



Strengthening Environmentally Friendly Behavior through Waste Sorting and Recycling Programs Increasing Value Added Healthy Islamic Boarding Schools and Zero Waste

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Abstract: *Applying the zero-waste concept is needed so that waste management in urban areas is not only more environmentally friendly. It's no longer just a trend, but this zero-waste has developed into a norm among the millennial generation in Indonesia. This service aims to strengthen environmentally friendly behavior through sorting organic and inorganic waste and training in recycling inorganic waste into valuable products. The method used Participatory Action Research (PAR). This service found that students at PPAI An-Nahdliyah responded positively to environmentally friendly behavior by sorting waste and received high creativity in recycling plastic bottle waste into valuable products, such as flower bouquets, pencil cases, etc. However, the sustainability of this program still needs to be improved. Therefore, this service recommends continuously improving students' resources to behave environmentally friendly and utilize their waste through reduction, reuse or recycling so that a zero-waste lifestyle is formed and supervision between each PPAI An-Nahdliyah student.*

Introduction

The zero-waste lifestyle is an effort to make an impact on the environment. This lifestyle is not just a trend but has become a general norm followed by some circles, especially young people in Indonesia. The widespread zero-waste lifestyle is inseparable from creative digital campaigns replicated by individuals, communities and inspiring young leaders¹.

The positive impact of the success of the zero waste movement campaign has spawned educational content for a minimal waste lifestyle at homes, schools and offices.

¹ Nur fauziyah Pradita, "Anak Muda dan Zero Waste; Dari Perubahan Gaya Hidup Hingga Kebijakan" <https://aliansizerowaste.id/2020/09/11/anak-muda-dan-zero-waste-dari-perubahan-gaya-hidup-hingga-kebijakan/> (2021)

This lifestyle is not just a trend but has become a general norm that various groups follow, especially the younger generation in Indonesia. Applying the zero waste concept is needed so that waste management in urban areas is not only more environmentally friendly. However, it is also increasingly bringing ecological, social and economic benefits. According to the Zero Waste Indonesia Alliance, which consists of ten environmental organizations, there are at least five main issues in waste management in Indonesia so far. First, the disposal capacity of cities still needs to grow. The average national solid waste service level index rose from 63.70 percent in 2015 to 71.59 percent in 2018, but good waste management was only around 32 percent. Second, the a high level of public indifference to waste, namely 72 percent, according to the results of the 2018 BPS survey. Third, there is a sharp increase in the composition of plastic-type waste. For example, the composition of plastic waste was around 9 percent in 1995, rose to 11 percent in 2005, and rose again to 16 percent in 2016. Fourth, the roles and responsibilities of producers are not yet mandatory. Fifth, law enforcement is not running optimally.

The Zero Waste Indonesia Alliance offers and encourages the government to apply alternative concepts in waste management in the form of a zero-waste program. This program encourages households to sort household waste with the help of the local government. Therefore, the waste generated during household activities should not end up in the TPA. This zero-waste program has several advantages, such as: (1) Reducing greenhouse gas emissions [especially methane] and pollution. (2). Reducing the cost of urban waste management. (3). Improving local food security and energy security. (4). Mobilizing local workers. (5). Give birth to social benefits. Initiatives such as community composting projects or food-sharing programs to prevent food from spoiling and wasting, as part of a zero waste program, do not only provide social benefits for residents. However, it also helps to strengthen social cohesion between communities. (6). Increase soil fertility. When food waste is separated and treated, it can produce compost and increase the soil's capacity to pull CO₂ from the atmosphere, thereby returning carbon to the soil. (7). Mitigation of resource depletion. Eight vital mineral resources are at risk of depleting over the next 100 years, including copper, phosphorus and aluminium. This risk can be reduced by implementing a zero-waste program in an industrial environment.

An-Nahdliyah Islamic Boarding School is one of the Islamic boarding schools in Malang District, to be precise in the Kepuharjo sub-district, Karangploso District, which is located on Jalan Raya Kepuharjo No.18 A, Malang Regency, East Java 65152. At its inception, the pesantren's land was waqf from KH. Hadi Sa'id. One of his sons, namely KH. Moh. Mansjur, SH, continued the plan by establishing the Nahdlatul Ulama Education Park (TPNU) in the village. In 1989 the construction of this hut began and was completed in 1990. The laying of the first stone was carried out in 1989 by the management of the NU branch of Malang Regency, while the inauguration of the implementation of the Nahdlatul Ulama Education Park The Ulama was carried out by the Nahdlatul Ulama Executive Board (PBNU), which was attended directly by the Chairman of PBNU KH. Abdurrahman Wahid

(Gus Dur) in 1990. At first, only 60 students were in boarding school. And who finished it, 42 people. Gradually more and more were added, along with the quality of education taught. So this cottage has at least 350 students (250 female and 100 female students). From the initial observations, several problems were found related to environmentally friendly behavior: (1) Due to the demographic conditions of this Islamic boarding school and its location on either side of the river, most students throw their rubbish into the river. Apart from that, the need for more understanding of proper waste management has led to many students throwing away their waste in the environment around the Islamic boarding school. The current condition is that the yard area around the Islamic boarding school is quite large. Still, in the future, if proper understanding is not given to this wrong behavior, it could result in the problem of piling up rubbish or even flooding caused by rivers that are getting shallower and at any time if it rains it will be possible for flooding to occur (see Figure 1). As the number of students increases, the waste generated also increases; preventive action is needed with environmentally friendly behavior or correct waste management behavior among the students of Nahdliyah.



Figure 1. The condition of the river and being in the middle of a pesantren which is experiencing siltation due to garbage

The expected assistance conditions from this community service activity will result in the following:

1. Development of reliable human resources for students who can behave environmentally friendly towards zero waste so that it has an impact on the pesantren environment in the long term
2. Formation of students who become role models for the behavior of sorting organic and inorganic waste in daily life so that they can increase economic value in the future, such as processing inorganic materials from plastic bottle waste into goods that have added value both for the students themselves or the environment within the Islamic boarding school.
3. Developing human resources for students with new ideas for managing sorted waste increases the economic value and creates a dynamic and creative Islamic boarding school environment.
4. The creation of an increase in the resource skills of the students taking care of the facilities and infrastructure for sorting organic and unorganic waste.
5. Fulfilment of independent learning 'media' for students can be realized through strengthening environmentally friendly behavior towards zero waste and increasing the creativity of students in processing inorganic waste from plastic bottle waste into products that have value additions and support the government's 3R Reuse, Reducing and Recycling program fostering the spirit of students to behave environmentally friendly.

The expected significance of this activity is that it can contribute to, support and strengthen the programs of the Indonesian government as a country that has signed the Sustainable Development Goals (SDGs) program primarily on environmental protection. This program is expected to be a medium for increasing public education on environmentally friendly behavior that is focused on managing waste made of plastic not only for the target community, namely the An Nahdliyah Kepuharjo Islamic Boarding School community, Karangploso sub-district, Malang Regency.

Based on the above phenomenon, it is necessary to conduct action research to strengthen environmentally friendly behavior through waste sorting and recycling programs to increase the value-added of healthy and zero-waste Islamic boarding schools as the moral responsibility of higher education institutions in the context of community service and improvement of Islamic boarding schools.

Method

To change the condition of An Nahdliyah students socially, economically and environmentally, the PAR (Participatory Action Research) method will be used. This method is carried out to understand the santri community towards (1) the potentials possessed in the pesantren environment, such as utilizing waste made from plastic, such as drink bottles, into products that are useful and have added value, (2) the wishes of the santri community to overcome their weaknesses and weaknesses, especially related to environmentally friendly behavior and their daily lives.

1. *Planning*. This planning was carried out after paying attention to the real conditions at the An Nahdliyah Islamic Boarding School, Kepuharjo Village, Karangploso Regency, Malang Regency, using a SWOT analysis where at this stage it was planned how to change students' environmentally friendly behavior in sorting organic and an organic waste and utilizing existing plastic waste.
2. *Action*. After the planning process is carried out, implementing the plan that has been made is assisted and facilitated by the researcher. The action that will be carried out is in the form of training to strengthen students' environmentally friendly behavior by recycling plastic waste into used plastic bottle crafts into products that have added value and increasing the creativity and mindset of students so they can explore new potentials and opportunities that can be used to develop Islamic boarding schools to be more beautiful and healthy.
3. *Observe*. After the planning process is carried out, implement the plans made with the assistance and facilitation of researchers. The action that will be taken is in the form of assisting the soft skills of the students' resources to have a sense of belonging and concern for environmental sustainability, especially in Islamic boarding schools to try to behave towards zero waste in their daily behavior.
4. *Reflection (reflect)*. The efforts made in solving the problems are reflected and evaluated, both the shortcomings, weaknesses, and the success of strategies and methods in solving the student's problems.

The strategy used in conducting this action research is to use a method that can be described as follows:

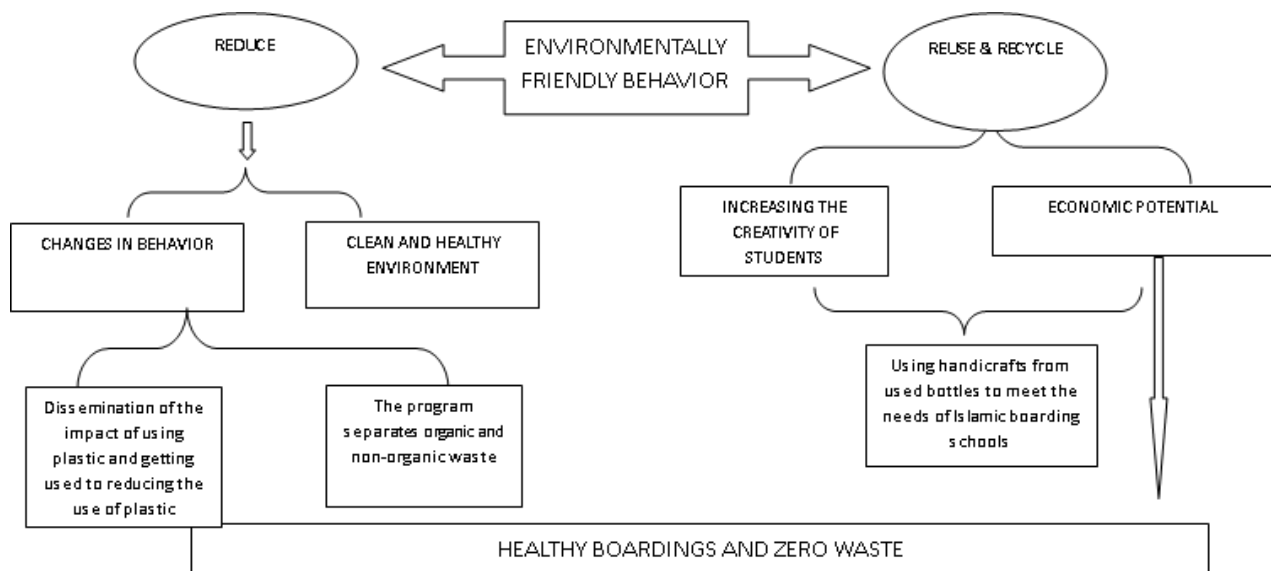


Figure 2. Problem Solving Framework

Result

FGD and Program Outreach

After the limited FGD was agreed upon with the leaders of the An-Nahdliyah Islamic Boarding School, Bu Nyai Muslihah and Gus Nahdlir Khoir S.Pd, the program was socialized to all students. Based on the official PPAI Annahdliyah web data, the total number of students is 1911. With details of 501 MTs Nahdlatul Ulama students, 250 MA Nahdlatul Ulama students, and 259 PTKI Annahdliyah. From the program priorities set in the socialization of previous activities, it was decided to recruit students who have a passion for volunteers and have their own will to participate in the upcoming workshop activities. At this stage of socialization, open registration for students. Those who have registered are given a pro-environmental behavioral pre-test to see how far their understanding is towards environmentally friendly behavior and waste management in Islamic boarding schools, especially inorganic waste management. From the registration process, it was found that 38 female students from the OSPA Management, with their awareness, would attend waste management workshops and inorganic waste recycling training and were willing to follow the strengthening stage process until it was completed.

Workshop or training on sorting organic and inorganic waste

In this activity, a waste management workshop was held to sort organic and inorganic waste. This workshop was carried out based on the results of the initial socialization and FGD with caregivers and administrators of OSPA (An-Nahdliyah Santri Management Organization), who agreed to request a waste management workshop with the theme "Strengthening Environmentally Friendly Behavior through Waste Sorting and Recycling Programs to Increase Value Added Healthy Islamic Boarding Schools and Zero Waste at the An-Nahdliyah Islamic Boarding School Kepuharjo Karangploso Malang Regency. This activity begins with a pretest. This pretest was delivered to workshop participants who had registered previously. This was done considering the need for volunteers with their own will to strengthen environmentally friendly behavior in managing their waste. The questions in the pretest are in the form of a questionnaire consisting of 2 main points: 1. Santri's Environmental Awareness (Organic and inorganic waste management behavior), 2. Santri's Environmental Knowledge (Knowledge related to organic waste management).

The first question posed to the students was: Why do you not sort waste at the Islamic boarding school into 2 (easily decomposed and not easily decomposed)? From the data processing recap of respondents' answers, around 61% or 23 respondents answered that they did not have a place. 18% of seven respondents answered that there was no reason they had sorted their waste. Then 16%, or six respondents, answered that

there was no time, and 5% or two respondents, answered that they were lazy. Summary of answers to the first question as shown in the following graph:

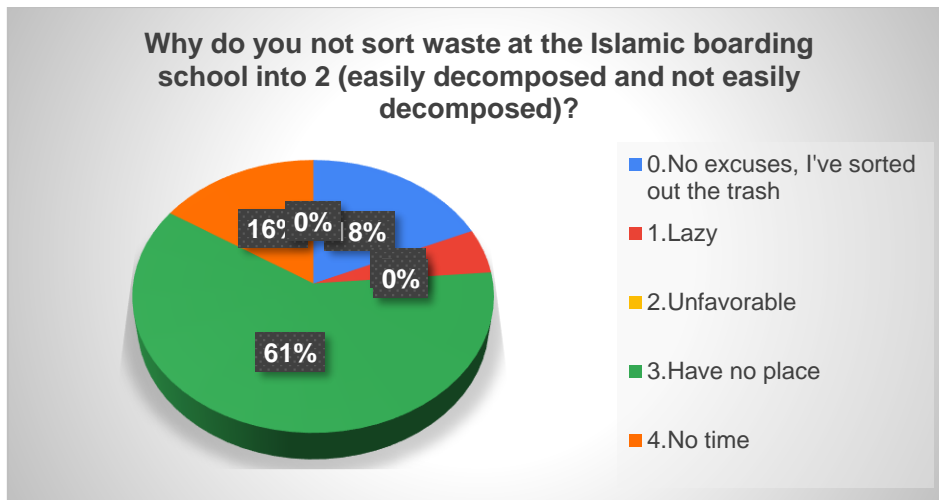


Figure 3. First question frequency distribution diagram

The second question is How do you manage biodegradable waste or kitchen (food) waste? From the data processing recap, 87% or 33 respondents answered that they were accommodated in a shelter and transported by officers. Then 11% or four respondents answered that it was reused (as fertilizer or given as animal feed). 3% or one respondent answered that it was burnt. Summary of answers to the second question as shown in the following graph:

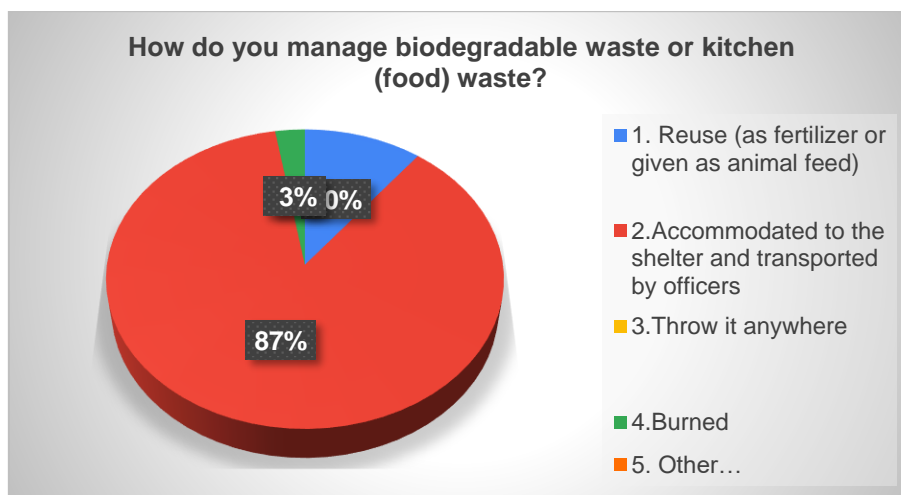


Figure 4. Second question frequency distribution diagram

The third question is What is your reason for managing waste by throwing it away or burning it? 66% or 25 respondents answered that they do not manage waste by throwing it indiscriminately/burning it. 21% of 8 respondents said they needed to learn

how to manage waste. 5% or two respondents answered that the temporary shelter was too far away and that the waste transportation took too long, so the generated had accumulated. 3% of respondents answered that this method is the fastest and easiest. Summary of answers to the third question as shown in the following graphic:

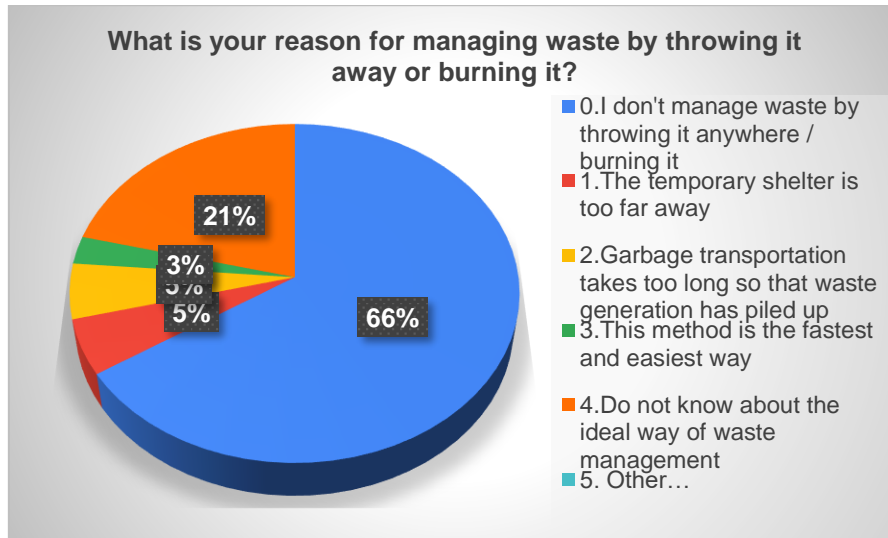


Figure 5. Third question frequency distribution diagram

The fourth question is whether waste processing occurs in the Islamic boarding school environment. What is your main concern? 95% of 36 respondents answered safety and comfort (no smell, no noise, no danger to society, and no health impact). 3% or one respondent answered about the impact on the surrounding environment and reciprocal benefits (material/non-material). Summary of answers to the fourth question as shown in the following graphic:

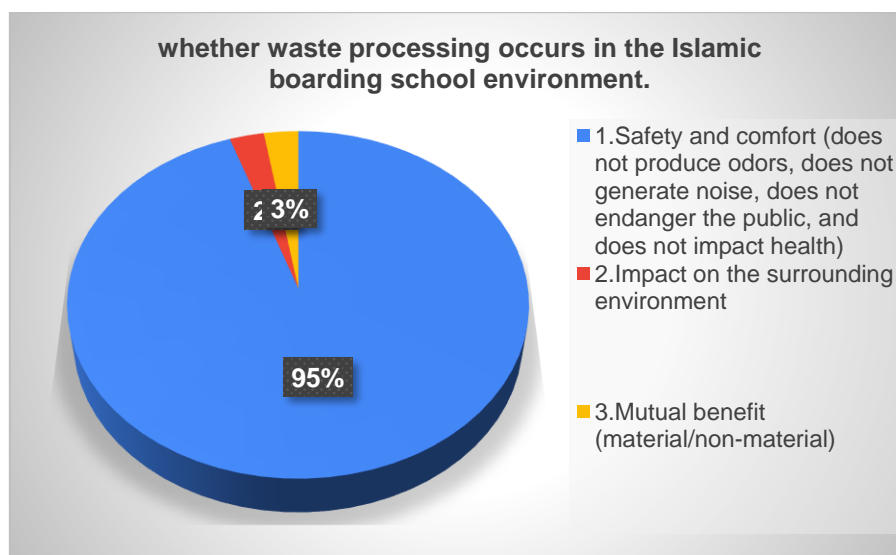


Figure 6. Fourth question frequency distribution diagram

The fifth question is if you are asked to play a role in waste management in a

boarding school environment. What is the biggest motivation that drives your willingness to participate in waste management in your environment? 97% or 37 respondents answered Concern for the environment and health, and only 3% or one respondent answered economic benefits. Summary of answers to the fifth question as shown in the following graphic:

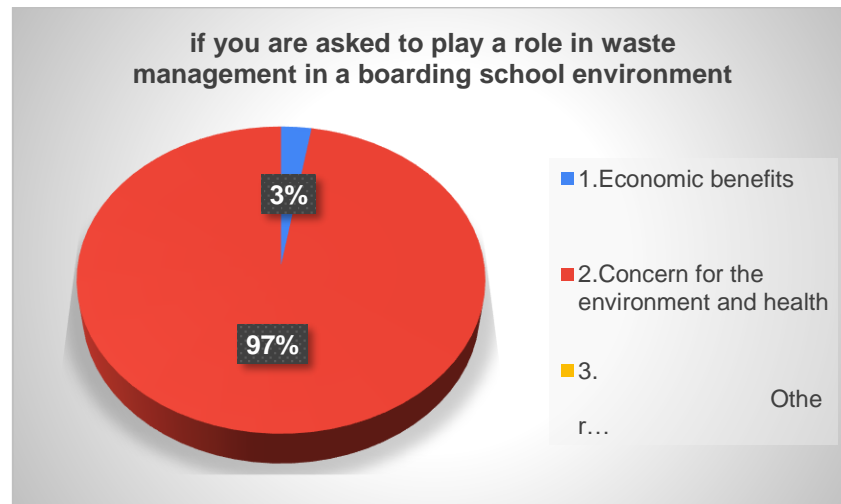


Figure 7. Fifth question frequency distribution diagram

Pretest and posttest

To find out and be able to measure changes in environmentally friendly behavior, the students also added a questionnaire related to Santri's Environmental Awareness (Organic and Inorganic Waste Management Behavior) as well as a questionnaire related to Santri's Environmental Knowledge (Knowledge related to organic waste management).

Table 1 explains the descriptive statistics of the students before attending the waste management workshop. The mean Santri's Environmental Awareness (Organic and Inorganic Waste Management Behavior) before attending the workshop was 276.1053. While Santri's Environmental Awareness after attending the workshop was 323,4737. While the Mean Santri's Environmental Knowledge (Knowledge related to organic waste management) before attending the workshop was 338.1842, the Mean Santri's Environmental Knowledge after attending the workshop was 367.2895

Tabel. 1. Paired Samples Deskriptive Statistics before and after the Workshop

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	EA	276.1053	38	34.85010	5.65343
	EA1	323.4737	38	22.36278	3.62772

Pair 2	EK	338.1842	38	31.99481	5.19024
	EK1	367.2895	38	28.01246	4.54422

Table 2 describes the results of the different environmental awareness tests of the students before attending the workshop (EA) and after attending the workshop (EA1). The results of the analysis show that there are differences in the environmental awareness of the students, with a significance value of 0.000. Likewise, from the results of the different tests on the environmental knowledge of the students before attending the workshop (EK) and the environmental knowledge of the students after attending the workshop (EK1), there is a difference with a significance value of 0.000.

Students' environmental awareness and knowledge changed after a waste management training workshop. From the students' responses, they said that after attending the workshop, they knew how to manage waste properly and correctly. In addition, they become aware that they have an important role in saving the earth from environmental degradation for future generations.

Tabel. 2 Paired Samples Test

		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
					Lower	Upper			
Pair 1	EA - EA1	-47.368	30.684	4.978	-57.454	-37.283	-9.516	37	.000
Pair 2	EK - EK1	-29.105	11.977	1.943	-33.042	-25.169	-14.980	37	.000

Training on Inorganic Waste Management Through Making Crafts from Plastic Bottles

After the waste management workshop activities were carried out, several potentials were found that could be carried out for students, especially in strengthening the creativity of students to recycle inorganic waste, specifically plastic bottles, into crafts that have economic value. In this activity, students were divided into several groups to make crafts from plastic bottle waste. The material for the pencil case the material is: a 600ml mineral water bottle, Kur rope, pearl, and glue gun. This decoration is made of: 5 bottles of used glass tea, Kur rope, glue gun, and wool yarn.

The students were divided into several groups. There are about 15 female santri groups formed. Then they get the equipment packages needed to do the craft, such as a

glue gun, glue gun, cutter, scissors, rope and pearls for decoration. As in the following photo:



Figure 8. The Process of Making Handicrafts from Plastic Bottles

From making the crafts, the students were given the freedom to be creative according to the imagination of each team member. The process of making this craft obtained as in the following picture:



Figure 9. Crafts from plastic bottles

FGD and monitoring evaluation of the results of assistance and strengthening of environmentally friendly waste segregation behavior.

Based on the pre-test results regarding the availability of 2 in-one bin that can be used to separate organic waste and inorganic waste, as a form of support for facilities and infrastructure to support waste sorting behavior, a 3-in-one bin is provided to separate organic waste from inorganic waste. Most of the students responses from the pre-test were willing to become volunteers to form environmentally friendly behavior in Islamic boarding schools so that, in the long run, this zero-waste lifestyle can be realized.



Figure 10. Submission of 3 in 1 Trash Can

Discussion

Environmentally friendly behavior is an action individuals take to minimize negative impacts on the environment². From the findings of the large amount of plastic waste that threatens the condition of terrestrial and marine ecosystems, the use of plastic and food waste should be given adequate attention in the future, with a focus on avoiding use/reuse behavior, reducing use/reduce the behavior, and recycling/recycle plastic as well as food saving behavior and reducing waste³. Drivers and obstacles to reducing waste were divided into societal, individual, and behavioral issues. Variables can alter the amount of trash produced. From these, efforts to convert to anti-wastage behavior are categorized into four categories: raising awareness of the problem, retailers' engagement, macroenvironmental change, and developing anti-wastage social norms⁴.

The widely accepted concept of sustainability is 3R (Reuse, Recycle & Reduce). The 3R concept is considered the most appropriate method for solving waste or waste faced by various countries. The 3R or Reuse, Reduce, and Recycle method is one of the best ways to treat and process various types of plastic waste. The application of this system is also very suitable for handling various types of plastic waste, from safe to toxic.

Reuse means to use again. This stage invites to reuse of products that have been

² N, Solekah., T, Handriana., & I, Usman. I. "Millennials' deals with plastic: the effect of natural environmental orientation, environmental knowledge, and environmental concern on willingness to reduce plastic waste". *Journal of Consumer Sciences*, 7 no 2 (2022):115-133. doi: <https://doi.org/10.29244/jcs.7.2.115-133>

³ H, Si., J. Si., D, Tang., S, Wen., W, Miao., & K, Duan. "Application of the Theory of Planned Behavior in Environmental Science: A Comprehensive Bibliometric Analysis. *International Journal of Environmental Research and Public Health*, 16 no 15 (2019): 2788. <https://doi.org/10.3390/ijerph16152788>

⁴ I, Stangherlin., M, Barcellos. "'Drivers and barriers to food waste reduction", *British Food Journal*, Vol. 120 No. 10 (2018): 2364-2387 <https://doi.org/10.1108/BFJ-12-2017-0726>; Gertrude G Zeinstra, Sandra van der Haar, and Geertje van Bergen, "Drivers, Barriers and Interventions for Food Waste Behaviour Change: A Food System Approach" (2020); Saman Attiq et al., "Drivers of Food Waste Reduction Behaviour in the Household Context," *Food Quality and Preference* (2021).

used. By reusing them, the waste arising from these products can be reduced⁵. One option or step is using drinking water bottles as small pots. Alternatively, use cookies as a food storage box at home. Another way of recycling is to take a soap or shampoo bottle and fill it by buying refills. Of course, by reusing it, you can reduce the spread of purchased plastic waste and reuse it in the old way.

Reducing means avoiding waste. This step aims to reduce the use of products that can later become waste. This step can be carried out and applied to waste or single-use products such as plastic bags which are prohibited in various places. This step is also the priority because when disposable waste is reduced, there is no need to proceed to the next step of reusing and recycling. A new problem will also be using difficult goods to recycle, so, unsurprisingly, reduction is highly recommended as the right first step.

Recycle, which means recycling. This step is the most frequently carried out, considering that much waste is already scattered in various locations such as the sea, land and air. Used or recycled products are more flexible, often even having economic value. Utilizing unused waste so that it has value without polluting the environment can drastically reduce the spread of plastic waste. Recycled products have a unique design and are very different from new types of products. Some parties even make accessories from recycled equipment that can be useful for boosting the local environmental economy.

Recycling Process or Stages The following are the stages of recycling activities that can be carried out: 1) Collecting, namely looking for items that have been disposed of, such as paper, bottles of mineral water, boxes of milk, cans and others. 2) sorting, namely grouping the waste collected by types, such as glass, paper, and plastic. 3) Reusing; After sorting, look for items that can still be used directly again. Clean it before use. 4) Send; Send your sorted waste to a recycling bin or wait for itinerant collectors who will be happy to buy your items. 5) Do Your Recycling; If you have the time and skills, why not do the recycling yourself? Creativity can transform various waste collected and sorted into useful new items. The waste recycling process is shown in Figure 10. following:

⁵ R. Maharnani., "Apa Itu Reduce, Reuse, Recycle? Ini Pengertian dan Contohnya" <https://kids.grid.id/read/472378574/apa-itu-reduce-reuse-recycle-ini-pengertian-dan-contohnya?page=all> (2020)

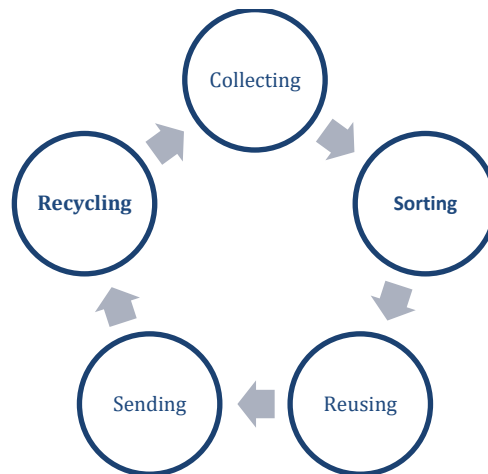


Figure 10. Waste Recycling Process

Theory Derived from Mentoring

This planning was carried out after paying attention to the real conditions at the An-Nahdliyah Islamic Boarding School, Kepuharjo Village, Karangploso, Malang Regency using a SWOT analysis where at this stage it was planned how to change students' environmentally friendly behavior in sorting organic and inorganic waste and utilizing existing plastic waste. Changing environmentally friendly behavior begins with raising awareness of the consequences if you do not behave in an environmentally friendly manner in the future. It is strengthened by knowledge or knowledge of proper waste management. A person's commitment (awareness, attitude, motivation, and willingness to act) is necessary for effective pro-environmental behavior⁶. Positive attitudes about taking pro-environmental action are positively influenced by awareness, knowledge, and risk perception about environmental challenges like climate change⁷. According to⁸ a willingness to engage in pro-environmental conduct is influenced by beliefs environmental knowledge and awareness.

After the planning process is carried out, implementing the plan that has been

⁶ E. L. Bohensky, D. G. C. Kirono, J. R. A. Butler, W. Rochester, T. Handayani, & Y. Yanuarti, "Climate knowledge cultures: Stakeholder perspectives on change and adaptation in Nusa Tenggara Barat, Indonesia." *Climate Risk Management*, Vol 12. (2016):17-31. <https://doi.org/10.1016/j.crm.2015.11.004>

⁷ M. Masud, R. Akhtar, R. Afroz, A. Al-Amin, & F. Kari, 2015. "Pro-environmental behavior and public understanding of climate change," *Mitigation and Adaptation Strategies for Global Change*, Springer, vol. 20 no 4 (2015): 591-600 DOI: 10.1007/s11027-013-9509-4; Harriet Bulkeley, "Common Knowledge? Public Understanding of Climate Change in Newcastle, Australia," *Public Understanding of Science* (2000); Shyang-Chyuan Fang, "The Pro-Environmental Behavior Patterns of College Students Adapting to Climate Change," *Journal of Baltic Science Education* (2021); Angelo Panno et al., "Mindfulness, Pro-Environmental Behavior, and Belief in Climate Change: The Mediating Role of Social Dominance," *Environment and Behavior* (2017).

⁸ V. Srivasta, R. R. Thakur, "Do Consumers' Beliefs, Knowledge, And Awareness Play An Important Role In Willingness To Adopt Pro-Environmental Behaviour?". *Journal of Emerging Technologies and Business Management*, Vol 10 no 1 (2021): 9. <https://jetbm.imtnagpur.ac.in/journal/vol10/iss1/2>

made is assisted and facilitated by the researcher. After the planning process is carried out, implementing the plan that has been made is assisted and facilitated by the researcher. The action that will be carried out is in the form of training to strengthen students' environmentally friendly behavior by recycling plastic waste into used plastic bottle crafts into products that have added value and increasing the creativity and mindset of students so they can explore new potentials and opportunities that can be used to develop Islamic boarding schools to become more beautiful and healthy.

The results of the strengthening training or workshop show that changes in the environmentally friendly behavior of PPAI An-Nahdliyah students are reflected in the significant difference between the pre-test and post-test before the waste processing workshop and after the workshop. Apart from that, students' creativity is formed to recycle plastic bottle waste into valuable products that can be used or even sold.

After the planning process is carried out, implementing the plan that has been made is assisted and facilitated by the researcher. After the planning process is carried out, implementing the plan that has been made is assisted and facilitated by the researcher. The action that will be carried out is in the form of training to strengthen students' environmentally friendly behavior by recycling plastic waste into used plastic bottle crafts into products that have added value and increasing the creativity and mindset of students so they can explore new potentials and opportunities that can be used to develop Islamic boarding schools to become more beautiful and healthier.

Observations were made to pay attention to and analyze the successes, weaknesses, and shortcomings of the strategies and methods used in solving waste management problems at PPAI An-Nahdliyah. After the planning process is carried out, implementing the plan that has been made is assisted and facilitated by the researcher. The action that will be taken is in the form of assisting the soft skills of the students' resources to have a sense of belonging and concern for environmental sustainability, especially in Islamic boarding schools to try to behave towards zero waste in their daily behavior. Starting with providing trash bins that can sort easily decomposed waste and bins for non-biodegradable waste and placed in each student room rayon. Apart from that, in collaboration with the management of Islamic boarding schools or OSPAs, especially cleaning staff, to play an active role as volunteers in the program to maintain the sustainability of students' environmentally friendly behavior, and there will be punishment if they violate the Islamic boarding school's hygiene regulations.

The efforts made in solving the problems are reflected and evaluated, both the shortcomings, weaknesses, and the success of strategies and methods in solving the student's problems. From the results of reflection and evaluation, the students were very happy with the waste management workshop. They feel they have gained new knowledge on managing waste properly and correctly. What is no less encouraging is that the students found another side or opened their mindset to care more about the

environment. From the plastic bottle recycling training activities, they feel they have a place to express their creativity according to their wishes to produce products made from plastic bottle waste into something that has material and non-material value. The main thing is to open your horizons to continue creatively utilizing the equipment provided during the training. So, it has an impact on their behavior. We identified factors influencing consumers' intention to recycle plastic waste. The results show that SN, awareness of consequences and convenience are the main predictors of consumer behavior toward recycling plastic waste⁹

From this activity, there was a change in environmentally friendly behavior in the waste management of students. This change is supported by increased environmental awareness and environmental knowledge of students. This supports several research results that show a positive influence between the consequences of awareness and the desire to behave environmentally friendly^{10&11}. The results of the inorganic waste recycling training showed changes in the student's behavior. Research also explains that awareness of environmental consequences indirectly influences interest in returning inorganic waste¹².

⁹ F. Khan, W. Ahmed, A. Najmi, "Understanding consumers behavior intentions towards dealing with the plastic waste: perspective of a developing country". *Resource. Conservation. Recycling*. 142 (2019) 49–58. <https://doi.org/10.1016/j.resconrec.2018.11.020>; Sabeen Hussain Bhatti et al., "The Determinants of Food Waste Behavior in Young Consumers in a Developing Country," *British Food Journal* (2019).

¹⁰ Z. Wang, D. Guo, X. Wang, "Determinants of residents' e-waste recycling behaviour intentions: Evidence from China," *Journal of Cleaner Production, Issues 137* (2016): 850-860; Hong Thi Thu Nguyen et al., "Determinants of Residents' E-Waste Recycling Behavioral Intention: A Case Study From Vietnam," *Sustainability* (2018); Xiaoping Dai et al., "Comparison Between Students and Residents on Determinants of Willingness to Separate Waste and Waste Separation Behaviour in Zhengzhou, China," *Waste Management & Research the Journal for a Sustainable Circular Economy* (2017); Muhammed Sajid, Zakkariya K A., and Harry Joy, "Determinants of E-Waste Recycling Intention in India: The Influence of Environmental Concern, Attitude and Economic Incentives," *Colombo Business Journal International Journal of Theory and Practice* (2022).

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Conclusion

Several activities were carried out starting from the planning stage, the program socialization stage, which was strengthened by a pre-test to measure environmental awareness and environmental knowledge of the students at the beginning, the implementation stage of the waste management workshop through segregation of organic waste and inorganic waste, the post-test stage as a form of feedback and mapping of differences before and after participating in workshop activities, followed by training on recycling the inorganic waste which focused on plastic bottle waste into products that have value to the stage of mentoring for environmentally friendly behavior change by completing 3 in one trash cans as well as post-activity assistance in the form of maintaining the sustainability of students' environmentally friendly behavior through the Islamic boarding school administrator's clean sie program or OSPA is all carried out independently by the students. Therefore it is the initial capital for the sustainability and sustainability of Islamic boarding schools' environmentally friendly behavior.

The conditions expected from forming students' creativity in adding creative new ideas in recycling plastic waste to increase economic value and create a healthy and clean boarding school environment are realized. They can be seen in the various types of inorganic waste recycling products such as flower bouquets, pencil holders, wall decorations, etc. Recognize and form differences in students' environmentally friendly behavior through pro-environmental behavior towards zero waste in sorting and recycling plastic waste before and after attending training.

Recommendations

The need for continuous improvement of students' resources that can consistently pay attention to the sustainability and sustainability of students' environmentally friendly behavior in the form of cooperation with the management of the Islamic boarding school, especially in terms of cleanliness and health aspects

After strengthening students' creativity in recycling inorganic waste, in the future, it is necessary to increase the skills of students' resources to manage organic waste into valuable values such as fertilizer or soap made from organic waste.

The need for support and supervision between individual students, administrators and caretakers of the Islamic boarding school, bearing in mind that there is still a need for unification of a shared vision to maintain wider sustainability of the conditions that have been achieved so that the zero waste movement which individually can be properly accommodated within the pesantren environment

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