

WASTE SEGREGATION AWARENESS AND PRACTICES OF JANITORIAL SERVICES IN ATERTIARY EDUCATIONAL INSTITUTION: INFLUENCING THE INSTITUTIONS DRIVE TO SUSTAINABLE CAMPUS

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Abstract

Janitorial services and works are one of the key units of an institution directly contributing to the institution's vision towards a sustainable campus. Their knowledge on what they do and how they practice their work is very crucial in the waste management strategies presently implemented by the institution themselves. This study assessed the level of awareness of the High--Performance Maintenance (Hi--Per) personnel of Far Eastern University-- Nicanor Reyes Medical Foundation on the different types of waste, policies and legal aspects regarding waste segregation. A descriptive--evaluative research design was used in this study using a total of 62 Hi--Per personnel. The findings showed that most of the respondents possess a high level of awareness in terms of the different types of wastes as well as the policies and legal aspects of waste segregation. A significantly high correlation was obtained with respect to their awareness and waste segregation practices. The relevant issues and challenges in waste segregation is being addressed by the institution's waste management schemes which is an indication of a waste management system being implemented efficiently in the university particularly by the janitorial services collaborated by all units and departments, reverberating good governance, wellness, materials recovery and conservation, which can be interpreted to efficient investment.

Keywords: Waste Segregation, University Janitorial Service, Sustainable Campus

1.0 INTRODUCTION

Today, environmental protection is given the highest importance in the global perspective. Environmental protection in the institutional level is addressed through efficient waste management and waste control process that is associated with storing, collecting, transporting, processing, and disposing but acknowledges the codes of conversions and sectors such as public health, engineering, economy and environmental affairs (Gequinto, 2017). The common types of waste generated from commercial buildings, schools, and various establishments are: food or kitchen wastes, papers, metals, cans, boxes, cartons, plastics, and garden wastes. Many people segregate their wastes, but very seldom perform composting or diversion of their wastes.

Waste segregation plays an important role in waste management. It is defined as the practice of separating rubbish to promote recycling, reduction and re--use of waste materials (Memije--Cruz, 2014). In the year 2000, the Republic Act (RA) 9003 or the Ecological Solid Waste Management Act of 2000 declares the mandatory conduct of waste segregation, under the supervision of the National Waste Management Commission and monitoring by Local Government Units (LGUs). It bears emphasis that segregation of wastes is inclusive and legally mandated, and even must be carried out at source, at the level of households, institutions, and industrial, commercial, and agricultural establishments.

At the local level, the Quezon City Government enacted Ordinance No. SP 1707 s. 2006, mandating an intensified waste segregation in its jurisdiction, and Ordinance No. SP 1483 s. 2005, providing for the proper handling and management of hazardous wastes. In line with this, the Far Eastern University -- Nicanor Reyes Medical Foundation (FEU--NRMF), being into the management of higher educational institution and a medical center is expected to comply with the legal mandates. The law (RA 9003) and the two local ordinances adequately provide a legal framework for compliance in order to help ease problems or, at least, mitigate risks brought about by unbundled or unsegregated wastes, be it in FEU--NRMF or in any other establishments that produce wastes.

Presently, the janitorial services, also known as the Hi--Performance Maintenance Specialists (Hi--Per) are solely responsible for the waste management and segregation process of the various units and departments of the Institute of Medicine (Tertiary Education Institution) and the Medical center. Since the establishment of the Institution in 1971, the Hi--Per takes charge of the implementation of the waste management scheme of the school and the medical center. The Hi--Per management agreed that the Hi--Per undergoes periodic waste management training every year. These trainings are part of their effort to maintain campus sustainability through well--trained waste management personnel from the top to the bottom of the organizational framework. However, there was no assessment made as to what extent these trainings have been educating the personnel since at present, a collaborative monitoring system being implemented to ensure efficient implementation of the institution's waste management scheme.

This study seeks to measure the extent of waste segregation practices in Far Eastern University – Nicanor Reyes Medical Foundation, particularly how the wastes are being undertaken by the of High Performance Maintenance Specialist (Hi--Per). The study will assess the level of awareness on waste segregation exhibited by Hi--Per employees in relation to the nature of wastes generated by the institution, their level of awareness of policies and legal aspects of waste segregation, as stipulated in Republic Act 9003 and Ordinance Nos. SP 1483 s. 2006 and SP 1707 s. 2006, and the common challenges faced by the institution in terms of waste segregation. This study is beneficial to the institution since its findings will serve as guide to promote better waste segregation practices among the Hi--Per employees, which, ultimately contribute to the betterment of the academic and work environment within which students learn and employees interact.

2.0 LITERATURE REVIEW

Waste Segregation as Management

Waste segregation is an important movement to process wastes easily. It can help in decreasing the amount of wastes in landfills and prevent overflowing of wastes. As the studies mentioned, the existing waste segregation strategies were;; the provision of trucks for the transportation of wastes, dissemination of knowledge for households and establishments, and sorting the different recyclable items and compostable items. The Waste Management Theory (2004) which claims that wastes or anything that is no longer useful in a given setting, must first be defined, to be appropriately managed. Despite their lack of use or purpose, wastes can still be converted into beneficial products by using the applicable waste management and manipulative actions, while concomitantly reducing human and environmental risks caused by wastes, promoting the conservation of resources, and producing valuable objects derived from wastes. The Waste Management Theory provides a relevant framework or lends shape to this research in such a way that;; (1). Waste segregation is a desirable human activity grounded on one's intellect to dismantle or still salvage something beneficial or valuable from an array of seemingly non--useful or purposeless things, (2) Human beings have an inherent distaste for a messy and disorderly environment, and favor in habitable, orderly and hygienic ones, and (3)By means of learning, training or vocation, men acquire knowledge of policies and standards considered relevant to their actions.

Legal Frameworks for Solid Waste Management

Enforced laws, ordinances and programs display a variety of aspects on waste segregation, awareness of people regarding waste segregation, and many others. The significant ordinances and laws such as the Republic Act 9003 or the Ecological Solid Waste Management Act of 2000, Quezon City Ordinance No. SP 1483 s. 2005 and Quezon City Ordinance No. SP 1707 s. 2006 have a purpose to enforce waste management and waste segregation. They provide for an ecological solid waste management program that needs the proper implementation of segregation, collection, transport, storage, treatment and disposal of wastes generated at source. These also require the segregation at the source of all household, institutional, industrial, and commercial waste into wet or biodegradable and dry or non--biodegradable that agrees with the law and promotes preservation, protection, and

revival of the ecosystem by means of early actions, management, and reduction of pollutants and dangerous waste.

Consequently, several relevant waste management programs were launched to implement these ordinances. Prominent of these is "The Hiwa--hiwalay na Basura sa Barangay Program". Through this program, launched on July 1, 2011 in the entire city, excluding the Barangay Holy Spirit which has its own successful solid waste management program, a "No segregation, no collection", was adopted. This means that, if residents do not segregate their wastes, these will not be collected by waste collectors. To pilot test the program, the City Government conducted a two--week dry--run for the residents so they may become more familiarized with the types of wastes to be segregated and be informed of the waste collection schedule. On a national scale, there are about 183 local government units that received notices to comply with Republic Act 9003 and whose local chief executives were admonished by the National Solid Waste Management Commission (NSWMC) and Environmental Management Bureau (EMB) to implement proper waste segregation, collection, disposal, storage, and transportation of wastes, with inclusion to cities that are allocated to Metro Manila, namely Quezon City, Pasay, Mandaluyong etc. (Villanueva, 2017).

Waste Management Awareness Studies in the Philippines

In the Philippines, a study entitled: "Awareness and Practices on Solid Waste Management Among College Students in Mindanao State University" was conducted purposely to determine the relationship between the level of awareness and the practices on solid waste management among college students. It was shown that most of the students have enough knowledge about solid waste management and are found to be highly aware of the difference between biodegradable and non--biodegradable wastes. Possession of such degree of awareness best explains why students actively participate in campus--based segregation, recycling of wastes, proper waste disposal and waste generation reduction. Another study in the Philippines conducted by Paul and Bandiez in 2011 determined the knowledge of elementary schools in Iloilo City in terms of the waste segregation and disposal practices. It is found that many students do not follow and cooperate in segregation and waste disposal tasks at schools due to the lack of waste bins and immodest enforcement and/or lack of awareness and motivation. Students do not appreciate the importance of waste segregation, most likely due to lack of models and proper instruction given by the school. Another related study conducted in the Philippines by Barloa, Lapie & de la Cruz in 2016 entitled "Knowledge, Attitudes, and Practices on Solid Waste Management among Undergraduate Students in a Philippine State University" focused on assessing the knowledge, attitudes, and practices of the undergraduate students in Laguna State Polytechnic University – Los Baños Campus during the second semester of academic year 2015--2016. The results of the study showed that most of the students in the said university had satisfactory levels for knowledge and attitude on solid waste management related matters with the percentage of 73.4% and 71.0% respectively. On the other hand, only less than half of the students had satisfactory level in terms of the practice of solid waste management--related matters with the percentage of 43.1%. Generally, only 55% of the total respondents showed satisfactory levels on general rating of knowledge, attitude, and practice on solid waste management. From the results of the study, the researchers came up with a conclusion that having high

knowledge and good attitude of the students towards the solid waste management have a positive effect on their practice level. Therefore, the higher knowledge and attitude rating the students have, the higher their practice level will be. Paghasian (2017), concluded that one must be aware of the proper waste management practices whilst applying them in daily life. Furthermore, segregating, reducing, reusing, and recycling affects the practice of solid waste management, but surprisingly does not influence disposal practices.

Overall, it can be identified that awareness and knowledge of the detrimental effects of waste were the main points needed for the proper practice of waste management. Furthermore, issues and problems regarding waste management which is related to waste segregation are also addressed in the study. Proper waste management system is stated to be not well-established in developing countries. Majority of the problems of waste management is due to the lack of awareness, which may be regarding the national policies and health hazards to health-care wastes. Insufficient findings, inadequate facilities and waste containers, and service waste collection for waste management are also problems waste management faces. All these problems may cause effects on people and environment. It could be lessened with the improvement of the overall waste management process.

3.0 Methodology

A descriptive--correlational research was employed in this study among 62 Hi--Per Specialist were considered by the study. These Hi--Per Specialist are in--changes of the waste collection and segregation in the Institute of Medicine and that of the Medical Center. The respondents are recruited through a population census or total enumeration technique implementing a minimum of 6--month employment inclusion criteria. The survey was conducted in FEU--NRMF from January to March 2019 to account for all the participants.

The research instrument is a Comprehensive Waste Management Questionnaire (CWMQ--66) composed of 66 questions on the awareness on types of, awareness on policies and legal aspects of waste segregation and common challenges faced by the institution on waste management. The questionnaire was initially validated by several experts in waste management and with an overall Internal Consistency coefficient of 0.94. This is contributed by an 0.92 internal consistency on awareness on types of waste which utilizes a 4--point Likert scale where 4 corresponds to strongly agree and 1 for strongly disagree;; a 0.89 internal consistency for the awareness on policies and legal aspects of waste segregation utilizing a 5--point Likert Scale where the highest rating of 5 corresponds to extreme awareness and 1 as to no awareness;; and a 0.89 internal consistency on the common challenges faced by the institution on waste management which also utilized a 5--point Likert Scale where 5 corresponds to strongly agree and 1 for strongly disagree. An informed consent was signed by the respondents before participating the survey.

All statistical calculations such as descriptive measures in terms of the percentages, mean median and mode as well as the linear regression to determine the correlation between the level of awareness in segregation and laws governing segregation is

performed using Microsoft Excel Data Analysis tool pack. The hypothesis is tested at 0.05 level of significance where the test is significant at p-values less than 0.05.

4.0 Findings

Level of Awareness of Hi-Per Specialists on Types of Wastes

Table 1: Level of Awareness on the Types of Wastes

Types of Waste	Weighted Mean	Standard Deviation	Descriptive Equivalent
Biodegradable	3.04	0.45	Aware
Non--Biodegradable	3.30	0.34	Extremely Aware
Infectious and Sharps	3.64	0.30	Extremely Aware
Overall	3.32	0.30	Extremely Aware

The Hi-Per Specialist in general was found to have extreme awareness on the types of waste they handle. It was found that they have specific extreme awareness on non--biodegradable and infectious waste, while their awareness on biodegradable waste was found to be the lowest of the three. This is attributed to the discrepancies on the theoretical frameworks on the types of wastes and the mandates of QC Ordinance No. SP 1707 s. 2006 being implemented by the local government on segregation and collection. Classic example is paper which is generally classified as biodegradable but based on the guidelines of SP 1707, it should be placed together with the "non--biodegradables". In addition, debris of cut trees and big plants as well as woods are also biodegradable by classification but must be separated as "agricultural waste" and is again collected together with the non--biodegradables.

Level of Awareness on the Policies and Legal Aspects of Waste Segregation

Table 2 indicates that the Hi-Per Specialist are extremely aware of the mandates of RA 9003 or the Ecological Solid Waste Management Act of 2000. The very high awareness or extreme awareness of the Hi-Per specialist is illustrated by the extreme awareness on the important mandates of the law. The extreme awareness of the Hi-Per Specialists on the mandates of RA 9003 is attributed to the trainings offered by the institution.

Table 2: Awareness of the Hi--Per Specialist on RA 9003 (Ecological Solid Waste Management Act of 2000)

Indicators	Weighted Mean	Descriptive Equivalent
1. Republic Act 9003 ensures the proper segregation, collection, transport, storage, treatment and disposal of solid waste through the formulation and adoption of the best environmental practices in ecological waste management.	4.34	Extremely Aware
2. Republic Act 9003 states that local municipalities should provide a designated area and containers in which to accumulate source separated recyclable materials to be collected by the local government.	4.40	Extremely Aware
3. Republic Act 9003 insinuates that this mainly ensures the protection of public health and environment.	4.50	Extremely Aware
4. Republic Act 9003 states that city establishments should provide a designated area and containers in which to be collected by the municipality.	4.48	Extremely Aware
5. Republic Act 9003 implies that local governments will enable a door to door collection of wastes produced	4.27	Extremely Aware
Overall	4.40	Extremely Aware

The same findings were obtained in terms of the respondents' awareness on QC Ordinance No. SP 1483 s. 2005, indicating that the Hi--Per Specialists are extremely aware of the important mandates of the ordinance. Similarly, this extreme awareness on the mandates of the city ordinance is brought by the trainings on waste management.

Contrary to the first two legal mandates, the Hi--Per Specialists was found to have in general, a moderate awareness on the legal aspects of Quezon City Ordinance No. SP 1707 s. 2006. Though extreme awareness was found in terms of the classification of wastes, the strict provisions of garbage can placement and markings as well as waste collection practices, there is moderate awareness on the amount of the penalty to be imposed on the misconduct of the city ordinance and lower level of awareness (somewhat aware) that the city ordinance is related to RA 9003. This becomes then an avenue for the institution for training enhancement on waste management. The training modules must make discussion on QC Ordinance No. SP 1707 s. 2006 equally intensive with RA 9003 and QC Ordinance No. SP 1483 s. 2005.

Table 3: Awareness of the Hi--Per Specialists on Quezon City Ordinance No. SP 1483

Indicators	Weighted Mean	Descriptive Equivalent
1.This city ordinance affirms that wastes shall be segregated to biodegradable and non- biodegradable.	4.60	Extremely Aware
2. This city ordinance asserts that all establishments are required to provide adequate and sufficient covered trash receptacles within their vicinity.	4.35	Extremely Aware
3. This city ordinance states that wastes produced or garbage for disposal should not be thrown away to bodies of water or in public places.	3.63	Moderately Aware
4. Quezon City Ordinance No. SP 1483 s. 2006 implies that adequate sanitation practices shall always be observed by every establishment within the city.	4.50	Extremely Aware
5. Quezon City Ordinance No. SP 1483 s. 2006 allow establishments to take out their trash prior to collection.	4.10	Moderately Aware
Overall	4.44	Extremely Aware

Table 4: Awareness of the Hi--Per Specialists on Quezon City Ordinance No. SP 1707 s. 2

Indicators	Weighted Mean	Descriptive Equivalent
1.This ordinance requires the segregation of wastes into biodegradable and non - biodegradable from institutional establishments.	4.55	Extremely Aware
2. Quezon City Ordinance No. SP 1707 s. 2006 states that an act of misconduct with regards to this city ordinance insinuates will be penalized with the fine of 3000 pesos.	3.95	Moderately Aware
3. This city ordinance is loosely in accordance to Republic Act 9003.	3.23	Somewhat Aware
4. This city ordinance states that wastes shall be placed in containers that are properly marked (i.e. biodegradable, non - biodegradable).	4.71	Extremely Aware
5. Quezon City Ordinance No. SP 1707 s. 2006 implicates that all establishments shall provide proper waste collection practices and storage areas.	4.39	Extremely Aware
Overall	4.16	Moderately Aware

Common Challenges faced by the Institution on Waste Management

Though there is extreme awareness on the types of wastes and an average extreme awareness on the policies and legal aspects of waste segregation, it is normal for an institution if encounter issues relevant to the practice if waste management.

**Table 5: Common Challenges on Waste Management (A)
Actual Waste Segregation Practice of Students, Employees, and Faculty**

Indicators	Weighted Mean	Descriptive Equivalent
1. Waste segregation is observed by the students.	3.90	Agree
2. Biodegradable, non-biodegradable and infectious wastes produced by the faculty are segregated.	4.13	Agree
3. Employees (e.g. non-faculty, Hi-Per, etc.) of the institution do practice segregation of wastes in their specific facilities.	4.45	Strongly Agree
4. Students follow the specific label/color coding of the trash bins efficiently.	3.89	Agree
5. The faculty separates their solid wastes from others like liquid wastes, etc.	3.95	Agree
6. Hi-Per are well-oriented of the different wastes generated by each facility of the institution.	4.55	Strongly Agree
Overall	4.15	Agree

Waste Containers Available in Each Area in School/Institute

Indicators	Weighted Mean	Descriptive Equivalent
1. There are at least one/two trash bins on each of the:		
a. Classrooms	4.65	Strongly Agree
b. Faculties	4.56	Strongly Agree
c. Libraries	4.65	Strongly Agree
d. Offices	4.66	Strongly Agree
e. Restrooms	4.63	Strongly Agree
f. Canteen	4.74	Strongly Agree
g. Parking Lots	4.48	Strongly Agree
h. Gymnasium	4.58	Strongly Agree
i. Swimming Pool area	4.50	Strongly Agree
2. Laboratories have at least 3 trash bins for Biodegradable, Non-Biodegradable and Infectious wastes	4.71	Strongly Agree
3. There are separate trash bins for Biodegradable, Non-biodegradable and infectious wastes on each facility of school	4.66	Strongly Agree
4. There are adequate numbers of trash bins found on each floor of the school	4.71	Strongly Agree
5. There are color coded trash bins or specific label for accessible waste segregation	4.84	Strongly Agree
Overall	4.71	Strongly Agree

**Table 6: Common Challenges on Waste Management (B)
Volume of Waste Generated in the Institution**

Indicators	Weighted Mean	Descriptive Equivalent
1. Solid wastes are the most common wastes produced by the institution.	4.27	Strongly Agree
2. High volume wastes are often generated in:		
a. Classrooms	4.45	Strongly Agree
b. Faculties.	3.97	Agree
c. Libraries	4.02	Agree
d. Offices	4.03	Agree
e. Restrooms.	4.31	Strongly Agree
f. Canteen	4.55	Strongly Agree
g. Parking Lots	3.92	Agree
h. Gymnasium.	3.90	Agree
i. Swimming Pool Area.	3.69	Agree
3. There are infectious wastes generated by the institution.	4.19	Agree
4. Segregated wastes are mostly Biodegradable wastes.	4.32	Strongly Agree
5. Segregated wastes are mostly Non-Biodegradable wastes.	4.40	Strongly Agree
Overall	4.16	Agree

Segregation Area/ Facilities

Indicators	Weighted Mean	Descriptive Equivalent
1. Waste segregation facility is any facility where the collection, source separation, storage, transportation, treatment of wastes etc. are being processed.	4.63	Strongly Agree
2. There is at least one segregation area in the whole Institution.	4.56	Strongly Agree
3. The disposal of segregated wastes in the segregation area is always observed.	4.61	Strongly Agree
4. Segregation facility/facilities are well-managed by the personnel/Hi-Per in charge.	4.71	Strongly Agree
5. Precautions in the Segregation facility/facilities are well-observed by the personnel/Hi-Per in charge.	4.73	Strongly Agree
Overall	4.65	Strongly Agree

As illustrated in Table 5, the respondents agree that there is efficient waste segregation practice in the institution, but the challenge is more on the segregation practice of the students and faculty. While it is evident that segregation is being practiced in the classroom itself through color coded waste bins as reported, it is different in terms of the faculty room where there is a common trash bin located in “very few” designated areas such as the ones found outdoors (beside the entry/exit door) and the nearby restrooms. Much solid waste generated is from the canteen, classrooms and restrooms and that these are in terms of biodegradable and non--biodegradable waste as illustrated in Table 6 while the respondents strongly agree

that the institution has well-managed segregation, even storage and collection facilities. Overall, the respondents believe that the common challenges being faced by the institution on waste management is currently being address because the institution has an effective waste management scheme. Thus, campus sustainability is not only achieved through practices that contributes much to the environments but also those that contributes much to efficient management and good investment.

Relationship Between the Level of Awareness on the Types of Waste and the Policies and Legal Aspects of Waste Segregation

Table 7: Correlation Table

Level of Awareness	Relationship between LAWS	p--value	Decision on Ho	Interpretation
Extreme Awareness	0.9206	0.004	Do not Accept	Significant
Moderate Awareness	0.8255	0.012	Do not Accept	Significant

There is significantly high to very high relationship between the level of awareness of the respondents and their awareness with the policies and legal aspects of waste segregation. The p--values were all less than 0.05 which resulted in the non--acceptance of the null hypothesis and thus, an adequate statistical evidence prove that Hi--Performance specialist with extreme knowledge on the types of wastes also has extreme knowledge on the policies and legal aspect of waste segregation. The janitorial services rendered by the Hi--Per Specialist is at par with their knowledge on the nature of their job giving way to efficiency of the institutional waste management scheme presently implemented which contributes to the aim of achieving campus sustainability.

4.0 CONCLUSION

The level of awareness of the janitorial services rendered by the Hi--Per Specialists in FEU--NRMF in terms of the types of waste and the policies and legal aspects of waste segregation was evaluated. It was found that the Hi--Per Specialists have extreme awareness on matters concerning waste segregation and the mandates governing it. This is later found to be consistent with the high correlation between their level of awareness on types of wastes and their awareness on the policies and legal aspects of waste segregation. These attributes of the Hi--Per Specialist enable them to provide efficient janitorial services to the institution and contribute to the efficient implementation of the waste management scheme of the institution. This also enables the institution to be able to address the common challenges presently faced in terms of waste management. So far, it is concluded that campus sustainability is achieved through efficient waste management scheme, paving towards good governance, wellness, materials recovery and conservation and good investment.

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