

WASTE MANAGEMENT IN ADULT EDUCATION CURRICULUM FOR SUSTAINABLE, ECO-FRIENDLY ENVIRONMENT

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Abstract

This research survey paper focuses on exploring the perceptions of adult education instructors regarding the integration of waste management education into Adult Education Curriculum to promote sustainable eco-friendly environment. The study involved 256 adult education instructors from Enugu State. The data was collected using a perception questionnaire developed by the researchers. The reliability of the questionnaire was established using Cronbach's Alpha, resulting in a value of 0.81, indicating good internal consistency. The collected data was analyzed using mean and standard deviation, and the t-test statistical tool was employed to test hypotheses at a significance level of 0.05. The findings revealed that adult education instructors held a positive perception towards the integration of waste management education into the curriculum for promoting sustainable eco-friendly practices. One of the key recommendations from the study was that relevant authorities in adult education programme and adult curriculum planning should build upon the positive perception of adult education instructors by actively integrating waste management education into the adult education curriculum. This integration should span various program levels and cover topics ranging from waste reduction and recycling to responsible disposal methods. Collaborate with curriculum development experts to ensure that waste management concepts are effectively woven into existing subject matter.

Keywords: Waste management education, adult education curriculum, sustainable eco-friendly environment, adult education instructors.

INTRODUCTION

The Nigerian experience in waste management challenges is marked by rapid urbanization and increased consumption patterns that have led to a significant upsurge in waste production. This

surge poses substantial threats to ecosystems, public health, and overall environmental well-being. To effectively tackle these challenges, it is imperative to implement sustainable waste management strategies. The 2030 Agenda for Sustainable Development, along with its Sustainable Development Goals (SDGs), underscores the urgent necessity of adopting responsible waste management practices. This is particularly crucial for achieving targets related to clean water and sanitation, creating sustainable cities and communities, and taking meaningful climate action (United Nations, 2015). While waste management education has traditionally been incorporated into primary and secondary (K-12) curricula, there is an increasing acknowledgment of the vital role that adult education plays in addressing waste-related issues. Adult learners, being influential members of society, possess the capacity to instigate positive transformations in waste management approaches. By making informed decisions and practicing responsible behaviors, they have the potential to bring about constructive changes (Yun & Ha, 2016). Waste management education plays a pivotal role in achieving sustainability goals by fostering responsible behaviors, promoting resource conservation, and mitigating environmental degradation. The integration of waste management education into curricula at all levels of learning is crucial for addressing the global challenges posed by increasing waste generation. Several key reasons highlight the significance of waste management education in achieving sustainability goals. Educating individuals about proper waste disposal, recycling, and composting helps reduce the strain on natural resources and minimizes pollution (Linder *et al.*, 2018). Waste management education encourages the adoption of practices that contribute to the conservation of materials, energy, and ecosystems. Waste management education introduces learners to the concept of the circular economy, where waste is considered a resource that can be reused, repurposed, or recycled (Kirchherr *et al.*, 2017). By understanding the value of waste as a potential input for new products, individuals contribute to reducing the demand for virgin resources. Waste management education cultivates a shift in attitudes and behaviors toward consumption and disposal. Informed individuals are more likely to adopt sustainable lifestyles, which include reducing waste generation, opting for reusable products, and making conscious consumer choices (Steg & Vlek, 2009). Uncontrolled waste disposal has adverse environmental impacts, including soil and water contamination, greenhouse gas emissions, and habitat destruction. Waste management education empowers individuals to make informed decisions that minimize these negative effects (Bilitewski *et al.*, 2019). The United Nations' Sustainable Development Goals emphasize responsible consumption and production, clean water and sanitation, and sustainable cities and communities. Proper

waste management is integral to achieving these goals and creating a more sustainable future (United Nations, 2015). Waste management education equips individuals with the knowledge and skills to make conscious decisions that contribute to a more sustainable and eco-friendlier environment. By instilling a sense of responsibility and encouraging positive waste management practices, education empowers individuals to play an active role in achieving sustainability goals and creating a healthier planet for current and future generations.

The escalating generation of waste has emerged as a critical global environmental challenge with multifaceted consequences. As consumption patterns and urbanization continue to rise, waste generation has reached unprecedented levels, leading to a range of environmental impacts. The phenomenon of escalating waste generation is closely linked to rapid urbanization, population growth, and increased consumerism. The expansion of industrial and commercial sectors, along with changes in lifestyle and production methods, has contributed to the surge in waste production across the globe and Nigeria inclusive (Hoorweg & Bhada-Tata, 2012). The exponential increase in waste generation has led to overflowing landfills, often resulting in uncontrolled waste disposal and contamination of soil. The accumulation of hazardous waste materials in landfills poses a risk of leaching toxins into the soil, potentially affecting water bodies and ecosystems (Guo *et al.*, 2019). Poor waste management practices, such as open burning of waste, release harmful pollutants into the air, leading to respiratory problems and contributing to air quality deterioration. Inadequate waste disposal also leads to the release of pollutants into water bodies, affecting aquatic life and human health (Dey *et al.*, 2018). The improper disposal and decomposition of organic waste in landfills generate methane, a potent greenhouse gas that contributes to climate change. Escalating waste generation exacerbates methane emissions, thereby impacting global warming and the stability of climate patterns (Reisinger *et al.*, 2018). As waste is often disposed of without considering its potential as a resource, valuable materials that could be recycled or repurposed are lost. Escalating waste generation accelerates the depletion of finite natural resources used in the production of goods (Shakerian *et al.*, 2019). Improper waste management can lead to the destruction of natural habitats and ecosystems, posing a threat to biodiversity. Pollution resulting from waste disposal affects flora and fauna, disrupting the delicate balance of ecosystems (Butt *et al.*, 2020). The rapid escalation of waste generation has led to a host of environmental challenges, from soil contamination and air pollution to climate change implications and threats to biodiversity. Recognizing the severity of these impacts underscores the urgent need for comprehensive waste

management strategies and increased emphasis on waste education to mitigate these far-reaching consequences and promote a sustainable future.

Sustainable waste management plays a pivotal role in achieving the Sustainable Development Goals (SDGs) set forth by the United Nations. These global goals encompass a wide range of socio-economic and environmental objectives aimed at creating a more equitable, resilient, and environmentally responsible world. The integration of effective waste management practices aligns with several SDGs, contributing to their successful realization. Sustainable waste management contributes to creating clean, resilient, and inclusive urban environments. Proper waste collection, recycling, and disposal systems enhance the quality of life in cities and reduce pollution, ultimately supporting the goal of creating sustainable communities (United Nations, 2015). Efficient waste management is at the core of responsible consumption and production. Minimizing waste generation, promoting recycling and reuse, and adopting circular economy principles directly align with SDG 12's aim to ensure sustainable patterns of consumption and production (United Nations, 2015). Sustainable waste management helps mitigate climate change. Reducing methane emissions from landfill sites and promoting waste-to-energy technologies contribute to SDG 13's objective of combating climate change and its impacts (United Nations, 2015). Proper waste management prevents marine litter and reduces the pollution of oceans and water bodies. By preventing the flow of waste into aquatic ecosystems, waste management supports the conservation of marine life and habitats (United Nations, 2015). Sustainable waste management prevents habitat degradation and land pollution. Responsible disposal and recycling practices help preserve terrestrial ecosystems, aligning with the goal of protecting biodiversity and ecosystems on land (United Nations, 2015). Sustainable waste management serves as a cross-cutting strategy that contributes to multiple SDGs, reinforcing the interconnectedness of environmental protection, social progress, and economic prosperity. By integrating waste management education and implementing sustainable waste practices, societies can simultaneously address a range of development challenges, promoting responsible consumption, reducing pollution, and contributing to the broader vision of a sustainable and equitable world. The strategic alignment of waste management with the SDGs underscores its importance in achieving global sustainability targets. The urgency to implement responsible waste management practices becomes glaringly apparent when considering the escalating rate of waste generation and the detrimental consequences it imposes on the environment, public health, and overall sustainability. The combination of rapid urbanization, growing consumption patterns, and inadequate waste management infrastructure has amplified

the need for swift and decisive actions to confront this pressing global dilemma. The surge in waste production contributes to environmental deterioration through various avenues. The improper disposal of waste, such as open dumping and littering, results in soil and water contamination, adversely affecting ecosystems and biodiversity (Rathi *et al.*, 2019). The urgency arises from the imperative to avert irreversible harm to natural habitats and ecosystems. Additionally, it involves curtailing the release of pollutants that contribute to the pollution of air and water resources. The insufficiency of waste management systems poses direct threats to public health. The accumulation of waste in open areas creates breeding grounds for disease-carrying vectors, thereby propagating the transmission of infectious diseases within communities (Akinyele *et al.*, 2018). The compelling need for responsible waste management practices gains further emphasis due to their potential to prevent health crises and safeguard the well-being of populations. The growing waste generation contributes to the depletion of valuable resources that could otherwise be reclaimed through recycling and reutilization. This loss of resources perpetuates a linear consumption model and places additional strain on the finite resources of the planet (Wang *et al.*, 2018). The urgency stems from the necessity to transition toward circular economy practices that optimize resource efficiency and diminish waste production. Responsible waste management plays a pivotal role in mitigating the effects of climate change. Land-filling and incineration of waste release significant quantities of greenhouse gases, exacerbating global warming (Hoornweg & Bhada-Tata, 2012). The pressing nature of reducing emissions tied to waste underscores international commitments to combat climate change and mitigate its adverse impacts. The urgency for adopting responsible waste management practices emerges from the interlinked challenges of environmental degradation, public health hazards, resource scarcity, and climate change. Swift action is imperative to avert irreversible harm, protect public health, and lay the groundwork for a more sustainable future. Responsible waste management practices are indispensable in confronting these challenges, advocating circular economy principles, and ensuring the welfare of both present and future generations. The urgent call for action underscores the necessity for collaborative endeavors and innovative solutions to address waste-related predicaments on a global scale. Meeting these challenges requires a concerted effort and a willingness to embrace creative strategies that promote responsible waste management and pave the way for a cleaner, healthier, and more sustainable world.

Waste management education plays a pivotal role in fostering informed decision-making and encouraging responsible behaviors among individuals and communities. By imparting

knowledge about waste generation, disposal options, and environmental consequences, waste management education empowers learners to make conscious choices that contribute to sustainability. This section explores the link between waste management education and informed decision-making, as well as its potential to drive responsible behaviors. Waste management education provides individuals with the understanding of waste-related issues and their impact on the environment. Informed individuals are more likely to critically evaluate their consumption patterns, assess waste disposal options, and make decisions aligned with ecological well-being (Kaza *et al.*, 2018). Waste management education encourages responsible consumption by highlighting the connection between overconsumption and waste generation. Learners gain insights into the life cycle of products, encouraging them to opt for eco-friendly and durable goods, reducing the overall waste footprint (Leal Filho *et al.*, 2017). Education fosters behavioral change by encouraging the adoption of sustainable waste practices. Learners are more inclined to segregate waste, recycle, and compost when they comprehend the environmental implications of their actions (Reza *et al.*, 2019). Waste management education thus transforms knowledge into action.

Adult education serves as a powerful platform for driving positive change in waste management practices. Adults, as active members of society, possess the potential to influence communities, shape behaviors, and champion sustainable waste management. Adult education equips learners with the knowledge and awareness needed to understand the environmental consequences of waste mismanagement. Informed adults are better positioned to make conscious choices about waste generation, recycling, and disposal (Leal Filho *et al.*, 2017). This empowerment fosters a sense of responsibility and encourages proactive engagement in waste reduction efforts. Adult learners have the capacity to serve as catalysts for behavior change within their families, workplaces, and communities. Their influence extends beyond personal actions, as they share insights and encourage others to adopt responsible waste management practices (Hartman *et al.*, 2019). This ripple effect amplifies the impact of waste education programs. Adult education programs provide opportunities for community engagement and leadership development. Adults can assume roles as waste management advocates, educators, and organizers, mobilizing communities to implement sustainable waste practices (Kragt *et al.*, 2017). By leading initiatives, they contribute to creating lasting change. Adult education emerges as a transformative tool for fostering responsible waste management practices. By recognizing the influence of adult learners in driving positive change, waste management programs can strategically target this demographic for maximum impact. Informed and engaged adults serve as change agents,

effectively spreading knowledge, inspiring behavior change, and leading communities toward more sustainable waste practices. The role of adult education in waste management extends beyond individual actions, creating a multiplier effect that contributes to broader societal and environmental benefits.

Adult education has significant potential to contribute to waste reduction and the adoption of eco-friendly practices. Adult learners, equipped with knowledge and skills, can drive meaningful change by influencing their own behaviors and engaging their communities. The potential of adult education in waste reduction and eco-friendly practices is multifaceted and far-reaching. Adult education programs instill a sense of responsibility and encourage behavioral transformation. By learning about the impact of waste on the environment, adults are motivated to adopt waste reduction strategies, such as minimizing single-use items and prioritizing reusable alternatives (Kragt *et al.*, 2017). Adult learners often have established roles within their communities, making them effective advocates for change. Through discussions, workshops, and outreach efforts, adults can mobilize their peers to participate in waste reduction initiatives and adopt sustainable practices (Leal Filho *et al.*, 2017). Informed adult learners have the potential to advocate for policy changes related to waste management. By engaging in informed conversations and using their influence, they can promote regulations that support waste reduction, recycling, and the implementation of sustainable waste practices (Hartman *et al.*, 2019).

The link between waste management education and informed decision-making, as well as the potential of adult education to drive waste reduction and eco-friendly practices, highlights the transformative impact of education on individual behavior and societal change. By empowering individuals with knowledge and encouraging responsible actions, waste management education contributes to creating a more sustainable and eco-friendlier world, where adults play a central role in shaping a cleaner and healthier environment for present and future generations. Efforts to incorporate waste management into adult education curricula involve multifaceted approaches. These include raising awareness about waste reduction, recycling, composting, and the adoption of circular economy principles. Collaborative learning experiences, practical workshops, and real-world case studies can enhance learners' understanding of waste management concepts and their implications for a sustainable future. More over these efforts that will be expanded in incorporating waste management education into adult education curriculum will not be fruitful if the adult education instructors have a negative perception on such curriculum integration. It is on this note that the researchers investigate the perception of

adult education instructors' on integrating waste management in adult education curriculum for sustainable eco-friendly environment

In investigating the perceptions of adult education facilitators regarding the integration of waste management education in the adult education curriculum for sustainable and eco-friendly environment. Additionally, various factors that potentially influence these facilitators' viewpoints will be explored. Among these factors, gender emerges as a noteworthy consideration that requires thorough investigation. While prior researchers such as Sholagberu, Kayode, and Taiwo (2020), along with Anyanwu (2010), posit that differences exist between female and male adult educators in terms of incorporating pertinent subjects like community education into the adult education curriculum, contrasting findings have been presented by Babangida (2021) and Manase (2012). The latter studies indicate that the perceptions of male and female educators do not significantly diverge when it comes to integrating societal topics such as family planning into adult education. Given the presence of these conflicting viewpoints, this current research endeavors to contribute to the resolution of the ongoing debate concerning the role of gender in adult educators' perspectives regarding the integration of waste management education into the adult education curriculum, with the overarching goal of fostering a sustainable and environmentally friendly learning environment.

Purpose of the Study

The purpose of this study is aimed at determining the perception of adult education facilitators' on integrating waste management education in adult education curriculum for sustainable eco-friendly environment. It will specifically determine:

1. The adult education facilitators' perception on integrating waste management education in adult education curriculum for sustainable eco-friendly environment?
2. The influence of gender on the perception of adult education facilitators in integrating waste management education in adult education curriculum for sustainable eco-friendly environment?

Research Questions

1. What is the adult education facilitators' perception on integrating waste management education in adult education curriculum for sustainable eco-friendly environment?
2. What is the influence of gender on the perception of adult education facilitators on integrating waste management education in adult education curriculum for sustainable eco-friendly environment?

Method

The research employed a descriptive survey methodology to investigate the viewpoints of adult educators regarding the integration of waste management education into the adult education curriculum, aimed at promoting an environmentally sustainable and eco-friendly atmosphere. The study's target population consisted of 489 facilitators engaged in the Adult Basic Education Programme across three of Enugu State's six education zones. These zones encompassed Nsukka Education Zone (including Igbo-Etiti, Nsukka, and Uzo-uwani Local Government Areas), Obollo-Afor Education Zone (comprising Igbo-Eze North, Igbo-Eze South, and Udenu Local Government Areas), and Udi Education Zone (encompassing Ezeagu and Udi Local Government Areas). A purposive sampling approach was used to select 256 adult education facilitators (131 males and 125 females) who participated in the 2023 annual capacity-building program organized by the National Commission for Mass Literacy, Adult and Non-Formal Education (NMEC) for Nsukka education zone. The data collection instrument was a questionnaire titled "Adult Educators' Perception on Integrating Waste Management Education in Adult Education Curriculum for an Eco-friendly Environment (AEPEE)." This 15-item questionnaire was designed by the researchers, validated by three experts from the Department of Adult Education and Extra-Mural Studies, as well as the Department of Educational Psychology at the University of Nigeria, Nsukka. The experts' feedback was incorporated into the final version. The questionnaire consisted of two sections: Section A focused on demographic information, while Section B centered around adult educators' perspectives regarding the integration of waste management education into the adult education curriculum for sustainable development. The questionnaire utilized a weighted scale, categorizing responses as Strongly Agree (SA), Agree (A), Strongly Disagree (SD), and Disagree (D). Participants were instructed to choose the response option that best represented their viewpoint. The validity of the instrument was confirmed, and its reliability was determined with a Cronbach's alpha coefficient of 0.81. Two research assistants were involved in data collection, resulting in a complete return of questionnaires from all participants. The collected data were analyzed using the mean and standard deviation to address the research questions. Items with a mean score below 2.50 were rejected, while those with a mean score equal to or above 2.50 were accepted. The research hypothesis was evaluated using a t-test statistical analysis at a significance level of 0.05.

Results

Data generated from survey questionnaire were analyzed and presented in tables below.

Research Question 1

What is the adult education facilitators' perception on integrating waste management education in adult education curriculum for sustainable eco-friendly environment?

Table 1: Mean and standard deviation on adult education facilitators' perception on integrating waste management education in adult education curriculum for sustainable eco-friendly environment

S/N	ITEM STATEMENT	Male facilitators			Female facilitators		
		X	SD	REM	X	SD	REM
1	Waste management education should be included in the adult education curriculum to promote a sustainable and eco-friendly environment.	3.51	0.69	Accept	3.37	0.68	Accept
2	Integrating waste management concepts can enhance adult learners' awareness of environmental issues.	3.48	0.71	Accept	3.53	0.68	Accept
3	Adult education teachers have a responsibility to educate their students about proper waste disposal methods.	3.60	0.78	Accept	3.64	0.80	Accept
4	Including waste management topics in the curriculum can empower adult learners to make environmentally conscious choices.	3.21	0.53	Accept	3.25	0.59	Accept
5	Waste reduction and recycling should be emphasized in adult education as essential components of sustainable living	3.57	0.78	Accept	3.46	0.56	Accept

6	Waste management education can inspire adult learners to become advocates for environmental conservation	3.28	0.59	Accept	3.33	0.61	Accept
7	Proper waste segregation should be taught in adult education to minimize the negative impact on the environment	3.65	0.81	Accept	3.63	0.81	Accept
8	Waste management education aligns with the broader goals of fostering civic responsibility among adult learners	3.34	0.66	Accept	3.41	0.68	Accept
9	The integration of waste management might require adjustments to the existing adult education curriculum.	3.20	0.58	Accept	3.30	0.49	Accept
10	Providing practical examples of successful waste management initiatives can make the curriculum more engaging for adult learners.	3.36	0.62	Accept	3.32	0.64	Accept
11	Waste management education can contribute to a positive shift in the overall behavior and habits of adult learners	3.48	0.64	Accept	3.50	0.64	Accept
12	Adult education institutions should collaborate with local waste management organizations to enhance the curriculum's effectiveness	3.05	0.50	Accept	3.14	0.53	Accept
13	The inclusion of waste management topics might lead to increased interest and enrollment in adult education programs	3.33	0.63	Accept	3.24	0.50	Accept

14	Adult education teachers need proper training and resources to effectively teach waste management concepts	3.51	0.71	Accept	3.54	0.76	Accept
15	Integrating waste management education can ultimately contribute to the creation of a greener and more sustainable society.	3.52	0.68	Accept	3.59	0.72	Accept
Cluster mean		3.406	0.64		3.41	0.66	
Average mean response		3.408					

Table 1. Shows that all the items on the questionnaire were accepted as they had response mean greater than the instrument scale mean (2.50). Also, the average mean (3.408) is greater than the scale mean. This implies that adult education facilitators are of the perception that waste management education in adult education curriculum will go a long way to drive sustainable eco-friendly environment. This is in line with Leal Fiho *et al*, (2017) opinioned that having access to information equips adults with the ability to make deliberate decisions regarding waste creation, recycling, and proper disposal methods. This empowerment nurtures a feeling of accountability and stimulates active participation in endeavors aimed at minimizing waste. Adults who are continuously learning possess the potential to act as initiators for altering behaviors within their households, professional environments, and local communities.

Research Question 2: What is the difference between the perception of male and female adult education facilitators on security education in adult education curriculum for sustainable development?

Table 2: Summary of male and female adult education facilitators mean response

Group	N	Mean \bar{x}	SD	Difference in \bar{x}
Male	131	3.406	0.64	0.004
Female	125	3.41	0.66	

Table 2, shows that a mean difference of 0.004 exist between responses of male and female adult education facilitators on waste management education in adult education curriculum for eco-friendly environment. The difference is quite insignificant.

Hypothesis

H₀₁: There is no significant difference between the perception of male and female adult education facilitators on security education in adult education curriculum for sustainable development

Group	N	Mean \bar{x}	SD	DF	T. cal	P.value	Decision
Male	131	3.406	0.64	254	0.19	0.8697	Accepted
Female	125	3.41	0.66				

The data above on table 3 indicated that the t-calculated is 0.19 at 254 degrees of freedom and ap. value of 0.8697 which is greater than 0.5 at 0.05 level of significance which indicated that we retain the null hypothesis. Therefore, there is no significant difference between the perception of male and female adult education facilitators on waste management education in adult education curriculum for eco-friendly environment. This finding is in line with Babangida, (2021), and Manase, 2012 that male and female adult education facilitators' perceptions do not differ on integrating topical society issues like family planning in adult education.

Discussion

Result of the present study revealed the perception of adult education facilitators on integrating waste management education in adult education curriculum for eco-friendly environment. Both male and female adult education facilitators have positive perception on integrating waste management education in adult education curriculum for sustainable eco-friendly environment. This is because Nigeria as a society is experiencing huge environmental degradations as a result of poor waste management skills among her citizenry. And also based on the fact that there is need for broader approach in tackle environmental issues that are posing serious challenges to our country. Waste management education especially in adult education curriculum is a veritable tool in empowering adult citizens with appropriate skills needed to manage waste for sustainable eco- friendly environment. Furthermore, this empowerment nurtures a feeling of accountability and spurs active involvement in endeavors aimed at reducing waste. Adults undergoing learning possess the potential to act as agents that stimulate alterations in behavior within their households, workplaces, and localities. Their sway reaches further than individual deeds, as they impart wisdom and inspire others to embrace conscientious practices in managing waste (Hartman *et al.*, 2019). This domino effect magnifies the influence of waste education initiatives. Programs in adult education present avenues for involvement within

communities and the cultivation of leadership abilities empowerment fosters a sense of responsibility and encourages proactive engagement in waste reduction efforts. Adult learners have the capacity to serve as catalysts for behavior change within their families, workplaces, and communities. Their influence extends beyond personal actions, as they share insights and encourage others to adopt responsible waste management practices (Hartman *et al.*, 2019). This ripple effect amplifies the impact of waste education programs. Adult education programs provide opportunities for community engagement and leadership development.

CONCLUSION

The study was carried out to determine adult education facilitators' perception on integrating waste management education in adult education programme for sustainable eco-friendly environment. The result of the study shows positive perception of adult education facilitators on integrating waste management education in adult education curriculum for sustainable eco-friendly environment. Also, there is no significant difference existed between male and female adult education facilitators' perception on integrating waste management education in adult education curriculum for sustainable eco-friendly environment.

Recommendation

The following recommendations are made thus;

- Relevant authorities in adult education programme and adult curriculum planning should build upon the positive perception of adult education instructors by actively integrating waste management education into the adult education curriculum. This integration should span various program levels and cover topics ranging from waste reduction and recycling to responsible disposal methods. Collaborate with curriculum development experts to ensure that waste management concepts are effectively woven into existing subject matter
- Relevant adult education authorities should Design the waste management curriculum with a holistic perspective that encompasses the environmental, social, and economic aspects of sustainable waste management. This comprehensive approach will provide adult learners with a well-rounded understanding of the connections between waste management practices and their broader impacts.
- Relevant agencies should incorporate innovative teaching methods such as multimedia presentations, online resources, and interactive workshops to cater to diverse learning styles and enhance engagement. Utilize technology to deliver up-to-date information on waste management trends and solutions.

- Local Government authorities should foster community engagement by involving adult learners in local waste management initiatives, clean-up campaigns, and awareness events. This active participation will reinforce the importance of waste management and empower learners to become advocates for change within their communities.
- Government should establish partnerships with local environmental organizations, waste management agencies, and experts to provide specialized knowledge and resources. Collaborative efforts can enrich the curriculum and offer learners access to up-to-date information and best practices.
- Relevant authorities should offer professional development opportunities for adult education instructors to enhance their own knowledge and teaching skills related to waste management. Workshops, seminars, and webinars can ensure instructors are well-equipped to deliver effective waste management education.

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