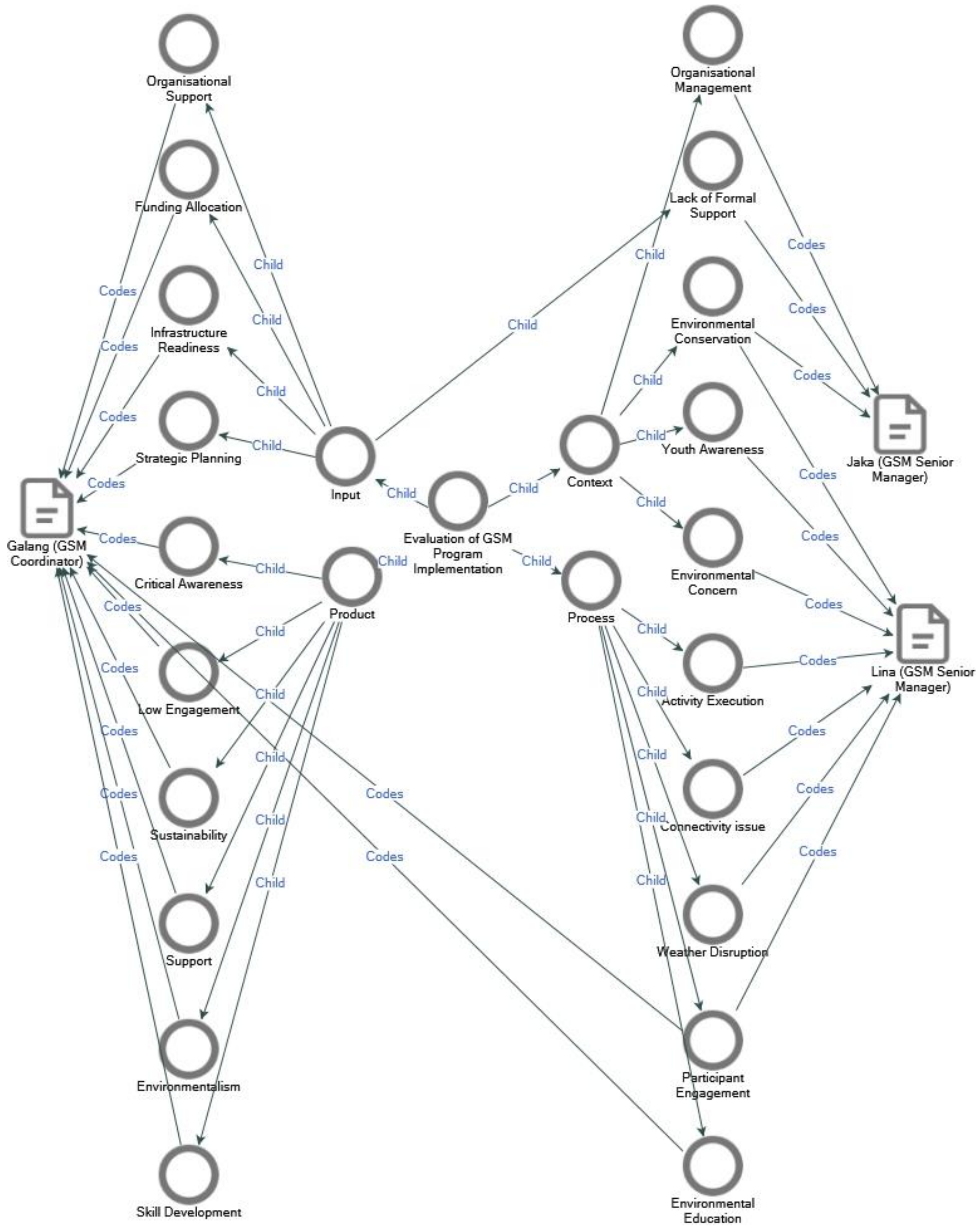

Figure 3. Interview Map

The evaluation of WALHI's implementation of the Green Student Movement (GSM) Program in Medan City shows that the program's contextual foundation stems from the urgent need for youth participation in environmental issues. The emergence of GSM was not driven by a structural mandate from WALHI, but rather by concerns about the lack of student involvement in environmental advocacy. The decision to adopt a millennial lifestyle-based approach, such as casual meetings in cafes and “fun-action” activities like tree planting and recycling, reflects an adaptive strategy that positions the movement closely with young people's socio-cultural habits.

This approach was chosen with awareness of the younger generation's limited attention to environmental damage and the rise of a consumer culture that contradicts sustainability values. GSM aims to build critical awareness through non-confrontational methods. Its long-term goals are not only to create an environmentally conscious community but also to foster the development of activists who understand climate issues structurally and act collectively. However, the absence of formal recognition for GSM in WALHI's statutes (AD/ART) results in the program's existence being inconsistent, depending on the commitment of the management in each period.

The input dimension reveals a weak yet creative support structure. The lack of a specific budget allocation means that GSM relies on internal contributions from WALHI's management. Logistics, facilities, and accommodation are managed independently with the solidarity of the network. This situation shows that, although the institutional capacity is weak administratively, the collective management spirit remains the key strength that sustains the program. This strategy also creates flexibility in planning but generates a high vulnerability to individual dependency (Jafar, 2024; Rusadi, 2024).

GSM activities are designed with specific targets, such as a 50% reduction in plastic use within a set period. This planning is accompanied by efforts to build cross-sector partnerships, ranging from universities to government institutions and the private sector. However, interview results show that the implementation mechanism has not been fully supported by a sustainable internal evaluation system. Although online activities have been considered, the choice of an offline approach remains dominant as it is seen as more effective in fostering emotional closeness and ecological awareness among participants (Badawi, 2024; Khairudin, 2022).

In the process dimension, the implementation of activities was considered fairly successful as they proceeded according to the established schedule. The GSM 2023 cohort stands as evidence of successful technical planning. However, active student participation in discussions remained low, indicating a gap between the initial enthusiasm during registration and the depth of involvement during implementation. Some participants did not meet the initial criteria but were still included to meet the quota. This situation highlights the need to review the participant selection process to enhance the quality of interaction in the activities.

External challenges, such as weather disruptions and internet connectivity issues, also affected the effectiveness of material delivery. The reliance on open spaces and remote locations revealed weaknesses in field activity risk mitigation. The process requires not only technical preparedness but also the ability to adapt to unforeseen circumstances. This evaluation underscores the importance of strengthening risk management aspects in the planning and execution of the program.

The product dimension shows that, although not all targets were achieved, the impact of GSM is still visible in the increased environmental awareness among participants. Some participants were identified as becoming critical and active students in post-program environmental advocacy activities. The environmental education provided not only transferred knowledge but also activated ecological empathy and a drive to act. However, the issue of low post-program involvement remains an ongoing challenge.

The program's sustainability is evident from the opportunities for participants to propose follow-up activities facilitated by WALHI. Support in the form of human resources and funding demonstrates the organization's commitment to leadership development. However, sustainability cannot rely solely on enthusiasm. An institutional system is needed to ensure the continuity of GSM as a long-term movement, not just a one-off event. This can be achieved through the institutionalization of the program within WALHI's structure or integration into the environmental education curriculum at partner universities.

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Figure 4. Word Cloud of Interview

The word cloud above provides a strong thematic representation of the main focus of the evaluation of the Green Student Movement (GSM) Program initiated by WALHI. Dominant words such as activities, participants, environmental, programme, and WALHI indicate that the central discourse of the research revolves around the aspects of activity implementation and youth participation in environmental issues. The presence of the words 'movement' and 'student' reinforces that GSM is not only an education-based program but also a strategy for mobilizing collective awareness, personified through the involvement of students.

The dominance of the words 'environmental' and 'green' highlights that ecological values are not merely a backdrop but the core of the entire GSM program. This suggests that GSM's orientation is not limited to symbolic actions but also aims to foster systemic ecological awareness. The inclusion of the words 'conservation' and 'education' further strengthens that GSM is designed to transform participants' ways of thinking through an educational approach that leads to concrete environmental conservation practices (Wu, 2024).

The emergence of the words 'participants' and 'students' as the core of the narrative indicates that the primary target group of this program is the youth. This message aligns with the orientation of the CIPP model, particularly in the context aspect, where GSM is positioned as a response to the lack of youth participation in environmental advocacy issues. The emphasis on participant involvement simultaneously highlights that the success of the program is heavily determined by the organization's capacity to build sustainable engagement.

The frequent appearance of the words 'management,' 'organizational,' and 'input' reflects the importance of institutional and managerial dimensions in this evaluation. This shows that the success of the program is not only determined by its content but also by the readiness of resources, coordination structures, and internal governance within WALHI. The lack of a specific budget allocation, as reflected in the appearance of the word 'funding,' highlights a structural limitation that remains a latent challenge.

Interestingly, the words 'support,' 'board,' and 'community' further emphasize that the involvement of the management and external networks plays a significant role in sustaining GSM. However, the limited formal support from the government, positioned peripherally, indicates that the program is largely driven by non-state initiatives. This condition illustrates the important role of civil society in pushing sustainability agendas autonomously, yet simultaneously presents a challenge in terms of long-term sustainability.

In addition to internal and structural aspects, the word cloud also indicates a strong process dimension. Words like 'implementation,' 'execution,' 'schedule,' and 'engagement' reflect that the implementation process is a crucial object of evaluation. Issues such as time constraints, weather disruptions, and selective participation of students who did not meet the initial criteria reflect that the success of the activities' implementation is highly dependent on technical management and situational adaptation.

Overall, this word cloud illustrates the complexity surrounding the implementation of the Green Student Movement (GSM) Program by WALHI. The overarching narrative not only highlights participatory and educational successes but also opens up space for criticism regarding the weaknesses in institutional aspects and structural support. Therefore, this visualization serves not only as a tool to reinforce findings but also as a reflective instrument to formulate directions for strengthening the youth-based environmental movement, making it more solid and sustainable in the future (Taqi, 2025; Zhang, 2022).

The evaluation findings of the Green Student Movement (GSM) Program, when viewed through the CIPP theory, show that the success of a program should not only be assessed by its final outcomes, but must be examined thoroughly across its emergence context, resource readiness, implementation process, and long-term impacts. In the context dimension, GSM has proven to emerge as a response to the social and cultural needs of the younger generation, which has been drifting away from environmental issues. This shows the relevance of the program to the existing social reality. However, in the input dimension, the lack of structural support and absence of formal legitimacy pose significant challenges, indicating that the program is driven more by the moral impetus of individuals and the collective effort of the management, rather than by an established system.

This evaluation provides an original contribution to the educational sciences by demonstrating how an environmentally oriented civic movement can operate as a student-centered learning model that integrates participatory and experiential approaches. By positioning students as active agents in environmental action, the GSM program extends the application of the CIPP model beyond institutional education settings into community-based learning contexts, bridging environmental governance and pedagogical innovation.

In the process dimension, GSM's implementation was relatively successful but faced various technical and participatory constraints, demonstrating the importance of adaptive planning and a more personalized approach toward participants. The product dimension reveals achievements in raising critical awareness and participant involvement, but it has yet to fully succeed in building the sustainability of the movement. Therefore, the CIPP theory not only serves as an evaluative framework but also as a reflective tool to understand that the success of a program is dynamic and multidimensional. The evaluation of GSM emphasizes the importance of strengthening institutional input and process management strategies so that the product achievements are not merely symbolic but result in tangible and sustainable impacts. (A concise and precise description of the results should be provided.)

4.2. The Green Student Movement (GSM) Program in Plastic Use Reduction Governance in Medan City

The Green Student Movement (GSM) Program, initiated by the Indonesian Forum for the Environment (WALHI), emerged as a response to the high levels of single-use plastic consumption among urban communities, particularly the younger generation in Medan City. This program is designed as an educational and participatory movement focusing on raising awareness, changing behavior, and building the capacity of students in sustainable environmental governance. Through collaboration between WALHI, educational institutions, the private sector, and civil society, GSM aims to act as a catalyst in the effort to reduce plastic use, not only within institutional spaces such as schools and universities but also expanding to local communities. This section systematically elaborates on the key findings from the evaluation of the GSM program implementation in Medan City, covering the context, input, process, and product dimensions of the program's execution.

Table 2. The GSM Program in Plastic Use Reduction Governance

No.	Aspect	Findings
1	Program Objective	Increase youth awareness on reducing single-use plastic through campaigns, training, and school communities.
2	Collaboration	Collaborated with schools, universities, and the private sector to provide eco-friendly facilities like tote bags and segregated bins.
3	Implementation Approach	Utilized a participatory approach by involving students in the planning and execution of environmental activities.
4	Individual Impact	80% of participants reduced plastic bag usage, and 65% started using alternatives like tote bags and tumblers.
5	Impact Limitations	Plastic waste reduction at the landfill site was only 5%, indicating the program's reach is still limited outside educational communities.
6	Key Challenges	Lack of government support, budget constraints, and resistance from the public to change plastic usage habits.
7	Potential and Opportunities	The global green economy trend and the use of social media as an effective campaign tool help expand the program's reach.
8	Sustainability Recommendations	Involve youth as pioneers and leaders of the movement; increase logistical support and incentives from both government and private sectors.

The Green Student Movement (GSM) Program, initiated by the Indonesian Forum for the Environment (WALHI), is designed with the primary goal of raising youth awareness regarding the urgency of reducing single-use plastic consumption. This goal is achieved through a series of educational activities such as environmental campaigns, waste management training, and the formation of environmentally-conscious student communities in schools and universities. This strategy is based on the assumption that students are strategic actors with great potential to internalize sustainability values and spread them within their surrounding environment (J. N. J. Roy, 2023).

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In its implementation, this program collaborates with various stakeholders, including educational institutions and the private sector. This collaboration is manifested in the provision of supporting facilities such as segregated waste bins, tote bags as replacements for plastic bags, and logistical support for activities. This multisectoral cooperation not only strengthens the program's reach but also enhances its legitimacy and implementation effectiveness. The presence of external actors, such as retail companies, also opens up space for financing innovation and incentive-based approaches that directly impact behavior change.

A participatory approach is a hallmark of the GSM program implementation. Participants are not only recipients of information but are also involved in the planning and execution of environmental activities. For example, students are engaged in workshops on creating recycled products, content creation for campaigns, and organizing public events such as exhibitions or environmental competitions. This approach aligns with the active learning principle, which emphasizes direct experience as the most effective way to build understanding and critical attitudes.

The program's results show a positive impact on the participants' individual behavior. According to a survey conducted, 80% of participants stated that they had reduced their use of plastic bags in daily life. Additionally, 65% of participants have switched to using environmentally friendly alternatives, such as tote bags and tumblers (Higuchi, 2024). This data indicates that education based on direct experience and active involvement can drive concrete and sustainable behavior change.

However, the program's impact on the overall reduction of plastic waste volume in Medan City remains relatively low. Data from the Medan City Environmental Agency shows that since the program's implementation, there has only been a reduction of about 5% in the amount of plastic waste going to the Final Disposal Site (TPA). This indicates that the program's reach is still limited to school and campus communities and has not yet expanded to the general public on a larger scale. Therefore, the strategy needs to be broadened to avoid being exclusive to the educational sector. The escalation of plastic waste generation in Medan City reflects not only population growth but also deeper socio-economic dynamics, including the dominance of low-cost disposable materials in urban markets, limited governmental incentives for recycling, and a convenience-oriented lifestyle that reinforces unsustainable consumption habits.

One of the main challenges faced by GSM is the lack of support from the local government, both in terms of policy and funding. Additionally, there are barriers in the form of resistance from the public toward adopting more environmentally friendly lifestyles. Many people are still reluctant to give up single-use plastic due to reasons of convenience, lower cost, and abundant availability. These factors pose significant obstacles to creating the systemic impact expected from this program.

Nevertheless, the GSM program has great potential for further development. The increasing public awareness of environmental issues and the global trend towards a green economy create opportunities for GSM to expand its reach. One notable potential is the use of social media as an effective campaigning tool, particularly in reaching the younger generation that is more connected to digital platforms. With engaging visual content and a strong narrative, environmental messages can be disseminated widely and rapidly.

To enhance the sustainability of the program, GSM is recommended to strengthen the position of youth not just as participants, but also as pioneers and leaders of the movement. Strengthening the capacity of students in managing environmental programs in schools and universities needs to become an integral part of the strategy. For instance, through initiatives like establishing campus waste banks, students would not only be taught to care for the environment but also to practice leadership and community-based program management.

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Logistical support from the government and the private sector is essential so that the program does not stop at the initiation stage. Assistance in the form of recycling facilities, equipment subsidies, and institutional capacity building in schools can serve as key catalysts for expanding the program's impact. Additionally, incentive-based approaches have proven effective in increasing the participation of previously passive or less engaged members of the community in environmental issues.

By positioning youth as central actors and developing strong multisectoral partnerships, the Green Student Movement (GSM) Program has great potential to become a model for effective plastic use reduction governance in urban areas. Evaluation of various aspects of the program's implementation shows that its sustainability and expansion will largely depend on strengthening institutional frameworks, innovating campaign strategies, and fostering cross-sector synergy to address the evolving complexities of environmental challenges.

The findings also contribute to the development of sustainability-based teaching strategies within environmental education. Through collaboration, project-based engagement, and behavioral modeling, GSM exemplifies how educational interventions can simultaneously advance ecological awareness and cultivate autonomous, reflective learners. This approach strengthens the link between environmental education policy, student empowerment, and transformative learning practice.

5. Discussion

The discussion begins by summarizing the key findings across the four CIPP dimensions: context, input, process, and product. The GSM program was found relevant to the environmental needs of Medan's youth (context), creatively implemented despite limited institutional resources (input), executed with adaptive strategies and participatory methods (process), and capable of generating measurable behavioral change and ecological awareness (product). These findings collectively demonstrate that the GSM initiative operates as an effective participatory environmental education model integrating social engagement and behavioral transformation.

The Green Student Movement (GSM) Program in Medan City successfully internalized environmental awareness among the youth, particularly in reducing single-use plastic consumption. This aligns with the findings of Kato (2024), who studied consumer responses to eco-friendly products, such as label-free plastic bottles, and found that education and sustainability values significantly influence consumer perceptions. In the case of GSM, participants who received training on the impact of plastic showed a preference for alternatives like tumblers and tote bags. The product dimension of the CIPP theory emphasizes the tangible outcomes of the program, which in this case are reflected in behavior change.

The behavioral change observed in the GSM program aligns with learning outcomes across cognitive, affective, and psychomotor domains. Cognitively, participants showed improved understanding of plastic waste impacts; affectively, they developed stronger ecological awareness and responsibility; and psychomotorically, they practiced sustainable actions such as consistently using reusable bags and tumblers. These outcomes demonstrate that GSM functioned as an educational intervention fostering comprehensive environmental learning and action.

Within the CIPP framework, this study operationalized each component through clearly defined stages. In the context dimension, the analysis identified the urgency of youth participation in addressing plastic waste in Medan City through preliminary observations and stakeholder mapping. The input dimension involved purposive sampling of 12 informants, comprising WALHI management, GSM program coordinators, and student participants, supported by documentation and field notes. The process dimension was examined through systematic observations of campaign activities and training sessions, while the product dimension assessed behavioral changes and program outcomes through triangulation of interviews, observation, and document data. Data were analyzed using the Miles–Huberman–Saldaña interactive model, ensuring iterative condensation, presentation, and verification to enhance the study's credibility and validity.

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However, challenges remain in the context dimension, particularly with the social and cultural conditions in Medan, which have not fully supported a plastic-free lifestyle. This aligns with Hassa's (2025) study on plastic reduction campaigns in Morocco, where differences in sociolinguistic backgrounds also affected campaign message effectiveness. In GSM's implementation, linguistic and cultural challenges became apparent when participants outside educational communities were less responsive to environmental campaigns presented in formal or academic formats.

From the input aspect, limitations in funding and infrastructure emerged as key obstacles, as identified by Satoto (2022), who proposed using mango leaf waste as a plastic alternative to reduce costs. In GSM, the budget mostly comes from internal WALHI contributions, without special support from the local government. This shows that the program's sustainability is heavily reliant on innovation in utilizing local resources and community creativity.

The effectiveness of participatory education, as emphasized in the CIPP theory in the process dimension, is evident in GSM participants' involvement in recycling workshops and social media campaigns. This is consistent with Abdel-Hameed's (2023) study, which, although more technical, shows that science education on PET recycling can foster eco-friendly innovations. Though the contexts differ, the essence remains the same: active participation triggers understanding and change.

However, the impact of GSM's implementation is still localized and has not reached the broader public. In Satoto's (2022) review, limitations in the scalability of green solutions were also an issue, as organic waste-based innovations have not fully disseminated to the mass market. This indicates that while the GSM product dimension has been successful within educational communities, it is not yet optimal systemically.

From the context dimension, the lack of integration of public policies is a systemic barrier, as also shown in Abdel-Hameed's (2023) study, where technical solutions for the green industry require regulatory support to be widely implemented. In Medan City, the plastic bag ban regulation has not been strictly enforced, so the effects of GSM are not supported by coherent regulations.

Digital campaigns within GSM are also still limited. Hassa's (2025) findings highlight the importance of adapting campaigns to local languages and narratives for high effectiveness. Similarly, in GSM, the campaign approach, which still relies on face-to-face methods, has not sufficiently reached the wider audience that is active on social media. This highlights the need for adaptation in the implementation process through enhanced digitalization.

The private sector has not been extensively involved in GSM, even though Kato (2024) shows that corporate involvement in providing eco-friendly products contributes significantly to the success of plastic reduction campaigns. Therefore, GSM needs to strengthen cross-sector collaborations as part of its input and process strategies to expand the program's reach (Arai, 2021).

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This study also resonates with Bandura's (2023) Social Learning Theory, emphasizing that students' behavioral transformation emerged through processes of observation and imitation within peer groups. The GSM program's collaborative and participatory activities created a social environment where environmentally responsible behaviors—such as reducing single-use plastics—were modeled, reinforced, and internalized. This indicates that learning in GSM extended beyond cognitive understanding, encompassing psychological mechanisms of motivation, self-efficacy, and social reinforcement that sustain long-term behavioral change.

One key finding of GSM is the role of students as change agents. This reflects the product dimension in CIPP, which emphasizes long-term impact. Previous studies rarely discussed the youth as the main subject of change, while GSM places them at the center of the environmental movement. This underscores the importance of grassroots involvement, not just top-down policies.

A comparison with existing literature confirms that the effectiveness of environmental programs cannot stand alone. There must be synergy between technical innovations, educational strategies, policy support, and social adaptation. GSM is strategically positioned to become a national replication model if supported by affirmative policies and fiscal incentives from the government, as well as strengthened networks with local communities and industries.

The uniqueness of this research lies in its comprehensive evaluative approach based on CIPP for a youth-based community environmental program. Unlike previous studies that tend to focus solely on technical or linguistic aspects, this research maps the dynamics of interaction between actors, campaign strategies, and structural challenges within a unified analytical framework. This approach offers a participatory evaluation model that can be replicated for environmental programs in different regional contexts across Indonesia.

6. Conclusion

The implementation of the Green Student Movement (GSM) Program in Medan City shows that high motivation among students is a key factor in driving behavioral change toward reducing single-use plastic consumption. This motivation arises from students' direct engagement in collaborative environmental actions, where shared goals, peer encouragement, and tangible outcomes reinforce their commitment to sustainable behavior. Such intrinsic motivation transforms awareness into consistent practice, illustrating that meaningful participation and social reinforcement are central to sustaining pro-environmental attitudes. However, the success of this program requires more than education and participation alone; it also depends on systemic support from local authorities, adequate funding, and partnerships that ensure long-term sustainability.

7. Suggestion

The Indonesian Forum for the Environment (WALHI) North Sumatra is expected to strengthen cross-sector collaborations, including with the local government, business actors, and local communities, to create a supporting ecosystem that enables GSM to reach a wider group of society. Additionally, there is a need to improve the program's implementation system to make it more adaptable to the interests and characteristics of the younger generation, including through innovative campaign media and incentives that encourage active student participation in environmental preservation.

Declarations

Author Contributions. The development of the conceptual framework and research design was led by TS and KTT, ensuring a solid foundation for the study. TS and KTT collaboratively formulated the methodology and conducted an extensive review of relevant literature. TS played a key role in gathering policy documents and sourcing pertinent research materials. Meanwhile, KTT was responsible for synthesizing the findings and performing an in-depth theoretical analysis. Each author actively participated in refining the manuscript, providing critical input, and giving final approval for its publication.

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Conflicts of Interest. The authors declare no conflict of interest.

Ethical Approval. I confirm that I have obtained all necessary permissions in compliance with applicable laws for the publication of any personal information or images of research participants or other individuals. Furthermore, I agree to provide EDUPIJ with copies of the consent forms or proof of such authorization upon request.

Data Availability Statement. The data supporting the findings of this study are openly available at the Open Journal System of EDUPIJ and can be accessed via the following DOI/link.

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