

Assessment on the Solid Waste Management Practices Among Personnel and Staff of Miputak East Central School

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Abstract — This study aimed to investigate the effective practice among the different solid waste management practices of the personnel and staff of Miputak Elementary School.

The respondents of the study were forty-two (42) composed of one (1) principal, thirty-eight (38) Teaching Personnel, and three (3) non-teaching personnel.

A descriptive-survey method of research was employed through the use of questionnaire as the data gathering tool. Frequency count, weighted mean, standard deviation, Mann-Whitney U Test, Kruskal-Wallis H Test, and the Spearman Rank-Order Correlation Coefficient were the statistical tools used to answer the problems set forth in the study.

The findings revealed that most of the respondents favored giving the utmost importance to recycling, which implies that recycling when practiced among the personnel and staff of an educational institution has to be prioritized, paramountly practiced, and taught. Furthermore, the solid waste management at Miputak Elementary School had been effectively practiced and established.

Keywords — *Solid Waste Management, Recycling, Management Practices, Practices, 4'Rs*

I. Introduction

Ecological solid waste management is a major problem in the country and the world, leading to economic and environmental sufferings. Mismanagement of waste can cause harmful effects on the environment and human health, such as diarrhea, dengue, chronic disease and even suffocation. It is important to segregate waste at the initial stages when it is generated, rather than going for a later option which is inconvenient and expensive (Ferronato and Torretta 2019, 1060-1071).

However, solid waste management is an adaptive challenge due to lack of financial resources and technology. Poor communities should not rely on waste disposal and treatment to minimize the increase in garbage generation. Instead, people must change their behavior in consumption and production of materials. (Paz, Domingo and Roxas 2020).

Further, solid waste management policies are essential for addressing the global issue of global sustainability, as they require the active involvement of community and waste management stakeholders to ensure successful results. Solid waste management policies should include

segregation, collection, transport, materials recovery, treatment, and disposal, and are essential for institutions and governments to put all of these elements in place. (Camarillo and Bellotindos 2021, 30-45).

Solid waste is all discarded household, commercial, institutional and industrial waste, street sweepings, construction debris, agriculture waste, and other non-hazardous/non-toxic solid waste. Solid waste management is the control of generation, storage, collection, transfer and transport, processing, and disposal of solid wastes in a manner that is in accord with the best principles of public health, economics, engineering, conservation, aesthetics, and other environmental considerations. However, solid waste management is often ignored. (Molina and Catan 2021).

Solid waste management is the collection, transport, disposal and treatment of waste materials produced through human activities. It is important to recognize the effects of improper management and practice waste characterization and segregation at source, proper collection and transfer, recycling, and composting as mandated by the law. Proper implementation should be given equal focus and attention to prevent garbage crisis (Paghacian, 2017).

Educational institutions are an agent of change and through existing laws, solid waste management concepts are being integrated in science education. The Philippine National Government and DepEd should conduct a continuing education and information campaign on solid waste management practices and strengthen the integration of environmental concerns in school curricula, with particular emphasis on waste management principles like segregation at source, reduction, recycling, reuse and composting. This will promote environmental awareness and action among the citizenry (Molina and Catan 2021).

Public schools are an integral part of the policy, but studies revealed poorly managed solid wastes in the locality. The Department of Education (DepEd) is considered significant in policy implementation, as it accommodates the bulk of younger population and must be given proper training on solid waste management. Schools with better solid waste management practice showed positive response by providing solid waste recycling options (Galarpe and Heyasa 2017, 110-115).

To implement RA 9512, also known as "An Act To Promote Environmental Education and for Other Purposes," and RA 9003, also known as "The Ecological Solid Waste Management Act of 2000," the Department of Education issued DepEd Order No. 05, S. 2014, also known as "Implementing Guidelines on the Integration of Gulayan sa Paaralan, Solid Waste Management, and Tree Planting Under the National Greening Program (NGP)". City Ordinance 123 as Amended, also known as "Garbage Collection and Environmental Health Protection and Sanitation Code of 1998 for the City of Dipolog," supplemented the same in our area. They set the framework and attitude for how educational institutions, including Miputak Primary School, and their staff members respond to issues with solid waste management.

Nonetheless, each teacher and member of staff at the aforementioned public school was given the choice to adopt whatever solid waste management strategy they felt was most appropriate

and practical for their particular situation. This circumstance prompted the researcher to look into the most efficient solid waste management techniques. Given these factors, the researcher looked into the most effective solid waste management practices used by the staff and employees of Miputak Elementary School in Miputak, Dipolog City, during the academic year 2022–2023. The goal of this inquiry was to develop solid waste management procedures that may be adopted and used by educational institutions.

Review Literature and Studies

Solid Waste Management (SWM) is the discipline associated with control of generation, storage, collection, transport or transfer, processing, and disposal of solid waste materials in a way that best addresses public health, conservation, economics, aesthetic, engineering, and other environmental considerations. Waste can be categorized based on material, such as plastic, paper, glass, metal, and organic waste, and hazard potential, such as radioactive, flammable, infectious, toxic, or non-toxic wastes. The school defined solid waste as thrown away food waste, plastic, paper or other materials used for packaging, as well as waste made by school operations like papers, boxes, and other used visual materials. This is particularly true in the case of public elementary schools in the Philippines, where the population of pupils is high and foods for the pupils are bought or brought from homes and not supplied. This contributes to a high volume of trash and other waste materials, creating serious problems for the schools (Nabor and Dela Cruz 2022, 1-14).

Schools in the Philippines have been struggling to implement effective waste management and to have an effective and efficient program. It is a challenge to get pupils, teaching and non-teaching personnel actively involved in the program. Wastes in the Philippine cities and municipalities are mostly composed of 52% organics, 28% recyclables, and 18% residuals (i.e., waste that cannot be reused, recycled, or composted). Through proper segregation, 80% of the waste can be safely returned to nature or industry without resorting to landfills and incineration. This practice of waste segregation is crucial as the issue of solid waste management is fast becoming a great concern in many schools. Rapid urbanization and industrialization have greatly changed the patterns of consumption of people, and the kinds of waste generated by pupils today have become more complex. The government has created laws to regulate solid waste management (Nabor and Dela Cruz 2022, 1-14).

The activities undertaken by schools to implement a solid waste management program, the extent of implementation along waste segregation, collection, re-use, reduce, recycle and composting, and the problems met during implementation. The study also reveals shortcomings in connection with the program such as lack of facility to process recyclable materials, attitudes and awareness of pupils when it comes to solid waste management, lack of trainings on recycling and composting of waste, inadequate and insufficient waste collection equipment, and lack of resources or fund in maintaining the program. The project Waste Management Practices: A key to sustainable Solid Waste Management Program will propose to address these issues (Derilo 2021).

Waste management has become a major issue in the 21st century, as it poses a threat to the health of individuals and the environment. It is now a basic human right, as it involves ensuring proper sanitation, solid waste management, provision of potable water, shelter, food, energy, transport and communications, all of which are beneficial to society and the economy. Solid waste generated is different from country to country and region to region, due to a variety of factors such as natural resource availability, lifestyle, and living standards. It is embarrassing and difficult to discuss, and is mostly contaminated with night soil. Waste generated in humid, tropical, and semitropical areas is characterized by a high concentration of plant litter, while waste generated in countries with seasonal change may contain an abundance of ash due to coal or wood used for cooking and heating (UNEP 2015).

Further, the new waste management paradigm is the reverse of the traditional waste hierarchy, focusing on preventing waste generation and treating waste as a resource. It involves reducing waste generation through re-use, recycling, composting or anaerobic digestion, recovery and waste to-energy. Waste disposal on landfills is the last resort only when waste has not been prevented, diverted or recovered in the preceding steps (UNEP 2015).

Solid waste is made up of organic and inorganic waste materials that is no longer needed and needs to be discarded due to its value loss. It can be categorized into sources such as domestic household waste, industrial waste, commercial waste, agricultural waste, building and demolishing waste, and more. Disposing improperly can lead to diseases such as cholera, diarrhea, and other illnesses (Chengula, Bahati and Mzula 2015, 643-648).

Further, waste management is the collection, transport, processing, recycling or disposal of materials produced by human activity to reduce their effect on health, the environment or aesthetics. It can involve solid, liquid, gaseous or radioactive substances, with different methods and fields of expertise for each. Waste management practices differ for developed and developing nations, for urban and rural areas, and for residential and industrial producers. Management for non-hazardous residential and institutional waste in metropolitan areas is usually the responsibility of local government authorities, while management for commercial and industrial waste is the responsibility of the generator (Chengula, Bahati and Mzula 2015, 2015, 643-648).

Waste management is the collection, transportation, reuse, and disposal of trash, as well as the oversight of these processes and maintenance of disposal locations. To reduce pollution, waste management should be concerned with the entire cycle of garbage generation, transport, storage, treatment, and recovery. Waste avoidance, internal production waste recycling, source-oriented waste quality improvement, and product reuse are all examples of waste minimization strategies. Solid waste has become a significant issue for the majority of medium- to large-sized cities in the Philippines due to the country's fast expanding population and lack of suitable disposal facilities. Poor solid waste management practices have caused major health problems, especially in highly populated areas. The biggest environmental health challenge in the Philippines remains the adverse environmental changes that could have substantial health repercussions as the nation becomes

more industrialized and its population grows. The principal focus of the national government is now the growing problem with waste management in practically all localities across the nation as a result of unchecked population growth, fast urbanization, and industrialization (Reyes and Furto 2015).

Waste management is the collection, transportation, reuse, and disposal of trash. It is concerned with reducing the amount of waste already present and the contact between human and waste or waste and the environment. To reduce pollution, waste management should focus on prevention, with recovery and disposal coming in second. Waste avoidance, internal production waste recycling, source-oriented waste quality improvement, and product reuse are all examples of waste minimization strategies (Jerrie and Tevera 2016). Also, studies have shown that school is an important avenue for providing education and disseminating information about solid waste management. Students have a high level of awareness on solid waste management, while their solid waste management practices in terms of segregation, reduce, reuse, and recycle were good. However, their practices in disposal and disposal were fair (Molina and Catan 2021)

Solid waste management is an important service that is increasing in volume and cost faster than urbanization globally. This is due to various factors such as financial, institutional and others. In the Philippines, waste problem is still prevalent despite the passage of Republic Act No. 9003 or Ecological Solid Waste Management Act of 2000. Insufficiency of funds is a major barrier to providing a better and improved system, especially in developing countries like the Philippines (Pagunsan and Shimada 2016). Also, segregating the waste is one way to reduce the garbage problem in the Philippines. Using materials that are environmentally friendly is another way to minimize and solve the garbage problems. The focus on economic growth has led to a lack of environmental management, making solid waste the most visible environmental problem in the country. A management to that can help planners make rational decisions on how to manage, recover and utilize the vast quantity of solid waste (Punongbayan, et al. 2016).

Further, the management of waste is a major environmental issue, with separate bins for biodegradable or organic waste and non-biodegradable waste. These waste materials are bagged, collected and transported to the Materials Recovery Facility, where they are sorted into styro, paper, plastic cups, spoons, forks and straws, food waste, and residual or non-recyclable waste. The increasing issue and concern of how much danger waste pose to both the human and non-human population has made its management a genuine concern. (Festijo and Yuson, 2016).

Waste disposal is a major problem in third world countries, such as the Philippines, which experienced floods due to improper waste disposal. Solid waste should be managed through a combination of activities, such as waste prevention, recycling, composting, controlled burning, or land filling. This is referred to as integrated solid waste management (Lohri, Camenzind and Zubrugg 2016). Thus, educational institutions must practice solid wastes management to generate environmental and economic benefits. Recycling and composting activities can create jobs, supply raw materials to industry, produce soil-enhancing compost, reduce landfills and combustors, and

prevent greenhouse gas emissions. Involving scavengers or waste pickers in formal recycling activities can empower them, increase their income and reputation, and improve their quality of life, health, and safety (Hayal, Worku and Fetene 2016).

Further, solid wastes management steps include storage at source, separation, on-site storage, collection, transportation, treatment, reuse, recycling, and ultimate disposal. The problems and constraints of the system are identified to find a sustainable management concept. Non-government organizations and community-based organizations are taking steps to address this issue (Ahsan et al. 2016). Also, waste management is a worldwide issue that poses a threat to the health of individuals and the environment. In some countries, waste is dumped indiscriminately, not collected by the waste management companies, and seen as a resource. To ensure proper waste management practices, it is recommended that community members should be involved in decision making and given the opportunity to manage their own waste (Essuman 2017).

The main problem in developing nations is the lack of knowledge and awareness of efficient waste management techniques. People who are uninterested in environmental issues are often underinformed and feel excluded from waste management decision-making, creating a culture of lack of accountability for pollution and waste issues. This can lead to a decrease in participating in green initiatives and a lack of concern for the environment (Mc Allister, 2015). Further, the study found that secondary schools in Westland Sub-county produce different types of waste and there were waste practices associated with how waste was managed in the respective schools. Attitude, knowledge, and practices were found to be key determinants of waste management in the schools. The researcher recommends that the school should come up with environmental topics in the curriculum, educate the public on the effects of environmental pollution, and put proper signage (Uwamwezi 2015).

The descriptive- correlational method was used to determine the level of respondents' awareness and extent of implementation of Solid Waste Management (SWM) Practices in terms of segregation, reduce, reuse, recycle, and disposal. The results revealed that respondents' awareness on SWM Practices was high and the extent of implementation was great. A significant relationship was noted between the levels of awareness and extents of implementation of SWM Practices (Lalamonan and Comighod 2020, 11-12).

The government initiative of "Tapat ko, linis ko" and "Basura ko, tapon ko" calls for every Filipino to be responsible for managing their solid wastes to prevent disaster. This survey aimed to determine the solid waste management and disaster preparedness of at-risk municipalities of Zamboanga del Norte. Results revealed that household waste makes up the largest bulk of waste, while government sites were used as open dumping areas. Regular monitoring of garbage disposal, checking of municipal dump site condition, and unclogging of canals is the common solid waste management practices and flash floods disaster preparedness. The LDRRMC team and volunteers are prepared, equipped with the necessary facilities, and readily on-call in the event natural disaster occurs (Mansanades 2019).

Further, solid waste management awareness, attitude, and practices of employees and students of a Catholic higher education institution in the Philippines. The data was collected using a self-administered survey questionnaire and analyzed using descriptive and inferential statistics. The major findings showed that respondents demonstrated a high level of awareness and attitude and high extent of practice of solid waste management. A significant difference was found when grouped according to status and religion. Awareness, attitudes, and practices were significantly related to age and educational level, except for sex which showed no correlation with attitude and practices. This paper validates how knowledge influences attitude that determines behavior in solid waste management as intervened by appropriate environmental education (Madrigal and Oracion 2018).

On the other hand, on an evaluation on how efficient the Philippines local government units (LGUs) are in implementing Republic Act No. 9003 or Ecological Solid Waste Management Act of 2000 using a two-stage approach. First, the relative efficiency of each LGU in the implementation of solid waste management is estimated using Data Envelopment Analysis (DEA). Second stage uses Tobit Regression Analysis to analyze the effect of the following explanatory variables (land area, number of barangays, poverty incidence, environmental governance and dummy variable – the ownership of disposal facility. First stage results show that the inefficiency of the LGUs in implementing the solid waste management can be attributed to mismanagement of funds and inappropriate operational scale, but second stage results suggest that all the explanatory variables evaluated have significant relation to the performance of LGUs (Pagunsan and Shimada, 2016).

II. Methodology

This section presents the discussion of the method used, research environment, respondents of the study, research instrument, validation of the instrument, scoring procedure, data gathering procedure, and statistical treatment of the data in this study.

Research Method

This study used the descriptive-survey method of research. A self-made questionnaire was used as an instrument of data collection, and data was statistically treated to achieve the primary objective of the study.

Research Environment

This study was conducted in Miputak Elementary School situated at Miputak, Dipolog City, a public (government) elementary school in Dipolog City Schools Division.

Research Respondent

The respondents in this study were the forty-two (42) personnel and staff of Miputak Elementary School. Table 1 shows the respondents' distribution.

Table 1. Respondents' Distribution

Respondents Category	Population
Principal	1
Teaching Personnel	38
Non-Teaching Personnel	3
Total	42

Research Instrument

A self-made questionnaire, which consisted of statements relative to the level of effectiveness of the solid waste management practice, was used as the primary instrument of this study. The self-made questionnaire was based on the literature and studies cited by the researcher in the previous sections.

Validating the Instrument

To determine the validity of the questionnaire, the instrument underwent a series of validations, namely face validity, construct validity, and content validity. The validation of the survey questionnaire can only be done by the experts in the field who will do the assessment and evaluation of the instrument to make sure it measures what it intends to measure, which is the level of effectiveness of the solid waste management practice at Miputak Elementary School. For reliability, the instrument was pilot tested in groups of individuals who has the same characteristics of the actual respondents. After the pilot testing, the researchers tested the reliability of their instrument, measuring its internal consistency with Cronbach's alpha. The instrument yielded a value of 0.8912, making the instrument reliable.

Ethical Issues

The researcher ensures that the study participants were not harmed in any way during the course of the investigation. The researcher requests permission from the school principal before beginning data collection. The researchers also ensure that the respondents were given privacy and protection, and that the research data had an adequate level of secrecy. The identity of the respondents was also concealed, and ultimately, after the study was completed, the instruments used to collect the data will be destroyed.

Data Collection

After receiving approval for the data collection tool, the researcher asks the school principle for authorization to interview school employees. The study's participants received the

instruments directly from the researchers after their consent to collect data was acquired. The researchers make sure that the IATF protocol for health protocol was followed throughout the data collection process. Following the survey, the researchers collated the collected data and sent it to a statistician for statistical analysis.

Scoring Procedure

The level of effectiveness on solid waste management practice among personnel and staff of Miputak Elementary School will be measure and interpreted using the Likert 4-Point Scale.

Scale	Continuum	Descriptive Equivalent
4	3.26 – 4.00	Highly Effective
3	2.51 – 3.25	Moderately Effective
2	1.76 – 2.50	Slightly Effective
1	1.00 – 1.75	Not Effective

Statistical Treatment of Data

The tallied and tabulated data was statistically treated using weighted mean, standard deviation and ANOVA (Analysis of Variance).

III. Results and Discussion

This section presents the discussion on the collected data, aiming to answer the statement of the problem of the present investigation. The data collected was statistically treated and arranged in tabular form in sequence with the statement of the problem.

Table 2. Level of Effectiveness of the Solid Waste Management Practices of the Personnel and Staff of Miputak Elementary School as to Reduce

Descriptors	AWV	SD	Verbal Description
I borrow, share and/or rent things that are need occasionally in order to reduce.	3.24	0.656	Moderately Effective
I buy only what I need so that I will not end throwing away extra food.	3.83	0.470	Highly Effective
I used reusable canister so that I can't buy wrapped/packed food.	3.79	0.470	Highly Effective
I used reusable water bottles for my water canister.	3.48	0.890	Highly Effective
I am cautious and responsible to every waste I produced.	3.38	0.825	Highly Effective
Mean	3.54	0.351	Highly Effective

Table 2 presents the level of effectiveness of the solid waste management practices of the personnel and staff of Miputak Elementary School as to reduce. The table revealed that the majority of the respondents viewed buying only the things needed so that they would not end up throwing away extra food as highly effective, with an average weighted value of 3.83, as compared

to borrowing, sharing, and/or renting things that are needed occasionally in order to reduce, which were viewed as moderately effective, with an average weighted value of 3.24. Also, it can be gleaned that applying the standard deviation to the data yielded a value of less than 3.0, which can be construed as meaning that the data subjects were relatively the same. Further, the mean on this aspect is 3.54, which is verbally described as highly effective. The findings stressed that most of the respondents favored buying only the things needed will not end up throwing away extra food which implies that reduce when practiced among the personnel and staff of an educational institution had to prioritized things that is needed in order to avoid generation of waste.

In support, Molina and Catan (2021) point out the fact that solid waste is a serious environmental problem in the modern world. Schools are one source of waste that must be dealt with. Reducing the amount of waste disposed of as trash through source reduction can not only improve environmental outcomes but also teach students about sustainability and save schools money.

Table 3. Level of Effectiveness of the Solid Waste Management Practices of the Personnel and Staff of Miputak Elementary School as to Reuse

Descriptors	AWV	SD	Verbal Description
I reuse my old materials than buying a new one	3.48	0.594	Highly Effective
I keep those unfilled papers and used it as scratch.	3.52	0.505	Highly Effective
I reuse grocery bags.	3.26	0.885	Highly Effective
I reuse washable food containers.	3.38	0.539	Highly Effective
I reuse scrap paper into reusable papers.	3.60	0.734	Highly Effective
Mean	3.45	0.450	Highly Effective

Table 3 shows the level of effectiveness of the solid waste management practices of the personnel and staff of Miputak Elementary School as to reuse. The table pointed out that most of the respondents favored the reusing of scrap paper into reusable paper, which had an average weighted value of 3.60 and was verbally described as highly effective, as compared to reusing grocery bags, which had an average weighted value of 3.26 and was verbally interpreted as highly effective. Also, it can be gleaned that applying the standard deviation to the data yielded a value of less than 3.0, which can be construed as meaning that the data subjects were relatively the same. Further, the mean on this aspect is 3.54, which can be verbally described as highly effective. The findings stressed that most of the respondents favored reusing of scrap paper into reusable paper which implies that reuse when practiced among the personnel and staff of an educational institution had to reused things that were still reusable.

In support, Tsai, Shen, and Tsai (2021) stress the fact that reuse is the practice of using a material over and over again in its current form. The essence of reuse is that it preserves some or all of the energy and materials that went into making an item. Society has long embraced the practice of reuse by finding alternate uses for an item rather than disposing of or recycling it.

Table 4. Level of Effectiveness of the Solid Waste Management Practices of the Personnel and Staff of Miputak Elementary School as to Recycle

Descriptors	AWV	SD	Verbal Description
I convert or redesign waste materials into a new product.	3.26	0.798	Highly Effective
I make decors out of plastic wrappers and other colorful waste materials	3.17	0.908	Moderately Effective
I give utmost importance of recycling.	3.60	0.627	Highly Effective
I initiate generating-income out of waste materials.	2.71	0.835	Moderately Effective
I recycle waste that needs to be recycle.	3.26	0.627	Highly Effective
Mean	3.20	0.574	Moderately Effective

Table 4 portrayed level of effectiveness of the solid waste management practices of the personnel and staff of Miputak Elementary School as to recycle. The table pointed out that most of the respondents viewed giving the utmost importance to recycling as having an average weighted value of 3.60, verbally described as highly effective, as compared to those respondents who favored initiating the generation of income from waste materials, which had an average weighted value of 2.71, verbally interpreted as moderately effective. Also, it can be gleaned that applying the standard deviation to the data yielded a value of less than 3.0, which can be construed as meaning that the data subjects were relatively the same. Further, the mean on this aspect is 3.20, which can be verbally described as moderately effective. The findings stressed that most of the respondents favored giving the utmost importance to recycling, which implies that recycling when practiced among the personnel and staff of an educational institution has to be prioritized, paramountly practiced, and taught.

In support, Mkhonto and Mnguni (2021) averred that participating in recycling is practical work that may not only enhance learners' perceptions of, attitudes towards, and understanding of recycling but also have an impact on the waste management practices of the institution.

Table 5. Level of Effectiveness of the Solid Waste Management Practices of the Personnel and Staff of Miputak Elementary School as to Rot/Disposal

Descriptors	AWV	SD	Verbal Description
I throw and left my garbage anywhere.	1.24	0.790	Not Effective
I burn waste materials.	1.62	0.825	Not Effective
I throw waste materials in common open dumps.	2.05	1.058	Slightly Effective
I dispose biodegradable wastes into a compost pit.	3.19	0.634	Moderately Effective
I dispose non-biodegradable wastes in the incinerator.	2.62	0.936	Moderately Effective
Mean	2.14	0.518	Slightly Effective

Table 4 revealed the level of effectiveness of the solid waste management practices of the personnel and staff of Miputak Elementary School as to rot/disposal. The table pointed out that most of the respondents favored throwing waste materials in the common open dumps having an average weighted value of 3.19 verbally described moderately effective as compared to throwing and left garbage anywhere having an average weighted value of 1.24 verbally interpreted as not effective. Also, it can be gleaned that applying the standard deviation to the data yielded a value of less than 3.0, which can be construed as meaning that the data subjects were relatively the same. Further, the mean on this aspect is 2.14, which can be verbally described as slightly effective. The findings stressed that most of the respondents favored throwing waste materials in the common open dumps which implies that rot/dump when practiced among the personnel and staff of an educational institution has to used dumping pit to disposed their garbage.

In support, Ampofo (2020) points to the fact that waste dumped in random locations or disposed of in uncontrolled dumps without any further management was sometimes practiced by schools in rural areas, which poses detrimental effects to health and the environment.

Table 6. Grand Mean on the Level of Effectiveness of the Solid Waste Management Practices of the Personnel and Staff of Miputak Elementary School

Level of Effectiveness of the Solid Waste Management	Mean	SD	Description
Reduce	3.54	0.351	Highly Effective
Reuse	3.45	0.450	Highly Effective
Recycle	3.20	0.574	Moderately Effective
Rot/Disposal	2.14	0.518	Slightly Effective
Grand Mean	3.08	0.473	Moderately Effective

Table 6 shows the grand mean of the level of effectiveness of the solid waste management practices of the personnel and staff of Miputak Elementary School. The table revealed that reduce and reuse were seen as highly effective among the 4 R's of solid waste management practices, followed by recycle, which was seen as moderately effective, and disposal, which was seen as slightly effective. Also, it can be gleaned that applying the standard deviation to the data yielded a value of less than 3.0, which can be construed as meaning that the data subjects were relatively the same. Further, the mean on this aspect is 3.08, which can be verbally described as moderately effective. The findings stressed that reduce and reuse were viewed as highly effective, which implies that personnel and staff at Miputak Elementary School most frequently practiced reduce and reuse as a solid waste management practice.

In support, Molina and Catan (2021) highlight reduce and reuse as good solid waste management practices that an educational institution adapted and implemented.

Table 7. Test of Significant Difference on the Level of Effectiveness of the Solid Waste Management Practices of the Personnel and Staff of Miputak Elementary School

Source	df	Sum of Square	Mean Square	Calculated F	p-value	Action
Between Groups	3	52.1629	17.3876	75.298	0	Ho Rejected
Within Group	164	36.8705	0.2309			
Total	167	90.0333	0.5391			

$\alpha = 0.05$ **Critical F = 2.6957**

Table 7 depicted the level of significant difference in the effectiveness of Miputak Elementary School personnel and staff's solid waste management practices. Applying Analysis of Variance (ANOVA), it yielded a calculated F-value greater than the critical F-value as well as a p-value less than the level of significance set at 0.05, which led to the rejection of the hypothesis, which states that there is a significant difference on the level of effectiveness of the solid waste management practices of the personnel and staff of Miputak Elementary School in terms of reduce, reuse, recycle, and rot. Thus, reduce, reuse, recycle, and rot had different levels of effectiveness in line with solid waste disposal and management.

In support, Punongbayan et al. (2014) pointed to the fact that waste management practices were effective in terms of collection, disposal, recovery, and processing as perceived by the respondents. However, problems occurred specifically because disposal areas for waste materials were not strategically located.

IV. Conclusion

Based on the results of this study, the following recommendations were offered:

1. School principals may issue policies on consistent solid waste management methods that should be followed by everyone on school property. In such guidelines, the utilization of waste reduction and waste reuse as optimal solid waste practices must be emphasized. In order to ensure strict adherence to the aforementioned rules, everyone must be required to adopt them, and, preferably, a penalty for non-compliance may be applied.
2. To educate everyone at the school on the significance of solid waste management practices, school administrators may organize forums and symposiums. Additionally, he or she may invite a representative from the national and local governments (DENR and CENRO) to speak about the national and local legislation that require the application of solid waste management methods both inside and outside the school's immediate neighborhood.
3. The school principal and master's teachers, particularly in science subjects, must ensure that the importance of solid waste management and its practices are discussed in the classroom.

4. Teachers must ensure that the relevance of solid waste management and its practices are discussed inside the classroom purposefully for pupils to gain a deeper understanding of such issues.
5. Future researchers were encouraged to conduct a study on this matter.

DISSEMINATION AND ADVOCACY PLAN

The advocacy plan shall be name “I LOVE MIPUTAK CS”. The aforementioned advocacy strategy aimed to preserve Miputak Central School's solid waste management sustainable and environmentally friendly.

In that line “I LOVE MIPUTAK CS” is a series of environmental activities to held inside the school.

Activity 1 - A Symposium will be organized to spread awareness among all parties concerned on the significance of good solid waste management and the laws requiring, governing, and punishing acts or omissions in contravention of the same. Also, resource speakers coming from the local and national government as well environmentalist may be invited as speakers for such symposium.

Activity 2 - A Poster Making Contest will be organized underscoring the topic on environmental awareness, solid waste management practices and sustainability to be participated by all students in the school.

Activity 3 – The conduct of the search for King and Queen Miputak CS Kalikasan underscoring the used of recycled and reused materials. The winners of the said contest shall be the Student Environment Ambassador of the school.

Activity 4 – The conduct of Friday clean-up habit on which everyone is enjoined to clean the entire Miputak Central School campus. During this activity that solid waste reuse and reduce practices must be observed.

Activity 5 - The signing of a Memorandum Order by the school principal institutionalizing the solid waste management practice inside the school vicinity.

These activities can be replicated to other government and private educational institutions in Dipolog City and in the province of Zamboanga del Norte.

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