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The Role of Community Education in Enhancing Recycling and Sustainable Waste Disposal Behaviors in Barangay Nuro Poblacion, Municipality of Upi, Province of Maguindanao Del Norte, BARMM

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ABSTRACT

This study explores the role of community education in enhancing recycling and sustainable waste disposal behaviors in Barangay Nuro Poblacion, Municipality of Upi, Province of Maguindanao del Norte, BARMM. It specifically seeks to examine how educational initiatives and awareness campaigns influence residents' attitudes, knowledge, and practices toward waste management. Employing a descriptive research design, the study gathers data through surveys, interviews, and focus group discussions with community members and local stakeholders to provide a holistic understanding of the issue. The research emphasizes the importance of education as a key driver in shaping sustainable environmental practices at the community level. By highlighting the integration of educational strategies with local government initiatives, the study aims to underscore how community-based learning can promote responsible waste management and long-term ecological sustainability. The results are expected to contribute to the development of effective environmental programs that encourage active participation and collective responsibility in maintaining a cleaner and healthier community.

Keywords: *Community Education, Recycling, Sustainable Waste Disposal, Waste Management, Behavioral Change, Environmental Sustainability*

INTRODUCTION

Waste accumulation and improper disposal continue to cause environmental and health issues in many communities (Martinez & Garcia, 2022). Education is vital in shifting attitudes towards recycling and sustainable waste disposal practices, fostering positive environmental behavior (O'Connor & Williams, 2022). Effective community education programs have shown promise in improving waste management behaviors, particularly in rural areas like Barangay Nuro Poblacion (Jansen & Li, 2023). In these communities, the role of education in raising awareness about the consequences of improper waste disposal is crucial for long-term sustainability (Taylor & Robinson, 2021). This research will explore how community education can enhance recycling behaviors and sustainable disposal practices in Barangay Nuro Poblacion.

In many regions, poor waste management is linked to a lack of education on recycling and waste segregation (Liu & Chen, 2022). Educating the community about waste reduction, recycling, and disposal practices has led to significant improvements in other areas, proving that knowledge can drive behavioral change (Wang & Kim, 2021). The need for community-level education is particularly evident in developing areas where waste management infrastructure is limited or underutilized (Nguyen & Zhang, 2023). This study will examine the effectiveness of education programs in driving

sustainable waste management behaviors, such as recycling and responsible disposal. Moreover, it will assess the types of educational methods that work best in these communities.

Community education is about providing knowledge and empowering residents to take responsibility for their waste disposal (Reyes & Patel, 2022). Engaging local leaders in educational initiatives helps ensure that the information provided is culturally relevant and tailored to the community's needs (Mendoza & Lee, 2021). Programs that utilize a combination of awareness campaigns, workshops, and hands-on training have proven effective in motivating communities to adopt recycling behaviors (Kumar & Singh, 2023). The collaboration of local government units and community organizations will be key in sustaining educational efforts over the long term. This study will examine how such collaborations can strengthen waste management practices in Barangay Nuro Poblacion.

The role of government policies and local regulations in supporting educational programs will also be examined (Harrison & Patel, 2020). Effective policy frameworks ensure that educational efforts are well-received and enforced, creating an environment conducive to sustainable behaviors (Miller & Harris, 2021). Policies incentivizing recycling and waste management programs further encourage public participation in waste disposal practices (Jones & Turner, 2022). This study will investigate how these policies impact the success of community education efforts and their ability to create lasting change in waste disposal practices. Understanding these factors will provide insight into how communities can be better supported in adopting sustainable waste management behaviors.

LITERATURE REVIEW

Recycling and sustainable waste disposal behaviors are essential for reducing environmental pollution and conserving natural resources, and community education plays a critical role in fostering these practices. Several studies have shown that recycling behaviors are significantly influenced by educational campaigns that raise awareness about environmental issues and waste management (Nguyen & Lee, 2023). Communities that engage in continuous educational programs tend to adopt more sustainable waste disposal methods, including recycling and waste segregation (Lopez & Harris, 2022). Rural areas, in particular, face challenges due to limited infrastructure, making education programs vital in overcoming these barriers (Nguyen & Zhang, 2021). These programs help instill habits that promote long-term environmental sustainability, emphasizing the importance of recycling to reduce landfill waste and conserve resources (Martinez & Lee, 2021).

Effective community-based education programs have proven to be successful in increasing participation in recycling initiatives (Jones & Cooper, 2022). These programs utilize various educational methods, including workshops, awareness campaigns, and peer-to-peer learning, to engage residents and improve waste management practices (Miller & Harris, 2021). Additionally, the involvement of local governments in supporting and reinforcing educational campaigns has been shown to amplify the success of these programs (Jones & Turner, 2022). Local leadership is crucial for creating an environment where residents feel motivated to adopt sustainable practices, such as waste segregation and composting, which are vital components of sustainable waste disposal (Wang & Zhang, 2021).

The role of local government policies and support is another factor that enhances the effectiveness of recycling and waste management education programs. Research suggests that communities with government-enforced recycling policies and continued educational reinforcement show greater participation in recycling programs (Harrison & Patel, 2020). Moreover, the success of recycling initiatives is closely tied to the quality and accessibility of the educational materials provided (Taylor & Nelson, 2023). Content that is culturally relevant and addresses the specific needs of the community

has been found to significantly improve participation rates in waste reduction efforts (Lopez & Mendoza, 2022).

Sustainable waste disposal practices, such as waste-to-energy and composting, are integral to reducing the amount of waste sent to landfills (Nguyen & Lee, 2023). Educational initiatives that highlight the environmental benefits of these practices encourage residents to adopt them, resulting in cleaner and healthier communities (Santos & Perez, 2022). Furthermore, research suggests that sustainable waste practices are more successfully implemented when educational programs are inclusive and accessible to all community members, regardless of socioeconomic status or literacy level (Lopez & Harris, 2020). This inclusivity ensures that everyone in the community can participate in and benefit from these programs, leading to more widespread adoption of sustainable practices (Mendoza & Cruz, 2023).

The effectiveness of community education also depends on the delivery methods used. Research indicates that a combination of in-person workshops, digital outreach, and media campaigns is more effective in reaching diverse populations (Roberts & Zhang, 2022). Digital platforms, in particular, offer an innovative way to engage younger generations and tech-savvy individuals, while traditional methods like door-to-door education remain effective in rural areas (Mendez & Gomez, 2022). Furthermore, frequent and sustained educational efforts are essential for creating lasting behavior changes in waste management practices (Zhao & Yu, 2022). Programs that run over an extended period provide more opportunities for residents to practice new behaviors, reinforcing the information provided (Miller & Harris, 2021).

Community engagement and involvement are also key components of successful education programs. Social influences, such as peer pressure and community norms, can significantly drive the adoption of recycling and waste reduction behaviors (Roberts & Zhang, 2022). Educational programs that foster a sense of collective responsibility, through activities like local clean-ups and waste reduction challenges, help to solidify these behaviors in daily life (Jones & Turner, 2022). As individuals see their peers adopting sustainable behaviors, they are more likely to follow suit, creating a culture of environmental stewardship (Lopez & Mendoza, 2022).

Despite the progress made in understanding the role of community education in waste management, there remain gaps in the literature. One area that requires further exploration is the long-term effectiveness of community education programs in fostering sustained behavior change (Nguyen & Lee, 2023). While many studies focus on short-term outcomes, research that tracks the impact of education programs over several years could provide valuable insights into their lasting effectiveness (Lopez & Mendoza, 2022). Another gap is the limited research on the role of digital education platforms, especially in rural areas, where internet access may be limited. Exploring how these platforms can complement or replace traditional face-to-face education methods could enhance the reach and impact of waste management education (Nguyen & Zhang, 2021).

In conclusion, community education is a powerful tool for promoting sustainable waste disposal and recycling behaviors. Through a combination of tailored educational content, effective delivery methods, and strong community involvement, these programs can significantly reduce environmental pollution and contribute to long-term sustainability. However, there is still a need for more research on the effectiveness of these programs, particularly in terms of their long-term impact and the integration of digital education platforms in rural communities.

MATERIALS & METHODS

The research methodology employed a descriptive-correlational research design to examine the relationship between community education and sustainable waste management behaviors in Barangay Nuro Poblacion. This approach enabled the researcher to assess how different educational strategies influenced residents' recycling and waste disposal habits. Data were collected using a survey questionnaire, which included both quantitative and qualitative items to measure behaviors and gather insights. Descriptive research was used to understand the current state of waste management practices, while correlational analysis identified any relationships between community education programs and residents' participation in sustainable practices.

The study was conducted in Barangay Nuro Poblacion, chosen for its unique rural context and ongoing waste management initiatives. The community faced typical challenges such as limited resources and infrastructure, making it an ideal location to explore the effectiveness of community education in promoting recycling. The research involved a diverse sample of 186 residents, selected through random sampling to ensure representativeness of various demographic groups, including age, gender, and socio-economic status. This allowed the study to capture a broad spectrum of behaviors and perspectives on waste management, focusing on both participants and non-participants of community education programs.

Data were gathered through structured surveys and interviews, with trained enumerators assisting in administering the questionnaire. The data were analyzed using descriptive and inferential statistics, including correlation and regression analysis, to determine the impact of community education on waste disposal behaviors. Reliability and validity were assessed through a pilot test and statistical measures such as Cronbach's alpha. Ethical considerations were paramount, with informed consent obtained from participants, and their confidentiality ensured throughout the study. The research aimed to provide actionable insights for policymakers and community leaders to enhance waste management efforts in similar rural areas.

RESULTS AND DISCUSSION

1. What is the demographic profile of the respondents in terms of:
- **1.1. Age;**
- **1.2. Sex;**
- **1.3. Educational Attainment;**
- **1.4. Occupation; and**
- **1.5. Household Size?**

Table 1 shows the frequency and percentage distribution of the demographic profile of the respondents in terms of age. The data reveals that the majority of respondents belong to the age group of 25 to 34 years, accounting for 34.4% of the sample. This suggests that the young adult population in the community is significantly engaged in community education programs related to recycling and waste disposal. It is also important to note the lower participation of older age groups, with only 3.2% of respondents being 65 years and above. These findings imply that younger individuals may be more receptive to adopting new practices and be more actively involved in initiatives aimed at sustainability. The age distribution suggests that community education programs should be tailored to engage various age groups effectively, particularly focusing on motivating older adults to participate in sustainable behaviors. This may require different strategies to align with the interests and abilities of older generations. Research has shown that age significantly influences environmental behaviors, with younger individuals often being more open to adopting innovative practices (Anderson, 2021). Therefore, it is essential to consider age-specific strategies when planning future community education initiatives.

Table 1
The Frequency and Percentage Distribution of the Demographic Profile of the Respondents in terms of Age

Profile	Characteristics	Frequency	Percentage
Age	Below 18	9	4.8
	18 to 24	37	19.9
	25 to 34	64	34.4
	35 to 44	34	18.3
	45 to 54	20	10.8
	55 to 64	16	8.6
	65 and above	6	3.2
	Total	**186**	**100.0**

Table 2 shows the frequency and percentage distribution of the demographic profile of the respondents in terms of sex. The data reveal that 61.8% of the respondents are female, indicating a higher level of female participation in community education programs related to recycling and waste disposal. This finding aligns with broader trends where women tend to engage more in community-based environmental activities. The male respondents represent 38.2% of the sample, suggesting that there is a noticeable gender gap in participation. This disparity implies that future community education programs could benefit from strategies targeting male engagement, such as involving men in leadership roles or emphasizing the practical benefits of recycling and waste management. Gender plays a key role in shaping environmental behaviors, with studies showing that women often show greater concern for environmental issues (Rojas et al., 2020). Thus, addressing gender-specific barriers to participation could enhance the effectiveness of sustainability initiatives.

Table 2
The Frequency and Percentage Distribution of the Demographic Profiles of the Respondents in terms of Sex

Profile	Characteristics	Frequency	Percentage
Sex	Male	71	38.2
	Female	115	61.8
	Total	**186**	**100.0**

Table 3 shows the frequency and percentage distribution of the demographic profile of the respondents in terms of educational attainment. The table highlights that 44.6% of respondents have completed a college degree, followed by 27.4% who have attended college but did not graduate. This suggests that a significant portion of the community possesses higher education, which may positively influence their awareness and understanding of recycling and sustainable waste disposal. Respondents with no formal education account for 2.2%, and those with high school-level education make up 15.6%. These findings indicate that education level is crucial in adopting sustainable behaviors. People with higher education levels may be more aware of the environmental impact of their actions and are more likely to engage in practices such as recycling.

However, a notable portion of the population still lacks formal education, which could challenge community education programs. Research has shown that higher educational attainment is linked to greater environmental consciousness and behavior (Miller & Thomas, 2020). To ensure inclusivity, education campaigns should address educated and non-educated populations in ways that resonate with their knowledge and experiences.

Table 3
The Frequency and Percentage Distribution of the Demographic Profile of the Respondents in terms of Educational Attainment

Profile	Characteristics	Frequency	Percentage
Educational Attainment	No formal education	4	2.2
	High School Level	29	15.6
	High School Graduate	17	9.1
	College Level	51	27.4
	College Graduate	83	44.6
	Postgraduate	2	1.1
	Total	**186**	**100.0**

Table 4 shows the frequency and percentage distribution of the demographic profile of the respondents in terms of occupation. The data shows that 61.8% of respondents are employed full-time, while 17.2% are students. This suggests that the majority of the adult population in the community is in the workforce and likely plays a role in influencing household waste management practices. Full-time employees might have a greater capacity to implement sustainable practices due to stable income and awareness of the importance of environmental behaviors in the workplace. Conversely, a smaller percentage of respondents are unemployed or retired, with these groups possibly having more time but fewer financial resources to engage in recycling. The findings imply that community education programs should consider participants' occupational status to effectively tailor initiatives. Programs targeting employed individuals might emphasize integrating waste management practices into daily routines. At the same time, strategies for students and retirees could focus on engaging family members or providing resources for low-cost sustainability actions. Studies have shown that employment status can influence the adoption of pro-environmental behaviors, with employed individuals often being more engaged in organized environmental programs (Green et al., 2021).

Table 4
The Frequency and Percentage Distribution of the Demographic Profile of the Respondents in terms of Occupation

Profile	Characteristics	Frequency	Percentage
Occupation	Student	32	17.2
	Employed (Full-time)	115	61.8
	Employed (Part-time)	9	4.8
	Self-employed	16	8.6
	Unemployed	12	6.5
	Retired	2	1.1
	Total	**186**	**100.0**

Table 5 shows the frequency and percentage distribution of the demographic profile of the respondents in terms of household size. The data reveals that 47.3% of respondents belong to households with 3 to 4 members, while 26.3% belong to households with 5 to 6 members. Smaller households, with 1 to 2 people, account for 14%; the least common group is those with households of 7 or more people (12.4%). These findings suggest that household size plays a role in adopting sustainable waste disposal behaviors. Larger households may face more challenges in managing waste due to the increased volume of waste generated, but they may also have greater opportunities for implementing collective recycling practices. On the other hand, smaller households might have less waste to manage, making it easier to adopt sustainable practices. Community education programs can target these differences by providing tailored solutions for different household sizes, such as community-driven collection

systems for larger households. Research indicates that household size is closely related to waste generation patterns and recycling behaviors, with larger households tending to produce more waste (Kleemann et al., 2021).

Table 5
The Frequency and Percentage Distribution of the Demographic Profiles of the Respondents in terms of Household Size

Profile	Characteristics	Frequency	Percentage
Household Size	1 to 2 people	26	14.0
	3 to 4 people	88	47.3
	5 to 6 people	49	26.3
	7 or more people	23	12.4
	Total	**186**	**100.0**

2. How do community education components—such as content quality and relevance, delivery methods and channels, frequency and duration, and accessibility and inclusivity—affect the adoption of recycling and sustainable waste disposal behaviors?

Table 6 presents the community education components that affect the adoption of recycling and sustainable waste disposal behavior in terms of content quality and relevance. The overall mean of 3.34 and standard deviation of 0.54 suggest that respondents largely agreed that the content quality and relevance of community education programs had an excellent impact on motivating sustainable waste disposal behaviors. The results indicate that most participants found the information provided to be highly relevant and easy to understand, which is crucial in influencing behavior change. The relatively low standard deviation indicates that the respondents' opinions were pretty consistent, suggesting broad agreement on the effectiveness of the content. The educational materials provided were informative and directly aligned with the community's waste management needs, which is vital for fostering lasting change. These findings underscore the importance of context-specific and explicit content in driving sustainable environmental behaviors. As highlighted by Smith et al. (2021), content that resonates with local practices and is accessible to the community plays a crucial role in enhancing the adoption of recycling and waste disposal habits. Community education programs should continue to focus on content that addresses specific local issues while ensuring that it is easily digestible and actionable for participants.

The highest mean of 3.38, with a standard deviation of 0.57, was observed for the item "The information community education programs provide about recycling is easy to understand." This indicates that respondents overwhelmingly found the recycling-related content presented in the community education programs obvious and easy to grasp. This result suggests that simplifying complex environmental issues into understandable and relatable messages is crucial for engaging participants. The relatively small standard deviation reflects a strong consensus among respondents regarding the clarity of the educational materials. The positive response to this item is important as clear communication is key to ensuring that the audience understands the message and is motivated to act upon it. As Jones et al. (2020) indicated, effective communication plays a pivotal role in shifting individuals' attitudes toward sustainable behaviors. To build on this success, community education programs should prioritize clarity in the content, ensuring that even complex recycling concepts are accessible to all community members, regardless of their educational background.

On the other hand, the lowest mean of 2.92, with a standard deviation of 0.92, was recorded for the item "The materials used in community education programs are available in different languages and formats to ensure inclusivity." This suggests a significant opportunity to improve the accessibility of educational materials for people from diverse linguistic and cultural backgrounds. The larger standard

deviation indicates a higher level of disagreement among respondents regarding the inclusivity of the materials, highlighting a gap in the effectiveness of the education programs for specific community groups. This finding emphasizes the need for greater attention to inclusivity and accessibility in future community education initiatives. In line with research by Miller and Thomas (2020), it is crucial to ensure that educational materials are designed to accommodate individuals from different socioeconomic and linguistic backgrounds, especially in culturally diverse communities. By addressing these gaps, community education programs can become more inclusive and better serve the entire population, leading to a more widespread adoption of sustainable waste management behaviors.

Table 6
The Community Education Components Affect the Adoption of Recycling and Sustainable Waste Disposal Behavior in terms of Content Quality and Relevance

Items	Mean	SD	Description	Interpretation
The information community education programs provide about recycling is easy to understand.	3.38	0.57	Strongly Agree	Excellent Impact
The content of community education programs is directly relevant to the recycling practices in your community.	3.34	0.52	Strongly Agree	Excellent Impact
Community education programs provide in-depth knowledge about sustainable waste disposal practices.	3.28	0.59	Strongly Agree	Excellent Impact
The topics in community education programs align with the community's waste management needs.	3.31	0.51	Strongly Agree	Excellent Impact
The information provided by the community education programs motivates you to adopt better recycling habits.	3.37	0.52	Strongly Agree	Excellent Impact
Overall Mean	**3.34**	**0.54**	**Strongly Agree**	**Excellent Impact**

Legend: 1.00-1.75 Strongly Disagree (Minimal Impact), 1.76-2.50 Disagree (Moderate Impact), 2.51-3.25 Agree (Good Impact), 3.26-4.00 Strongly Agree (Excellent Impact)

Table 7 presents the community education components that affect the adoption of recycling and sustainable waste disposal behavior in terms of delivery methods and channels. The overall mean of 3.25 and standard deviation of 0.59 suggest that respondents generally agree that the delivery methods and channels used in community education programs effectively promote recycling and sustainable waste disposal behaviors. The positive response indicates that a significant portion of the community found the methods, such as workshops, brochures, and digital platforms, helpful in conveying the necessary information. The relatively small standard deviation reflects a degree of consensus in the effectiveness of these delivery channels, implying that most participants had a similar perception of their impact. Given the growing use of digital platforms, particularly social media, this aligns with current trends in environmental education that emphasize digital outreach (Jones et al., 2021). The findings highlight that diverse delivery methods, both traditional (e.g., workshops) and modern (e.g., social media), help extend the reach of community education. It suggests incorporating multiple communication channels into future programs can maximize outreach and engagement. To further improve, programs should continue to diversify their delivery methods to ensure that individuals from all backgrounds have access to valuable recycling information. Ensuring accessibility through these channels may also increase participation and enhance the program's effectiveness across different demographic groups.

The highest mean of 3.34, with a standard deviation of 0.62, was recorded for the item "The use of visual and interactive materials in community education programs helps you understand waste management better." This indicates that respondents found using visual aids, such as charts, diagrams, and interactive tools, particularly effective in helping them understand recycling and waste disposal

practices. The relatively high mean and moderate standard deviation highlight that these visual and interactive elements significantly enhanced comprehension and engagement. This is consistent with research suggesting that interactive and visual content can aid learning by simplifying complex topics and making them more engaging (Lee et al., 2020). These findings suggest that future community education programs should continue integrating interactive components to foster a deeper understanding of environmental issues. Moreover, leveraging online tutorials and interactive apps could further enhance participant involvement. The success of these methods emphasizes the importance of incorporating engaging teaching tools to improve educational outcomes and encourage sustained behavioral change.

On the other hand, the lowest mean of 3.14, with a standard deviation of 0.60, was recorded for the item "Community education programs through digital platforms (e.g., social media, websites) have effectively reached a broader audience." This indicates that while digital platforms were somewhat effective, there is room for improvement in their ability to reach a wider audience. The mean is still relatively high, suggesting that digital platforms did have a positive impact but may not have been fully utilized or accessible to all community members. The standard deviation reflects a moderate level of disagreement, indicating that some respondents felt digital platforms were not as effective as other methods. This may be due to limited access to the internet or a lack of familiarity with these platforms among certain demographic groups, particularly older adults or those from lower socioeconomic backgrounds. As Rojas et al. (2021) indicate, digital outreach can be powerful, but efforts must be complemented by efforts to bridge digital divides. To maximize the impact of digital platforms, community education programs should focus on ensuring accessibility through improved internet access, training on digital literacy, and offering alternative ways to engage non-digital participants.

Table 7
The Community Education Components Affect the Adoption of Recycling and Sustainable Waste Disposal Behavior in terms of Delivery Methods and Channels

Items	Mean	SD	Description	Interpretation
Community education methods (e.g., workshops, brochures, social media) are effective in conveying information on recycling.	3.28	0.57	Strongly Agree	Excellent Impact
Community education programs effectively use multiple channels (e.g., online platforms, face-to-face meetings) to spread awareness about waste disposal.	3.23	0.57	Agree	Good Impact
The use of visual and interactive materials in community education programs helps you understand waste management better.	3.34	0.62	Strongly Agree	Excellent Impact
Community education programs through digital platforms (e.g., social media, websites) have effectively reached a broader audience.	3.14	0.60	Agree	Good Impact
Community education programs are delivered in ways that make it easy to access and learn about waste disposal practices.	3.26	0.57	Strongly Agree	Excellent Impact
Overall Mean	**3.25**	**0.59**	**Agree**	**Good Impact**

Legend: 1.00-1.75 Strongly Disagree (Minimal Impact), 1.76-2.50 Disagree (Moderate Impact), 2.51-3.25 Agree (Good Impact), 3.26-4.00 Strongly Agree (Excellent Impact)

Table 8 presents the community education components that affect the adoption of recycling and sustainable waste disposal behavior in terms of frequency and duration. The overall mean of 3.15 and standard deviation of 0.63 suggest that respondents generally agreed that the frequency and duration of community education programs effectively promote recycling and sustainable waste disposal

behaviors. The respondents indicated that the programs were frequent enough to remind them about proper waste disposal and that the duration was sufficient to grasp key concepts. The moderate standard deviation suggests a relatively consistent view, though some respondents felt the programs could be more frequent. This finding highlights the importance of regular reinforcement to ensure long-term engagement with sustainability practices. As Green et al. (2020) noted, frequency and duration play an essential role in maintaining sustained behavior change by reinforcing key messages over time. Future community education programs should aim to strike a balance between adequate duration and frequency, ensuring that participants have ample opportunity to absorb information and make it a part of their daily routine. Additionally, the flexibility of program schedules should be considered to accommodate people with busy lifestyles, thus increasing participation rates. These efforts will likely lead to more consistent engagement and better adoption of sustainable practices.

The highest mean of 3.43, with a standard deviation of 0.61, was found for the item "Community education programs should be conducted more frequently to increase awareness about recycling." This suggests that respondents strongly need more frequent educational sessions to reinforce their understanding of sustainable waste disposal. The high mean indicates that community members see the value in more frequent engagement with recycling practices. The standard deviation, though moderate, shows a broad consensus on the importance of frequent programs, highlighting that regularity is crucial to maintaining awareness and fostering consistent action. This supports findings from studies by Miller and Thomas (2021), which argue that regular, ongoing engagement helps keep sustainability at the forefront of participants' minds. Increasing the frequency of these programs could ensure that residents remain actively involved and motivated to adopt new recycling behaviors. The demand for more frequent programs also suggests a need for continuous community education and involvement in local sustainability efforts. Future initiatives could explore innovative ways to engage participants, such as community recycling days or interactive workshops that provide more hands-on learning opportunities.

Table 8
The Community Education Components Affect the Adoption of Recycling and Sustainable Waste Disposal Behavior in terms of Frequency and Duration

Items	Mean	SD	Description	Interpretation
Community education programs on recycling are frequent enough to remind you about proper waste disposal practices.	3.09	0.73	Agree	Good Impact
The duration of community education programs is sufficient for you to grasp the key concepts of sustainable waste disposal.	2.99	0.67	Agree	Good Impact
Community education programs should be conducted more frequently to increase awareness about recycling.	3.43	0.61	Agree	Good Impact
The length of the community education programs provides ample time for residents to engage and learn.	3.23	0.58	Agree	Good Impact
The timing and frequency of community education programs are suitable for busy individuals like you to participate.	2.98	0.56	Agree	Good Impact
Overall Mean	**3.15**	**0.63**	**Agree**	**Good Impact**

Legend: 1.00-1.75 Strongly Disagree (Minimal Impact), 1.76-2.50 Disagree (Moderate Impact), 2.51-3.25 Agree (Good Impact), 3.26-4.00 Strongly Agree (Excellent Impact)

On the other hand, the lowest mean of 2.98, with a standard deviation of 0.56, was recorded for the item "The timing and frequency of community education programs are suitable for busy individuals like you to participate." This suggests that while the programs are generally effective, some respondents felt that the timing and frequency did not always align with their schedules. The mean indicates that many people may have difficulty attending due to conflicting time commitments. The relatively small standard deviation shows that a moderate number of participants shared this concern. Since many community members are employed full-time or have other obligations, future programs must consider flexible timing options that accommodate diverse schedules. According to Green et al. (2021), scheduling flexibility and convenience are critical to ensuring consistent participation in community-based environmental programs. To address this issue, future initiatives should consider offering sessions at different times or providing online options to reach a wider audience. Making the programs more accessible through these measures could enhance participation and drive better adoption of sustainable practices.

Table 9 presents the community education components affect the adoption of recycling and sustainable waste disposal behavior in terms of accessibility and inclusivity. The overall mean of 3.06 and standard deviation of 0.66 suggest that, on the whole, respondents agreed that the community education programs were accessible and inclusive, but some areas still require improvement. The accessibility of the programs, including their location and availability for individuals with special needs, was positively received. However, the standard deviation indicates that there was some variation in the responses, pointing to potential barriers in reaching certain groups within the community, particularly those with disabilities or other special needs. This finding highlights the need for educational programs that truly cater to all community members, ensuring that accessibility is prioritized in all facets of program delivery. As Patel et al. (2020) reported, ensuring inclusivity in community education is crucial to fostering equitable participation in sustainability efforts, especially in communities with diverse needs.

The highest mean of 3.18, with a standard deviation of 0.65, was recorded for the item "Community education programs include all age groups, including the elderly and children." This result shows that programs were generally successful in engaging different age groups, ensuring that the elderly and children were included in the learning process. The relatively high mean reflects the respondents' belief that these programs were indeed accessible to all, and the moderate standard deviation suggests a fairly consistent perception among participants regarding inclusivity. Given the increasing emphasis on intergenerational learning in sustainability education, this outcome supports the value of designing programs that appeal to younger and older community members. According to Johnson and Perez (2021), inclusivity in age groups plays an essential role in building widespread community support for environmental practices. Future programs could benefit from offering age-specific activities that encourage collaboration between generations.

However, the lowest mean of 2.92, with a standard deviation of 0.92, was recorded for the item "The materials used in community education programs are available in different languages and formats to ensure inclusivity." This indicates a notable gap in the inclusivity of educational materials, particularly for non-native speakers or individuals who require alternative formats. The high standard deviation reflects significant disagreement among respondents, highlighting that many community members did not find the materials sufficiently accessible. This finding aligns with research by Nelson et al. (2020), which suggests that multilingual and multi-format materials are vital for ensuring broad participation in educational programs. Moving forward, community education programs should prioritize offering materials in multiple languages and formats, such as audio, braille, and digital, to ensure that no one is excluded due to language barriers or other limitations.

Table 9
The Community Education Components Affect the Adoption of Recycling and Sustainable Waste Disposal Behavior in terms of Accessibility and Inclusivity

Items	Mean	SD	Description	Interpretation
Community education programs are accessible to people with disabilities or other special needs.	2.95	0.68	Agree	Good Impact
The location of community education programs makes it easy for residents to attend and participate.	3.12	0.49	Agree	Good Impact
Community education programs include all age groups, including the elderly and children.	3.18	0.65	Agree	Good Impact
The materials used in community education programs are available in different languages and formats to ensure inclusivity.	2.92	0.92	Agree	Good Impact
Community education initiatives are designed to cater to the needs of people from different socioeconomic backgrounds.	3.13	0.58	Agree	Good Impact
Overall Mean	**3.06**	**0.66**	**Agree**	**Good Impact**

Legend: 1.00-1.75 Strongly Disagree (Minimal Impact), 1.76-2.50 Disagree (Moderate Impact), 2.51-3.25 Agree (Good Impact), 3.26-4.00 Strongly Agree (Excellent Impact)

3. How does the demographic profile of the respondents influence their recycling and sustainable waste disposal behaviors in terms of:

3.1. Recycling practices;

3.2. Sustainable waste disposal practices;

3.3. Adoption of waste reduction strategies; and

3.4. Attitudinal and behavioral shifts?

Table 10 presents the demographic profile of the respondents that influenced their recycling and sustainable waste disposal behaviors in terms of recycling practices. The overall mean of 3.03 and standard deviation of 0.65 suggest that respondents agreed that their demographic characteristics influenced their recycling practices. The data indicate that age, education, employment status, and household size significantly shape individuals' recycling behaviors. Respondents with formal education and those employed full-time were more likely to engage in recycling activities, reflecting a common trend where education and employment status correlate with higher levels of environmental awareness. These findings emphasize the importance of tailoring community education programs to address the specific needs of different demographic groups, ensuring that those with lower levels of education or informal employment receive the support they need to adopt recycling habits. Research by Harrison and Mills (2021) has similarly shown that individuals with higher education levels are more inclined to adopt pro-environmental behaviors, including recycling.

The highest mean of 3.11, with a standard deviation of 0.64, was recorded for the item "Men and women in your community engage in recycling at different rates." This finding suggests that gender plays a role in recycling behaviors within the community, with women tending to engage more frequently in recycling practices. The standard deviation indicates some variability in responses, yet the overall trend shows that female respondents were more likely to engage in sustainable recycling behaviors. This is consistent with previous studies that have found women generally exhibit more concern for environmental issues and are more likely to engage in pro-environmental behaviors (Khan et al., 2020). As such, community programs should consider gender dynamics and tailor messaging to

encourage male participation, possibly by highlighting the benefits of recycling in practical, everyday terms for men.

On the other hand, the lowest mean of 2.87, with a standard deviation of 0.65, was recorded for the item "People in your community with formal employment tend to recycle more consistently than others." While respondents generally agreed with the statement, the lower mean suggests that employment status might not be as strongly determinant of recycling behavior as expected. This indicates that while employed individuals may engage in recycling more regularly, other factors, such as household size or access to recycling facilities, might also influence recycling practices. Research by Thompson and Robinson (2021) suggests that while employment status can influence environmental behavior, the availability of resources and community support more strongly determine the frequency of recycling. Future programs could focus on improving access to recycling resources, particularly in areas with limited access, regardless of employment status.

Table 10
The Demographic Profile of the Respondents Influenced their Recycling and Sustainable Waste Disposal Behaviors in terms of Recycling Practices

Items	Mean	SD	Description	Interpretation
Your age influences how often you participate in recycling activities.	3.17	0.61	Agree	Good Practice
Individuals with higher education are more likely to engage in recycling than those with lower educational attainment.	2.91	0.75	Agree	Good Practice
People in your community with formal employment tend to recycle more consistently than others.	2.87	0.65	Agree	Good Practice
Household size plays a role in whether or not recycling practices are followed in your household.	3.08	0.58	Agree	Good Practice
Men and women in your community engage in recycling at different rates.	3.11	0.64	Agree	Good Practice
Overall Mean	**3.03**	**0.65**	**Agree**	**Good Practice**

Legend: 1.00-1.75 Strongly Disagree (No Practice), 1.76-2.50 Disagree (Limited Practice), 2.51-3.25 Agree (Good Practice), 3.26-4.00 Strongly Agree (Excellent Practice)

Table 11 presents the demographic profile of the respondents influenced their recycling and sustainable waste disposal behaviors in terms of sustainable waste disposal practices. The overall mean of 2.94 and standard deviation of 0.68 suggest that respondents generally agreed that their demographic characteristics influenced their sustainable waste disposal practices, but the level of agreement was slightly lower compared to recycling practices. Individuals with higher educational attainment and larger household sizes were more likely to engage in sustainable practices such as waste segregation and composting. The relatively lower mean score indicates that while there was agreement, sustainable waste disposal practices were not as widely adopted as recycling practices, possibly due to a lack of awareness or resources. Studies by Patel and Singh (2021) have suggested that education is pivotal in promoting waste segregation practices, as it increases awareness of the environmental benefits.

The highest mean of 3.20, with a standard deviation of 0.67, was recorded for the item "Your educational level influences your tendency to practice sustainable waste disposal (e.g., composting, waste segregation)." This result highlights the positive influence of education on adopting sustainable waste disposal practices. Respondents with higher education levels were more likely to engage in practices such as composting and waste segregation, as they were better informed about the environmental impact of waste. This aligns with the findings of Liu et al. (2020), who emphasized the role of education in driving environmentally responsible behaviors. To further enhance participation

in sustainable waste disposal practices, community programs should focus on raising awareness and providing resources to individuals with lower education levels.

The lowest mean of 2.69, with a standard deviation of 0.71, was recorded for the item "Individuals with higher income levels are likelier to practice sustainable waste disposal than those with lower incomes." This suggests that income may not have as strong an impact on sustainable waste disposal behaviors as other factors, such as education or household size. The data points to a potential resource access gap that could help individuals with lower incomes practice waste disposal sustainably. As Baker et al. (2021) noted, socio-economic factors like income may influence access to specific waste management resources, but they are not the sole determinants of behavior. Community programs should consider providing low-cost or no-cost waste management solutions to lower-income households to ensure that sustainable waste practices are accessible to all.

Table 11
The Demographic Profile of the Respondents Influenced their Recycling and Sustainable Waste Disposal Behaviors in terms of Sustainable Waste Disposal Practices

Items	Mean	SD	Description	Interpretation
Your educational level influences your tendency to practice sustainable waste disposal (e.g., composting, waste segregation).	3.20	0.67	Agree	Good Practice
Older individuals in your community are more likely to engage in sustainable waste disposal than younger individuals.	2.91	0.71	Agree	Good Practice
People in your community with larger households tend to engage more in sustainable waste disposal activities.	2.93	0.63	Agree	Good Practice
The gender of an individual has an impact on the likelihood of them practicing sustainable waste disposal.	2.95	0.68	Agree	Good Practice
Individuals with higher income levels are likelier to practice sustainable waste disposal than those with lower incomes.	2.69	0.71	Agree	Good Practice
Overall Mean	**2.94**	**0.68**	**Agree**	**Good Practice**

Legend: 1.00-1.75 Strongly Disagree (No Practice), 1.76-2.50 Disagree (Limited Practice), 2.51-3.25 Agree (Good Practice), 3.26-4.00 Strongly Agree (Excellent Practice)

Table 12 presents the demographic profile of the respondents influenced their recycling and sustainable waste disposal behaviors in terms of the adoption of waste reduction strategies. The overall mean of 3.00 and standard deviation of 0.65 suggest that respondents generally agreed that their demographic profile influenced the adoption of waste reduction strategies. Respondents indicated that age, income level, and educational attainment played a significant role in adopting strategies such as reducing plastic usage and reusing materials. The slightly higher mean score for younger individuals and those with higher education levels indicates that these groups are more inclined to adopt waste reduction practices. This supports the findings of Roberts et al. (2020), who identified education as a key driver in the adoption of waste-reduction behaviors. The data also suggests that individuals with larger families tend to adopt waste reduction strategies more readily, likely due to the increased waste generated by larger households.

The highest mean of 3.10, with a standard deviation of 0.57, was found for the item "Men and women in your community adopt waste reduction strategies at different rates." This result indicates that gender influences the adoption of waste reduction strategies, with women more likely to embrace behaviors such as reducing plastic usage and reusing materials. The standard deviation suggests a moderate level

of agreement, but the overall trend shows that women are generally more proactive in adopting waste-reduction practices. This is consistent with research by Clark and Thomas (2021), which found that women tend to be more engaged in environmental issues and adopt sustainable behaviors at higher rates. Community programs should consider gender-specific strategies to increase male engagement in waste reduction practices.

On the other hand, the lowest mean of 2.91, with a standard deviation of 0.70, was recorded for the item "People with larger families are more likely to adopt waste reduction practices, such as reusing materials and avoiding plastic." While there was general agreement, the lower mean indicates that larger families may face barriers in consistently adopting waste reduction practices. Larger households may produce more waste, making it more challenging to reduce or reuse materials effectively. Research by Fischer and Johnson (2021) suggests that the challenges of managing waste in larger households are often overlooked in sustainability programs. To address this, community education programs should develop specific strategies that cater to the needs of larger families, such as providing bulk recycling services or offering tips for reducing household waste.

Table 13
The Demographic Profile of the Respondents Influenced their Recycling and Sustainable Waste Disposal Behaviors in terms of the Adoption of Waste Reduction Strategies

Items	Mean	SD	Description	Interpretation
Your demographic profile (e.g., age, income) influences the adoption of waste reduction strategies such as reducing plastic usage and reusing materials.	3.08	0.63	Agree	Good Practice
Younger individuals tend to adopt waste reduction strategies more readily than older individuals in your community.	2.90	0.73	Agree	Good Practice
Higher educational attainment leads to a greater adoption of waste-reduction strategies among residents.	2.98	0.65	Agree	Good Practice
People with larger families are more likely to adopt waste reduction practices, such as reusing materials and avoiding plastic.	2.91	0.70	Agree	Good Practice
Men and women in your community adopt waste reduction strategies at different rates.	3.10	0.57	Agree	Good Practice
Overall Mean	**3.00**	**0.65**	**Agree**	**Good Practice**

Legend: 1.00-1.75 Strongly Disagree (No Practice), 1.76-2.50 Disagree (Limited Practice), 2.51-3.25 Agree (Good Practice), 3.26-4.00 Strongly Agree (Excellent Practice)

Table 14 presents the demographic profile of the respondents that influenced their recycling and sustainable waste disposal behaviors in terms of the attitudinal and behavioral shifts. The overall mean of 3.12 and standard deviation of 0.58 suggest that respondents generally agreed that their demographic characteristics influenced attitudinal and behavioral shifts toward recycling and sustainable waste disposal. Respondents with higher educational levels and formal employment were more likely to report significant changes in attitudes towards sustainability, with education fostering a more positive outlook on recycling and waste management. This finding aligns with previous research by Anderson and Stevens (2021), who found that education positively influences individuals' environmental attitudes and behaviors. Age was also a factor, with older individuals showing more significant changes in attitudes towards recycling as they became more aware of environmental issues. Larger household sizes also appeared to play a role in shaping attitudes, as individuals in such households were more likely to have a broader understanding of the impact of waste management on the environment.

The highest mean of 3.19, with a standard deviation of 0.52, was recorded for the item "People in your community are more likely to change their recycling behaviors as they grow older." This result shows that age plays a significant role in shaping attitudes toward recycling, with older individuals being more likely to alter their behaviors as they become more aware of the environmental impact. The relatively high mean indicates that aging individuals tend to reflect more on their actions and adjust accordingly. This finding suggests that community education programs should target older demographics, emphasizing the long-term benefits of sustainable waste management practices. Research by Harris and Clark (2021) suggests that older individuals are more likely to respond positively to sustainability initiatives when they understand their long-term benefits.

On the other hand, the lowest mean of 3.03, with a standard deviation of 0.64, was recorded for the item "Residents with larger household sizes are more likely to show significant changes in attitudes toward waste management practices." This result indicates that household size plays a role in shaping attitudes, but the effect was not as pronounced as expected. Larger households may not necessarily lead to more significant change in waste management attitudes. This suggests that other factors, such as access to waste management services or community support, may be more important in influencing attitudes. According to Johnson and Smith (2020), addressing the specific needs of larger households, such as providing tailored resources and community support, could help facilitate a greater shift in attitudes and behaviors towards waste management.

Table 14
The Demographic Profile of the Respondents Influenced their Recycling and Sustainable Waste Disposal Behaviors in terms of the Attitudinal and Behavioral Shifts

Items	Mean	SD	Description	Interpretation
Your demographic characteristics (e.g., age, education) influence how your attitudes toward recycling and waste disposal have changed.	3.17	0.57	Agree	Good Practice
People in your community are more likely to change their recycling behaviors as they grow older.	3.19	0.52	Agree	Good Practice
Higher levels of education are associated with more positive attitudes toward recycling and waste disposal.	3.10	0.57	Agree	Good Practice
People with formal employment tend to favor adopting sustainable waste disposal methods more favorably.	3.11	0.59	Agree	Good Practice
Residents with larger household sizes are more likely to show significant changes in attitudes toward waste management practices.	3.03	0.64	Agree	Good Practice
Overall Mean	**3.12**	**0.58**	**Agree**	**Good Practice**

Legend: 1.00-1.75 Strongly Disagree (No Practice), 1.76-2.50 Disagree (Limited Practice), 2.51-3.25 Agree (Good Practice), 3.26-4.00 Strongly Agree (Excellent Practice)

4. Is there a significant difference in recycling and sustainable waste disposal behavior when grouped according to demographic profile?

Table 15 depicts the test of significant differences in recycling and sustainable waste disposal behavior when grouped according to demographic profile. The findings show significant differences in recycling and sustainable waste disposal behaviors based on age. The p-value of 0.000 for age groups indicates that as individuals age, their behaviors shift significantly regarding sustainable waste management. Younger individuals, particularly those below 18 and between 18 and 24 years, had higher means, suggesting greater engagement in recycling practices. Older age groups, especially those over 65, show significant variation, likely due to generational differences in attitudes toward

sustainability. As research by Anderson (2021) suggests, younger generations tend to be more proactive in adopting sustainable practices, likely due to increased exposure to environmental education. These results imply that community education programs must be designed with age-appropriate messaging, where older age groups may require more tailored strategies to encourage participation. The low participation of older adults in recycling suggests the need for outreach programs that address barriers like mobility or awareness. Community initiatives should focus on fostering an inclusive environment for all age groups to support long-term behavior change.

Table 15
Test of Significant Difference in Recycling and Sustainable Waste Disposal Behavior when Grouped According to Demographic Profile

Profile	Sustainable Behavior in Waste Reduction and Recycling					
	Category	**Mean**	**f-value**	**p-value**	**Remarks**	**Decision on Ho**
Age	Below 18	3.22	4.429	.000	Significant	Rejected
	18 to 24	3.24				
	25 to 34	3.02				
	35 to 44	3.12				
	45 to 54	3.00				
	55 to 64	2.88				
	65 and above	4.00				

Significant if p-value <0.05
Legend: Ho is rejected if Significant
Ho is failed to reject if Not Significant

Table 16 depicts the test of significant differences in recycling and sustainable waste disposal behavior when grouped according to demographic profile. The results reveal significant differences between male and female respondents in their recycling and sustainable waste disposal behaviors, with females reporting a higher mean (3.19) than males (2.97). The p-value of 0.000 suggests a statistically significant difference, indicating that gender influences participation in environmental behaviors, with women generally more inclined toward sustainability. These findings align with research by Rojas et al. (2020), who found that women are more likely to engage in environmental behaviors such as recycling and waste reduction. This disparity in gender participation suggests that community programs might benefit from targeting male engagement more effectively. Educational campaigns could focus on how recycling benefits the household or local economy, potentially framing it as a practical solution for men. Programs could also promote male leadership roles within the community to inspire broader involvement. These results emphasize the importance of gender-specific strategies when planning community education efforts.

Table 16
Test of Significant Difference in Recycling and Sustainable Waste Disposal Behavior when Grouped According to Demographic Profile

Profile	Sustainable Behavior in Waste Reduction and Recycling					
	Category	**Mean**	**f-value**	**t-value**	**Remarks**	**Decision on Ho**
Sex	Male	2.97	12.823	.000	Significant	Rejected
	Female	3.19				

Significant if p-value <0.05
Legend: Ho is rejected if Significant
Ho is failed to reject if Not Significant

Table 17 depicts the test of significant differences in recycling and sustainable waste disposal behavior when grouped according to demographic profile. The findings suggest that educational attainment does not significantly influence recycling and sustainable waste disposal behaviors, with a p-value of 0.712 indicating no statistically significant differences among various educational levels. This result

challenges the assumption that higher education directly correlates with pro-environmental behaviors. Despite this, individuals with higher educational levels reported engaging more in discussions about sustainability, though this did not directly translate into more significant differences in actual behaviors. According to Martinez and Zhou (2022), while education is an important factor in raising environmental awareness, it may not always lead to changes in behavior unless accompanied by accessible resources and community support. These results imply that community education programs must do more than just impart knowledge—they must also provide practical solutions and resources that facilitate the adoption of sustainable behaviors. As suggested by Green et al. (2021), the effectiveness of environmental programs could be enhanced by integrating behavior change theories into their design, ensuring that education leads to action. Future programs could focus on providing resources that make sustainability practices easier and more accessible for people across all educational levels.

Table 17
Test of Significant Difference in Recycling and Sustainable Waste Disposal Behavior when Grouped According to Demographic Profile

Profile	Sustainable Behavior in Waste Reduction and Recycling					
	Category	**Mean**	**f-value**	**p-value**	**Remarks**	**Decision on Ho**
Educational Attainment	No Formal Education	3.00	.585	.712	Not Significant	Failed to Reject
	High School Level	3.10				
	High School Graduate	3.06				
	College Level	3.22				
	College Graduate	3.06				
	Postgraduate	3.00				

Significant if p-value <0.05
Legend: Ho is rejected if Significant
Ho is failed to reject if Not Significant

Table 18 depicts the test of significant differences in recycling and sustainable waste disposal behavior when grouped according to demographic profile. The data indicate significant differences in recycling and waste disposal behaviors based on occupation, with students showing the highest mean score of 3.28, suggesting that they are more engaged in sustainable practices. The p-value of 0.029 confirms that occupation influences recycling behaviors, with students being particularly active due to their exposure to sustainability education in schools. This supports the findings of Thompson and Richards (2021), who observed that students are more likely to engage in environmental actions due to formal education and peer influence. On the other hand, full-time individuals showed slightly lower engagement, possibly due to time constraints and competing priorities.

Table 18
Test of Significant Difference in Recycling and Sustainable Waste Disposal Behavior when Grouped According to Demographic Profile

Profile	Sustainable Behavior in Waste Reduction and Recycling					
	Category	**Mean**	**f-value**	**p-value**	**Remarks**	**Decision on Ho**
Occupation	Student	3.28	2.565	.029	Significant	Rejected
	Employed (Full-time)	3.03				
	Employed (Part-time)	3.22				
	Self-employed	3.00				
	Unemployed	3.25				
	Retired	4.00				

Significant if p-value <0.05
Legend: Ho is rejected if Significant
Ho is failed to reject if Not Significant

The results imply that community programs should offer flexible scheduling and strategies that accommodate working adults, integrating sustainability practices into their everyday work environments. Additionally, as Parker et al. (2020) suggested, leveraging students' enthusiasm for sustainability can be a powerful tool in spreading environmental awareness to the broader community. Future initiatives could encourage students to become sustainability ambassadors, helping to bridge the gap between education and practical action.

Table 19 depicts the test of significant differences in recycling and sustainable waste disposal behavior when grouped according to demographic profile. The data demonstrates that household size significantly impacts recycling and sustainable waste disposal behaviors. Respondents from households with 1 to 2 members reported higher engagement in sustainable practices, with a mean of 3.31, compared to those from larger households. The p-value of 0.012 shows that smaller households are more likely to implement consistent recycling behaviors. This is likely because smaller households generate less waste, making managing and recycling easier. Larger households, which generate more waste, showed a mean of 2.87, indicating greater difficulty in adopting sustainable waste management practices. These findings are consistent with research by Kleemann et al. (2021), which suggests that household size can significantly affect the ability to manage waste. Community programs should consider these differences by providing tailored support for larger households, such as offering bulk recycling services or teaching strategies for managing larger volumes of waste. Targeting programs specifically at larger households could increase engagement and promote sustainable behaviors across all household sizes.

Table 19
Test of Significant Difference in Recycling and Sustainable Waste Disposal Behavior when Grouped According to Demographic Profile

Profile	Sustainable Behavior in Waste Reduction and Recycling					
	Category	**Mean**	**f-value**	**p-value**	**Remarks**	**Decision on Ho**
Household Size	1 to 2 people	3.31	3.760	.012	Significant	Rejected
	3 to 4 people	3.17				
	5 to 6 people	3.00				
	7 or more people	2.87				

Significant if p-value <0.05
Legend: Ho is rejected if Significant
Ho is failed to reject if Not Significant

CONCLUSION

The study on the role of community education in enhancing recycling and sustainable waste disposal behaviors in Barangay Nuro Poblacion has underscored the importance of education in fostering long-term environmental sustainability. The findings highlight that well-structured and culturally relevant community education programs have the potential to significantly influence residents' recycling habits and waste management practices. By focusing on both content quality and the accessibility of educational materials, the study demonstrates that educational efforts tailored to the specific needs and context of the community lead to increased participation in sustainable waste practices. Furthermore, the involvement of local leaders in delivering these programs ensures that the messages resonate more deeply with the community members, thereby enhancing the impact of the programs.

Importantly, the research found that educational strategies promoting inclusivity, such as offering materials in multiple formats and languages, are critical for ensuring broad participation. This aligns with findings from other studies that emphasize the need for accessibility to reach diverse demographic groups, particularly those with limited access to formal education or technology. Additionally, the

study suggests that combining various educational methods, including workshops, digital outreach, and media campaigns, can effectively address different learning preferences and expand the reach of the programs. The results also indicate that policies supporting these educational efforts, especially those incentivizing recycling and waste reduction, create an environment where community members are more likely to adopt sustainable behaviors.

Finally, the study calls for further research to explore the long-term effectiveness of community education programs and how digital platforms can be integrated to support traditional educational methods in rural areas. While the findings of this study are promising, continued efforts to refine and adapt community education programs are necessary to ensure that they remain effective in promoting sustainable waste management. The adoption of waste reduction practices, including recycling and composting, is vital for reducing the environmental footprint of rural communities like Barangay Nuro Poblacion, and the collective responsibility cultivated through education is a key factor in achieving a cleaner and more sustainable environment.

Recommendations

Based on the findings of this study, it is recommended that community education programs in Barangay Nuro Poblacion should be tailored to the specific cultural and environmental context of the area. Educational content should focus on practical, locally relevant solutions such as composting and waste-to-energy initiatives, which can motivate residents to adopt sustainable practices. In addition, it is essential to make the educational materials accessible to all members of the community, particularly marginalized groups, by offering them in multiple formats (e.g., visual aids, audio recordings) and languages. Community education events should also be held at convenient times and locations to ensure that everyone, regardless of their schedule or mobility, can participate.

Further, a stronger collaboration between local government units and community organizations is crucial for sustaining waste management education efforts. Local authorities should support these initiatives through policy enforcement, resource allocation, and incentives for recycling. Collaboration can also enhance the effectiveness of programs by providing consistent feedback, monitoring, and adaptation to meet the community's changing needs. Incorporating digital tools like social media and online platforms could expand the outreach, particularly to younger, tech-savvy individuals, though efforts must also be made to bridge the digital divide for those with limited internet access.

Lastly, to foster long-term behavioral change, the study suggests focusing on consistent and ongoing education rather than short-term campaigns. Programs should integrate regular workshops, community clean-ups, and refresher courses to reinforce sustainable waste disposal practices. Additionally, future programs should broaden their scope beyond recycling, promoting comprehensive waste reduction strategies like waste segregation and reducing single-use plastics. This approach will help ensure that residents adopt and maintain sustainable behaviors over time, creating a cleaner and more sustainable environment for the community.

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