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Solid waste management practices of high school students in selected secondary schools of Zambales, Philippines

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Abstract

One of the greatest dilemma in the community is the management of waste disposal of the people. Not only does it impose health related problems, it also hinders the nation`s progress as a whole. The study aimed to determine the solid waste management practices of selected high schools as perceived by the teacher and student-respondents in Zone II (Palauig, Iba and Botolan) Division of Zambales during the School Year 2018-2019. The researcher utilized quantitative descriptive research design with questionnaire as the main instrument in gathering data from fifty teachers and one hundred fifty students who were randomly selected. The study focused on the solid waste management practices such as waste segregation, waste disposal, waste recycling/re-use and waste reduction. The teacher-respondents "sometimes" practiced on waste segregation, waste disposal, and waste recycling while "always" practiced" on waste reduction. The student-respondents "always" practiced on waste segregation while "sometimes" practice on disposal, recycling and waste reduction respectively. There is significant difference on the dimension of solid waste management as perceived by teacher and student respondents. There is significant difference on the solid waste management practices between teacher and student respondents.

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Introduction

Solid waste management is defined as 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 the range of public health, conservation, economics, aesthetic, engineering and other environmental considerations (North American Waste Generation, 2016).

Solid waste management includes planning, administrative, financial, engineering and legal functions. Solutions might include complex inter-disciplinary relations among fields such as public health, city and regional planning, political science, geography, sociology, economics, communication and conservation, demography, engineering and material sciences (World Bank, n.d.)

The primary goal of solid waste management is reducing and eliminating adverse impacts of waste materials on human health and environment to support economic development and superior quality of life (North American Waste Generation, 2016)

The emphasis in modern solid waste management is on the reduction, reuse and recovery before disposal. These are the focus of various integrated waste management systems in Asian countries. Reduction is using fewer disposable goods. While reuse is using items again after their initial consumer used. Recovery is recapturing the material or energy value of the item at its highest point.

With rapid population expansion and constant economic development, waste generation both in residential as well as commercial/ industrial areas continues to grow rapidly, putting pressure on society`s ability to process and dispose of this material. Also, inappropriately managed solid waste streams can pose a significant risk to health and environmental concerns. Improper waste handling in conjunction with controlled waste dumping can cause a broad range of problems, including polluting water, attracting rodents and insects, as well as increasing

floods due to blockage in drains. As well as it may bring about safety hazards from explosions and fires. Improper solid waste management can also increase greenhouse gas (GHS) emission, thus contributing to climate change.

Nowadays, one of the greatest dilemma in the community is the management of waste disposal of the people. Not only does it impose health related problems, it also hinders the nation`s progress as a whole. The amount of solid waste generated reflects the economic status of a community.

In the Philippines, flooding is very much evident all over the Metro Manila and other provinces including the regions and province of the country suffered from tremendous calamities during the past months and years. One of the serious problems is attributed to the improper disposal of wastes particularly use of plastic and non-biodegradable materials.

Of the estimated 6,700 tons generated per day, approximately 720 tons per day is recycled or composted. The balance—some 6,000 tons daily—is either hauled to the city's dump sites, dumped illegally on private land, in rivers, creeks, Manila Bay, or openly burned, adding to the heavily polluted air shed. Thousands of scavengers and waste pickers live and survive on this waste, eking out a harsh existence on mountains of smoldering waste. Some are children as young as 5 years old. Taking into account their families, the hundreds of junk shops and their workers, the thousands of eco-aides, the thousands of garbage trucks and their crews, and the tens of thousands of slum dwellers living on, around, and near the dump sites, an estimated 150,000 residents of Metro Manila know the sight and smell of garbage as an integral part of their daily lives.

In order to address the problems of wastes disposal, particularly solid wastes, Republic Act 9003 known as the "Ecological Solid Waste Management Act of 2000" was enacted. The Act provides for an ecological solid waste management program that will ensure protection of the environment.

This program is spearheaded by the Department of Environment and Natural Resources in collaboration with Local Government Units and Non-Government Organizations.

Not only various agencies are involved in waste management, even the schools play a significant role in waste management. This year, in a convergence approach of program implementation, the Department of Environment and Natural Resources along with Interior and Local Government, Department of Education, and Metropolitan Manila Development Authority (MMDA), entered into a Memorandum of Agreement with Non-Government Organization Galing Pook Foundation, Inc. (GPF) for the implementation of the National Ecosavers Program or NEP. The government will tap 1.99 million-strong students in public elementary and high schools in the National Capital Region for the school-based waste management program. Under the new program, the students are enjoined to collect and segregate recyclable materials from their respective households and bring them to their schools where these are pooled for final collection by accredited junk shop or recyclers. They are likewise encouraged to bring biodegradable materials, which will be turned into compost soil that can be used as medium in producing tree seedlings for planting under the National Greening Program (Executive Order No. 26: Towards a Greener Philippines – FFTC-AP (2012)

Relative to these , public secondary schools of Zone II (Palauig, Iba and Botolan) Division of Zambales, adopted the environment programs of the DepEd, especially mandated relative to the YES-O organizations in order to lessen the inside and surrounding the school premises including public and common areas in the community, waste management, segregation and recycling program, awareness campaigns to address specific issues such as pollution, sanitation and health, tree planting activities and nursery establishment. It is in this context that the researcher attempted to determine solid waste management practices of those in the academic sectors particularly in the high schools of Zone II, Division of Zambales.
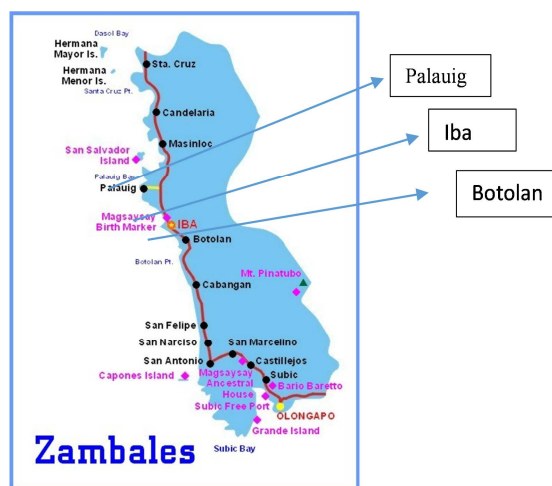
Materials and methods

Method of Research
Descriptive research design was used to describe the solid waste waste management practices of the high school students.

Location of the Study
The study was conducted in six selected public secondary schools in Zone II (Palauig, Iba and Botolan), Division of Zambales, Philippines (Fig. 1).

Fig. 1. Map of Zambales showing the location of the study.

Respondents
There were two groups of respondents for a total of two hundred (200). It includes fifty (50) secondary school teachers and one hundred fifty (150) high school students randomly selected from the secondary schools in Zone II (Palauig, Iba and Botolan), Division of Zambales, Philippines. The study made use of purposive sampling technique to represent each school.

Research Design, Data Gathering And Analysis
The questionnaire-checklist method and unstructured interviews were used to gather data in this study. Part I of the questionnaire reflected the profile of the respondents: for student – respondents, this includes: age, sex and curriculum year. While teachers consisted in their profile are: age, sex, educational attainment, civil status, position, specialization and length of service.

Part II of the questionnaire focused on the solid waste management practices such as waste segregation, waste disposal, waste recycling/reuse and waste reduction.

After subjecting the research instrument to process validation, it was submitted to the adviser for approval prior to actual administration to the target respondents.

A letter of permission was secured by the researcher from the Schools Division Superintendent (thru channels) in the distribution of research questionnaires.

During the month of March, 2019, the questionnaire was administered to six selected public secondary schools of Zone II (Palauig, Iba and Botolan), division of Zambales. The questionnaire for the teacher and student respondents was personally distributed and retrieved through the helped and cooperation of the principals and teachers of the school were the study is conducted by the researcher.

After gathering the data, these were tallied, analyzed and interpreted. The data collected in this study were subjected to certain statistical treatments. The Statistical Package for Social Sciences (SPSS) will be used in the analysis of data. SPSS is a widely used program for statistical analysis particularly in Social Sciences. The original SPSS manual (Espiritu (1985); Psychological, Anthropological and Sociological Foundations of Education) has been described as one of "sociologist's most influential books" for allowing ordinary researchers to do their own statistical analysis. In addition to statistical analysis, data management (case selection, file reshaping, creating derived data) and data documentation (a metadata dictionary was stored in data file) are features of the base software.

The tabulated data in Microsoft Excel was treated using Statistical Package for Social Sciences Version 20 (SPSS v.20) software. Manual calculation will disregarded, thus presentation of formula will no longer be necessary.

Results and discussion

Table 1 shows the profile variables of the teacher-respondents with regards to age, sex, civil status, educational attainment, position and years in teaching profile variables.

Most of the teacher respondents were from age group of 31-35 years old with 18 or equivalent to 36.00% while least of the teacher respondents from age group of 46-50 with 2 or equivalent to 4.00%. The computed mean age of the teacher-respondents was 33.40 years old. The data clearly shows that the teacher respondents were on their early adulthood. This is the stage where about to experience new roles and patterns in life in handling marital and family responsibility. (Executive Order No. 26: Towards a Greener Philippines – FFTC-AP, 2012)

Majority of the teacher-respondents with 31 or equivalent to 62.00% are females while 19 or 38.00% are males. The table clearly demonstrate the dominance of the female teachers and this could be ascribed or accounted on the noted dedication and commitment of women in the teaching profession. The shifting of male sector to engage in skilled manpower and preference to work abroad are attributed to the decrease of number of male to engage in teaching profession. This finding is similar to the study of Brade (2018) on research capabilities of teachers where female dominates in the study. Similarly the study of Baugan (2011) stressed that more women excel in teaching profession because of the premise of their ability to show more care, patience and understanding among children compare to men. They even bring them the sense of being mother even within the ambit of their profession. Their motherly instinct give them the chance to outshine in the teaching service.

Majority with 29 or equivalent to 58.00 of the teacher respondents are married; 19 or 38.00% are still single and 2 or 4.00% are widow. It manifest that majority of the teacher-respondents were already handling marital and family responsibility. It further manifest that they are emotionally and financially ready to

provide the needed food, clothing, shelter and education for the children. This finding is similar to the study of Lingat (2017) where the respondents are dominated by married teachers.

Out of fifty (50) teacher-respondents, majority with 29 or equivalent to 58.00% have masteral units earned; 11 or 22.00% are BS degree holders while least of the respondents have attained doctoral units and holder of doctoral degree with only 1 or 2.00%. The data clearly demonstrate on the imptance of taking graduate studies not only for professional competence and advancement but for promotion in the future. This holds on their desire not to remain Teacher-1 to the rest of their lives but motivated by the desire to the promoted as Head Teacher or School Administrator someday. This finding is similar to the study of Catacutan (2017) where the teacher respondents have pursued their graduate studies as basis for professional and career development

Majority of the teacher-respondents are occupying Teacher 1 position while least are Master Teachers with 2 or equivalent to 4.00%.

Majority of the teacher-respondents have been in the teaching profession for about 0-5 years with 28 or equivalent to 56.00% followed by 13 or 26.00%, with 6-10 years and the least had served for 21-25 years with only 1 or 2.00%. The computed mean years of teaching was 6.22 years. Data in the table implies that majority of the teacher-respondents were novice and new in the teaching profession. It further demonstrate of their satisfaction and fulfillment in the career and wish to stay long up to the age of retirement.

Table 1. Profile Variables of the Teacher-Respondents.

Profile of the Teacher-Respondents		Frequency	Percentage
Age Mean=33.40 years old	21-25	4	8.00
	26-30	12	24.00
	31-35	18	36.00
	36-40	10	20.00
	41-45	4	8.00
	46-50	2	4.00
	Total	50	100.00
Sex	Female	31	62.00
	Male	19	38.00

Profile of the Teacher-Respondents		Frequency	Percentage
	Total	50	100.00
Civil Status	Married	29	58.00
	Single	19	38.00
	Widow	2	4.00
	Total	50	100.00
Educational Attainment	BS Graduate	11	22.00
	BS + MA/MS units	29	58.00
	MS/MA graduate	8	16.00
	MS/MA + PhD/EdD units	1	2.00
	Ed.D./Ph.D. holders	1	2.00
	Total	50	100.00
Position	Master Teacher	2	4.0
	Teacher 1	48	96.00
	Total	50	100.00
Years in Teaching Mean=6.22	0-5 years	28	56.00
	6-10 years	13	26.00
	11-15 years	6	12.00
	16-20 years	2	4.00
	21-25 years	1	2.00
	Total	50	100.00

Table 2 shows the profile variables of the student-respondents with regards to age, sex, and grade level.

Table 2. Profile Variables of the Student-Respondents.

Profile of the Teacher-Respondents		Frequency	Percentage
Age Mean=14.81 Years old	11-12	11	7.30
	13-14	41	27.30
	15-16	88	58.70
	17-18	9	6.00
	19-above	1	.70
	Total	150	100.00
Sex	Female	96	64.00
	Male	54	36.00
	Total	150	100.00
Grade Level	Grade 7	18	12.00
	Grade 8	14	9.30
	Grade 9	35	23.30
	Grade 10	83	55.30
	Total	150	100.00

Majority of the student-respondents with 88 or equivalent to 58.70% are from age group of 15-16 years old; 41 or 27.30% from 13-14 years old; and the least from 19 years old and above with only 1 or 0.70%. The computed mean age of the student respondents was 14.81 years old. The data clearly demonstrate that the student that the student-respondents were relatively young teenager. WHO identifies adolescence as the period of human growth

and development that occurs after childhood and before adulthood from ages 10 to 19. It represents one of the critical life span characterized by a tremendous pace in growth and change. Biological process drive many aspects of this stage with the onset of puberty marking the passage from childhood to adolescence.

Out of one hundred fifty (150) student-respondents, majority with 96 or equivalent to 64.00% are females while 54 or 36.005 are males. This scenario is similarly observed in other district where female school children are dominated by males. This result can be supported by the United Nations Educational and Cultural organizations (UNESCO) (2012), Institute of Statistics which found out that there are greater numbers of female secondary learners than males even in the Philippines.

Majority of the student respondents with 83 or equivalent to 55.30% are from Grade 10 followed by 35 or 23.30% from Grade 9; 18 or 12.00% from Grade 7 and 14 or 9.305 from Grade 8.

Table 3 shows the teacher and student-respondents towards solid waste management practices as to Waste Segregation.

Table 3. The Teacher and Student-Respondents towards Solid Waste Management Practices as to Waste Segregation.

Waste Segregation		Teacher N=50			Student N-150		
		OWM	Rank	QI	OWM	Rank	QI
1	Trash cans for biodegradable materials are used in the school/classrooms.	3.00	10	Sometimes	3.15	9	Sometimes
2	Biodegradable wastes such as the plants, papers, and easily decomposed materials are segregated.	3.08	7.5	Sometimes	3.25	6	Always
3	Non-biodegradable materials are also segregated from others.	3.08	7.5	Sometimes	3.23	7	Sometimes
4	Bottles and glasses are also separated from other materials	3.30	4	Always	3.39	5	Always
5	Metals and other similar materials are also segregated from the trashes.	3.20	6	Sometimes	3.13	10	Sometimes
6	Plastics are placed in one container/sack.	3.32	3	Always	3.42	4	Always
7	Segregation of wastes in a practice in the school.	3.26	5	Always	3.43	3	Always
8	Students observe segregation of wastes.	3.06	9	Sometimes	3.18	8	Sometimes
9	Teachers remind students to segregate wastes.	3.56	1.5	Always	3.66	1	Always
10	Head/Administrators of the school remind the teachers and students to observe cleanliness and separate waste materials.	3.56	1.5	Always	3.63	2	Always
Overall Weighted Mean		3.24		Sometimes	3.35		Always

The teacher respondents "always" practiced reminding students to segregate wastes as well as Head/Administrators of the school remind the teachers and students to observe cleanliness and separate waste materials manifested on the weighted mean value of 3.56 and ranked 1st while "sometimes" practiced on using trash cans for biodegradable materials in the school/classrooms with mean of 3.00 and ranked 10th. On the other hand, the student respondents were "always" to hear from teachers being reminded on segregating the wastes with mean of 3.66 and ranked 1st while least on segregating metals and other similar materials from the trashes with mean of 3.13 interpreted as "sometimes" and ranked 10th. Overall, the teacher responses obtain a weighted mean of 3.24 interpreted as "sometimes" while 3.35 for student-responses interpreted as "always". Similar finding was obtained in the study of Bautista (2019) that college students had good practices in solid waste management in terms of waste disposal, recycling and reusing.

The giving of reminder and regular giving of information provides forming into a good habit to practice segregation. The school is the proper venue for massive drive for full awareness on the importance of solid waste management. The findings of Ogola, (2012) indicate that wastes from the household were not sorted. Instead, all the wastes collected from individual household were mixed in refuse bags. This makes recycling of wastes from homes not practical, and thereby reducing the quality of recyclable wastes like paper and cardboard. The Integrated Waste Management System may provide the government long term strategy for management of solid wastes. It also includes the provision of a landfill site, transfer stations, household waste sites and a range of treatment disposal methods including a central composting, energy from waste and the collection of source separated recyclables (Nie, Brent and Hull (1970):SPSS Statistical Package for the Social Sciences, New York)

Table 4 shows the teacher and student-respondents towards solid waste management practices as to waste disposal.

Table 4. The Teacher and Student Respondents towards Solid Waste Management Practices as to Waste Disposal.

Waste Disposal		Teacher N=50			Student N=150		
		OWM	Rank	QI	OWM	Rank	QI
1	Biodegradable materials are piled in one area to decompose.	3.00	2	Sometimes	3.21	1	Sometimes
2	Plastics and bottles are placed in one container for collection of the barangay or sold to buyers.	3.06	1	Sometimes	3.19	2	Sometimes
3	Liquid wastes and some chemical wastes are buried in one place in the school.	2.62	4.5	Sometimes	2.83	5	Sometimes
4	Leaves and papers are burned in the school.	2.24	8.5	Rarely	2.53	10	Sometimes
5	Papers are collected and sold to buyers.	2.60	6	Sometimes	2.96	4	Sometimes
6	Metals and similar objects are collected and sold to buyers.	2.62	4.5	Sometimes	2.79	7	Sometimes
7.	Wastes are just thrown anywhere in the school.	2.24	8.5	Rarely	2.61	9	Sometimes
8	Collected wastes are collected and placed in incinerators.	2.14	10	Rarely	2.79	7	Sometimes
9	Collected wastes are buried in garbage pits at the back of the school.	2.40	7	Rarely	2.79	7	Sometimes
10	Wastes in the school are collected by the barangay mobile/trucks for disposal.	2.88	3	Sometimes	3.13	3	Sometimes
	Overall Weighted Mean	2.58		Sometimes	2.88		Sometimes

The teacher respondents "sometimes" practiced that plastics and bottles are placed in one container for collection of the barangay or sold to buyers manifested on the weighted mean value of 3.06 and ranked 1st while "rarely" practiced on placing the collected wastes in incinerators with mean of 2.14 and ranked 10th. On the other hand, the student respondents "sometimes" practiced on the biodegradable materials are piled in one area to decompose manifested on the weighted mean of 3.21 and ranked 1st while least practice on burning leaves and papers in the school with mean of 2.53 and ranked 10th. Overall, the teacher and student responses obtain a weighted mean of 2.58 and 2.88 both with qualitative interpretation of "sometimes"

practiced on waste disposal. In areas that lack refuse collections-usually in low-income communities, the residents tend wither to dump their garbage at the nearest vacant lots, public places, creek or river or simply burn it in their backyard. Uncollected waste can accumulate on the streets and clog drainage system when it rains, which might cause flooding. Wastes can also be carried away by run-off water to rivers, lakes and seas, affecting those ecosystem. The decomposition of organic materials produces methane, which can cause fire and explosions, and is a potent greenhouse gas. The biological and chemical processes that occur in open dumps produce strong leachates, which pollute surface and groundwater.

Similarly, the study of Ogola (2012) indicates that there is no recycling programme implemented in Polowane City. 60% of waste disposed in the landfill consists of recyclable waste. Though the city does not have a formal waste recycling system, it was found that the disposal site has informal waste reclaimers that are collecting recyclable wastes on a daily basis. Table 5 shows the teacher and student-respondents towards solid waste management practices as to waste recycling/re-use.

Table 5. The Teacher and Student- Respondents towards Solid Waste Management Practices as to Waste Recycling/Re-use.

Waste Recycling/Re-use		Teacher N=50			Student N=150		
		OWM	Rank	QI	OWM	Rank	QI
1.	Plastic cups are recycled into flower pots.	2.76	9	Sometimes	3.13	5.5	Sometimes
2.	Tin cans are also used for gardening.	2.74	10	Sometimes	3.19	2	Sometimes
3.	Biodegradable materials such as decayed leaves, animal manure, twigs and those easily decomposed are used as compost materials for plants.	2.84	7	Sometimes	3.18	3	Sometimes
4.	Plastic bags are cleaned and re-used again.	2.80	8	Sometimes	2.83	10	Sometimes
5.	Bottles are cleaned and be used again.	2.96	5	Sometimes	2.88	9	Sometimes
6.	Papers and old magazines are recycled into paper machete and used in art works.	2.98	4	Sometimes	3.15	5.5	Sometimes
7.	Bottled plastics are used in art works.	3.02	2.5	Sometimes	3.28	1	Always
8.	Plastic wastes are recycled as art projects of students.	3.10	1	Sometimes	3.17	4	Sometimes
9.	Big bottled plastics are used as pails.	3.02	2.5	Sometimes	3.13	7	Sometimes
10.	Big tin cans are used as medium for measurement in rice and other commodities.	2.90	6	Sometimes	2.91	8	Sometimes
	Overall Weighted Mean	2.91		Sometimes	3.09		Sometimes

The teacher respondents "sometimes" practiced recycling plastic waste as part projects with mean of 3.10 and ranked 1st while least on using tin cans for gardening with mean of 2.74 and ranked 10th. On the other hand, the student-respondents "always" practiced using plastic in art works with mean of 3.28 and ranked 1st while "sometimes" practiced on cleaning and re-used plastic bags with mean of 2.83 and ranked 10th. Both the teacher and student respondents obtained an overall weighted mean 2.91 and 3.09 interpreted "sometimes" practiced on waste recycling. Table 6 shows the teacher and student-respondents towards solid waste management practices as to waste reduction.

The teacher-respondents "always' practiced the administration effort to encourage teachers and students to help in the reduction of wastes and maintain cleanliness of the surroundings by making posters manifested on the weighted mean of 3.54 and ranked 1st while "sometimes" practiced on purchasing and use school supplies made from recycled products such as pencils made from blue jeans and binders made from old boxes with mean of 3.04 and ranked 10th.

The student-respondents "always" practiced to see teachers are teaching children how to reduce wastes with mean of 3.42 and "sometimes" practiced on the purchase and use school supplies made from recycled products such as pencils made from blue jeans and binders made from old boxes with mean of 2.92 and ranked 10th.

Overall, the responses towards waste reduction for teacher "always" practiced with mean of 3.34 while "sometimes" practiced for the student respondents with mean of 3.19.

The Analysis of Variance to test `differences on dimensions of solid waste management practices by the teacher-respondents is shown in Table 8.

Table 6. The Teacher and Student- Respondents towards Solid Waste Management Practices as to Waste Reduction.

Waste Reduction		Teacher N=50			Student N=150		
		OWM	Rank	QI	OWM	Rank	QI
1	The Administration encourages teachers and students to help in the reduction of wastes and maintain cleanliness of the surroundings by making posters.	3.54	1	Always	3.21	6	Sometimes
2	Teachers teach children how to reduce wastes.	3.52	2	Always	3.42	1	Always
3	Students are encouraged not to use plastic always instead use recyclable materials.	3.32	7	Always	3.29	3	Always
4	Canteen sellers are encourage not to use plastics as food wrap.	3.40	4	Always	3.05	9	Sometimes
5	Purchase and use school supplies made from recycled products such as pencils made from blue jeans and binders made from old boxes.	3.04	10	Sometimes	2.92	10	Sometimes
6	Save packaging, colored paper, egg cartons and other items for arts and crafts projects.	3.14	9	Sometimes	3.06	8	Sometimes
7	When buying lunch and snacks, grab only what you need.	3.30	8	Always	3.22	5	Sometimes
8	Remember to recycle your cans and bottles after finish eating.	3.34	6	Always	3.16	7	Sometimes
9	The School – administrators advocates environment-friendly atmosphere.	3.42	3	Always	3.30	2	Always
10	The Administration coordinates closely with the Local Government Units for regular collect wastes in school.	3.38	5	Always	3.26	4	Always
Overall Weighted Mean		3.34		Always	3.19		Sometimes

Table 8. Analysis of Variance to test differences on dimensions of solid waste Management practices as by the teacher-respondents.

Groups	Count	Sum	Average	Variance
Waste segregations	10	32.42	3.242	0.039773
Waste Disposal	10	25.8	2.58	0.1064
Waste Recycling	10	29.12	2.912	0.015129
Waste Reduction	10	33.4	3.34	0.024

Source of Variation	SS	df	MS	F	F crit	Decision
Between Groups	3.56939	3	1.18979	25.683	2.86626	Reject Ho
Within Groups	1.66772	36	0.04632			Significant
Total	5.23711;	39				

There is no significant difference on the practices towards dimension of solid waste management as to waste disposal, waste recycling, waste reduction manifested on the computed F value of 25.683 which is greater than (>) the F critical value of 2.86626, therefore the Null Hypothesis is rejected.

The data clearly indicates that the respondents have dissimilarity and deviance on their perspective towards waste management practices. They have a contrasting opinion on the adverse effect on health, and life of human being if solid waste management problem is not properly address by practicing waste segregation, proper disposal, waste recycling and waste reduction. On the local or regional level, reducing wastes is accomplished through these methods by source separation and subsequent material recovery. Currently, the United States recycles about 10% of its glass and 25% of its paper wastes; in countries such as Switzerland and the Netherlands, the proportion in the glass recycled approaches to 50% while Japan recycles 50% of its paper wastes (Brade, 2018). The Analysis of Variance to test `differences on dimensions of solid waste management practices by the student-respondents is shown in Table 9.

Table 9. Analysis of Variance to test `differences on dimensions of solid waste Management practices by the student-respondents.

Groups	Count	Sum	Average	Variance
Waste segregations	10	33.47	3.347	0.036557
Waste Disposal	10	28.83	2.883	0.055112
Waste Recycling	10	30.85	3.085	0.023472
Waste Reduction	10	31.89	3.189	0.021277

Source of Variation	SS	Df	MS	F	F crit	Decision
Between Groups	1.1354	3	0.37846	11.0972	2.86626	Reject Ho
Within Groups	1.22776	36	0.03410			Significant
Total	2.36316	39				

There is significant difference on the practices towards dimension of solid waste management as to waste disposal, waste recycling, waste reduction manifested on the computed F value of 11.0972 which is higher than (>) the F critical value of 2.86626, therefore the Null Hypothesis is rejected.

The data clearly indicates that the respondents have dissimilarity and divergence on their opinion towards waste management practices. There had been contrasting points of view towards the practices of the solid waste management by the student-respondents.

Table 11 shows the t-test to determine differences on the practices towards solid waste management between teacher and student-respondents.

Table 11. t-test to determine differences on the practices towards solid waste management between teacher and student-respondents.

t-Test: Two-Sample Assuming Equal Variances

	Teacher	Student
Mean	3.242	3.347
Variance	0.039773	0.036557
Observations	10	10
Pooled Variance	0.038165	
Hypothesized Mean Difference	0	
Df	18	
t Stat	-1.20183	
t Critical one-tail	1.734064	
t Critical two-tail	2.100922	

There is no significant difference on the practice towards solid waste management between teacher and student-respondents manifested on the computed t-test value of -1.20183 which is lower than (<) t-critical one-tail value of 1.734064 or t-critical two tail value of 2.10022, therefore the Null Hypothesis is Accepted.

The data clearly indicates on the commonality of opinion towards solid waste management. Both teacher and students had seen the importance on proper waste disposal, proper segregation of waste, reduction of waste and it effect to health and humanity. In order to address the problems of wastes disposal, particularly solid wastes, Republic Act 9003 known as the "Ecological Solid Waste Management Act of 2000" was enacted. The Act provides for an ecological solid waste management program that will ensure protection of the environment. This program is spearheaded by the Department of Environment and Natural Resources in collaboration with Local Government Units and Non-Government Organizations.

The biggest challenge to the growing LGUs is to come up with solid waste and pollution control strategies that would effectively reduce the rubbish released to the environment. Unfortunately, this challenge cannot be effectively addressed by each LGU alone. LGUs need to combine their technical and engineering expertise, and their regulatory and enforcement powers with public education, awareness, and involvement campaigns to be able to properly implement solid waste and pollution control programs. Finally, a good solid waste and pollution control strategy will not be an effective one until it is fully implemented, accepted, and institutionalized by the people and institutions. As noted by several local chief executives with exemplary solid waste programs, their strategies were not about good engineering and slogans but rather strong political will in

implementing what is good for the environment and the people. [www.bayancity.gov.ph]

Conclusions

Based on the findings of the study, the following conclusions are drawn:

1. The teacher-respondent is a typical female, in her early adulthood, married, Teacher-1 with masteral units and had been in the teaching profession for more than half of a decade.

2. The student-respondent is a typical female, in her teenage hood and in Grade 10.

3. The teacher-respondents "sometimes" practiced on waste segregation, waste disposal, and waste recycling while "always" practiced" on waste reduction. The student-respondents "always" practiced on waste segregation while "sometimes" practice on disposal, recycling and waste reduction respectively.

4. There is significant difference on the dimension of solid waste management as perceived by teacher and student respondents.

5. There is significant difference on the solid waste management practices between teacher and student respondents.

Recommendations

Based on the findings of the study, the researcher offers the following recommendations:

1. Sustain or monitor check-up and follow-up to students in the implementation of proper waste segregation disposal, recycling and reduction.

2. Conduct a study on the relationship of waste management to health and economic impact.

3. Continue and strengthen the school action on developing high awareness of students in the implementation of Solid Waste Management practices.

4. Conduct a replication of this study with in-depth and wider in scope so as to validate the findings obtained in the study.

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