Waste Management Practices of an Educational Institution

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Abstract - The study aimed to assess the waste management practices of LPU-B. Specifically, it determined the level of effectiveness of Waste Management Practices of LPU-B in terms of: collection strategies, disposal and recovery and processing of waste materials; determined the problems encountered on waste disposal practices tested the significant difference on Waste Management Practices in LPU-B and finally, proposed an action plan that will improve the Waste Management Practices of LPU-B.

This research utilized descriptive method of research. The descriptive research is also known as statistical research that describes data and characteristic about what practices, level of effectiveness and recovery and processing. The respondents of the study were the staff and heads of different offices/department. One hundred and one (101) respondents were chosen randomly and purposively. The researchers used a questionnaire as the main gathering instrument.

The researchers concluded that waste management practices of LPU-Bwas effective in terms of collection, disposable, recovery and processing as perceived by the respondents. Problems occurred specifically that disposal areas of waste materials were not strategically located. Moreover, means of recovering and reusing such waste were not strictly implemented.

Keywords – Waste Management LPU-B collection, disposal and processing and recovery.

I. INTRODUCTION

Batangas City is a progressive community which provides a peaceful and clean and a high value for the environment and above all God fearing community. The local government of the city proposed projects and plans for the conservation of the environment. It promulgated an Act, Environment Code (E-Code) last October 27-31, 2011.And license received a Gold Award in the Project Category in the International Awards for Liveable Communities (LivCom) Competition which was held at Songpa, Seoul, South Korea and was recognized as a Model Eco-City by the Philippine National Solid Waste Commission, and considered as the First Class City Category of the Philippines.

According to Perez, (2011) segregating the waste is also doing part in waste management. Avoidance of having trash is one way of lessening the garbage problem in the country. Using materials that are environmental friendly, to minimize and solve the garbage problems of the Philippines. On the other side, the focus on economic growth has led as to take environmental management for granted. Solid waste became the most visible environmental problem in the country, and has remained so for years.

A management to that can help planners study objectively and make rational decisions as to the best alternative strategic options of managing, recovering and utilizing the vast quantity of solid waste is a very important investment (Guzman, et.al 2010).

The Sangguniang Panlungsod of Batangas City promulgated an ordinance in the E-Code providing for the Environment Code of Batangas City. Ordinance No. 16, Series of 2010.

This code shall be known and cited as the "Environment Code of Batangas City," and shall be commonly referred to as E-Code.

As stated in Section 82: Under the ECODE ordinance of Batangas the Batangas City Solid Waste Management Plan shall contain strategies that promote waste minimization at source, community-based or cluster-based solid waste segregation, ecologically sound sanitary temporary storage, safe and secure waste collection method, efficient and effective transport schemes, market-based disposal fees that would sustain operations of sanitary landfill, specific for the following major sources of solid wastes: included in the ordinance that the households on the residential houses within

subdivisions, apartments and condominiums. The Sangguniang Panlungsod shall enact resolutions/ordinances recognizing Eco-waste Clusters and deputizing cluster leaders as recommended by the City ENRO. The barangay cluster leaders shall be authorized to recommend to the Sangguniang Panlungsod guidelines for the solid waste management plan. These guidelines may also include collection of fees, fines and penalties including the proposed utilization schemes for income generated by each clusters.

Also all industries located inside the City shall be mandated, for offshore industries, the solid waste management to establish their own waste disposal facilities or in the alternative, enter into contract with solid waste disposal facilities of private operators or of the City. Plan shall include provisions for safe collection and transport of solid waste from plant to ports.

They shall be required to establish their own solid waste disposal facilities in the mainland or may enter into contract with solid waste disposal facilities of private operators or of the City.

Furthermore, the commercial establishments cover business establishments offering services such as food and short- term accommodation, selling and or trading processed goods, vehicle repairs and maintenance, students and office needs services shops and stalls, coastal resorts, garage and port operators and other as may be identified later.

According to Baula (as cited in Bussala, 2010) the participation is the key when the students are involved in the waste management program of the school, an effective and sustainable implementation of the waste management practices is achieved. The support of the school's administration to the waste management is also critical.

One of the issues discovered by Barrows and Griffin (2010) in their study was the lack of documentation on the part of the school regarding the implementation of the waste management practices such as recycling. For this reason, researchers in the past had difficulty obtaining full and accurate data. Barrows and Griffin asserted that the first step to improving waste management in schools is to improve their accountability, and similarly, the regulations placed on them.

Waste management includes strategy system to have proper collection, segregation and proper disposal of waste. Everywhere in many sectors from hospitals, factories, manufacturing companies, Government/ private offices, hospitality establishments or even in the households have their own waste management practices.

Lyceum of the Philippines University Batangas (LPU-B) is committed to its continuous improvement; LPU-B is also the first school in the region to receive a school-wide ISO 9001:2000 accreditation, signifying the school's compliance to quality management standards, (Wowbatangas.com) and (Lyceum of the Philippines University Manual).

LPU-B is dedicated in providing quality education and never stops in upgrading the facilities and enhancing the curriculum to produce high caliber graduates. With all this, the University exert effort on other areas on non- academic aspects for the betterment of the entire LPU-B's community. Thus, Waste Management Practices of Lyceum is included,

In fact, LPU-B is fully implementing the 5s program or simply the five-step process (sort, set in order, shine, standardized and sustain) in each offices and departments. The selected auditors rate and audit each of the departments/offices who qualifiesto the standards of 5s program. The 5s award will be given to those who able to meet the criteria.

In the hospitality industry, Waste Management is essential to implement and notice at all times. The positive result has a great effect on the behavior side/operation. The researchers as a tourism student soon to be part of the hospitality industry would like to know the waste management practices, its system and how it affects our environment, how important waste management system and if there is risk factors of waste management practice to humanity.

With this, the researchers will make a further study to contribute for the improvement of waste management system of LPU-B. To prevent the grave effect of improper waste management that can lead to the destruction of the environment. In this way the researchers can somehow help the community in environmental preservation by providing and utilizing the results of the study.

II. OBJECTIVES OF THE STUDY
This research focused on the Waste Management Practices of LPU-B. Specifically, it aimed to determine the level of effectiveness of Waste Management Practices of LPU-B in terms of: collection strategies, disposal and recovery and processing of waste materials. Furthermore, to determine the problems encountered on waste disposal practices and to identify if there is significant difference on Waste Management

Practices in LPU-B. Finally, to propose an action plan that will improve the Waste Management Practices of LPU-B.

III. METHOD

Research Design

This research utilized descriptive method of research. The descriptive research is also known as statistical research that describes data and characteristics about what practices, level of effectiveness and recovery and processing. It answers that question who, what, where, and how. This kind of research also deals with the present existing condition and data gathering (Beredo et al.,2013).

Participants

The respondents of the study were the staff and heads of different offices/department. Respondents were chosen randomly and purposively. A total 101 respondents were surveyed in the study.

Instrument

In order to obtain the necessary data, the researchers used a questionnaire as the main gathering instrument. The questionnaire was self-structured patterned from books and studies of similar topics. The questionnaire is composed of three parts. Part 1 involved the respondents' department/office where he/she belongs. Part 2 deals with the effectiveness of the existing waste management practices of LPU-B. Part 3 is consist of the problems encountered in the waste management practices in LPU-B.

Procedure

In order to obtain information about waste management the researchers utilized the library, online resources, and data searching online. After series of consultations and reviews, the questionnaire was finalized by the faculty member of the department of College of International Tourism and Hospitality Management. The researcher distributed the questionnaires to the respondents in order to identify and get the answer to the questions stated in the objectives of the study.

Data Analysis

All data gathered were presented graphically to interpret the result and descriptive statistics such frequency distribution and weighted mean were used. Frequency distribution and weighted mean and ranking were utilized to determine the waste management practices of LPU-B in terms of: collections, disposal and recovery and processing. Also, to identify the problems encountered in waste management practices. Pearson r is the most commonly used method of computing a correlation coefficient between variables that are linearly related, it is used to analyze if there significant relationships among the different waste management practices being employed by LPU – B. (http://www.thefreedictionary.com)

For certain responses in the study, the following scale and its corresponding verbal interpretations were used: 3.50 – 4.00: Highly Effective (HE)/ Strongly Agree (SA); 2.50 – 3.49: Effective (E)/Agree (A); 1.50 – 2.49: Moderately Effective (ME)/ Disagree (D); 1.00 – 1.49: Not Effective (NE)/Strongly Disagree (SD).

IV. RESULTS AND DISCUSSION
Table 1. Effectiveness of the Existing Waste Management Practices (N=101)

Collection Practices	WM	VI	Rank
1. Waste Materials are collected according to the schedule.	3.31	E	2
2. Waste Materials are collected during weekends and even during holidays.	3.02	E	6
3. Departments are informed on the days when garbage are to be collected.	3.05	E	5
4. No garbage are left uncollected on the scheduled time.	2.97	E	9
5. Waste Materials are collected in designated area.	3.27	E	3
6. Medical Waste are place in appropriate container located throughout medical department facility at time of generation. (if applicable)	3.14	E	4
7. Wastes are collected by the maintenance staff.	3.40	E	1
8. Infectious Waste, chemical waste, toxic substances are collected together, regardless of whether or not they are contaminated. (if applicable)	3.01	E	7
9. Grease trap, kitchen waste, are collected by authorized staff in strong, leak proof containers that are clearly label. (if applicable)	3.00	E	8
Composite Mean	3.13	**E**	

Table 1 shows the effectiveness of the existing waste management practices in terms of collection. All items yield from 2.97 to 3.40 weighted mean with moderately effective verbal interpretation. The waste are collected by the maintenance staff ranked first with 3.40 weighted mean while no garbage are left uncollected on the scheduled time ranked last with 2.97 weighted mean, both statements with effective verbal interpretation. The composite mean of 3.13, verbally interpreted as moderately effective suggests that respondents are sensible enough about the collection practices of the wastes.

Every college, offices and building itself have assigned maintenance personnel to do the cleaning, collecting and disposing of waste as the classes and offices ended each day. That complements to waste materials are collected according to the schedule ranked as no 2. Though no garbage are left un collected on the schedule time ranked lowest but with verbal interpretation of effective.

In order to the local community to participate in waste management services the municipality of Bhaktapur has overall responsibility in inspecting and facilitating effective waste management. The municipality allocates one ways inspector to each of the wards. (Practical Action Nepal November 2008)

In addition, staff management of the Bhaktapur municipality the monitoring of streets sweeping and waste collections are very effective because municipalities' staff work in the area where they deal.

Furthermore, the study of Dimaculangan (2009) shows that the wastes being disposed can be recovered and reused. It is also possible to design and construct material recovery facilities or M.R.F fort the solid waste management.

The effectiveness of the existing waste management practices in terms of disposal is presented in Table 2. All items yield from 3.03 to 3.31 weighted mean with effective verbal interpretation. Waste are disposed in the designated area and are not disposed in rivers, canals and vacant lots ranked first while leftovers are disposed in the trash bins ranked last. The composite mean of 3.18, verbally interpreted as effective indicated that respondents were conscious enough about the disposal practices of wastes.

The result revealed and showed consistency on: Waste disposal in the designated collection area as it tied to waste materials are not disposed to rivers, canals, sea or vacant lots. This show how waste management system is being practiced by lyceum a whole.

Table 2. Effectiveness of the Existing Waste Management Practices

Disposal Practices	WM	VI	Rank
1. Waste Materials are not disposed to rivers, canals, sea, or vacant lots.	3.31	E	1.5
2. Disposal of waste materials are being done through bidding process.	3.11	E	7
3. Waste Materials are disposed according to the methods prescribed by the government.	3.21	E	4.5
4. Waste Materials are disposed properly in the designated trash bins.	3.24	E	3
5. Waste are disposed according to schedule.	3.16	E	6
6. Leftovers are disposed in separate trash bins.(if applicable)	3.03	E	9
7. Waste are disposed in the designated collection area.	3.31	E	1.5
8. Infectious Waste, chemical waste, sharps waste, toxic substances are disposed properly.	3.21	E	4.5
9. Kitchen waste, infectious waste, chemical waste, sharp waste, toxic substances, medical waste are disposed in marked high-density garbage bags. (if applicable)	3.07	E	8
Composite Mean	3.18	**E**	

In the study made by Baula(2010) wherein when student are involve in the waste management program an effective and sustainable implementation of the waste management practices are achieved. Moreover, the faculty are the promoters and must be the leaders of the school's waste management program in order for the students to follow.

According to Practical action Nepal 2008 the residents of Nepal are expressing their desire to develop final disposal system with the help of the municipalities promotion of waste reduction, reuse and recycling among local communities would be match easier by the same token, 58 municipalities in various part of the country are providing effective house to house waste collection services and some are making good progress towards finalist disposal.

Through the help of five steps process or 5s the principle in is improved safety, efficiency and employee morale. The result of 5s are both visually and economically dramatic where in it eliminates waste full

platter and creates owner ship of process among workers.

In the study, of Perez, 2011 avoidance of having trash is one way of lessening the garbage problem in the country. Using materials that are environmental friendly, community can help in minimizing and even solving the garbage problems of the Philippines.

Table 3. Effectiveness of the Existing Waste Management Practices

Recovery and Processing Practices	WM	VI	Rank
1. Practice 3R. (Reuse, Reduce, Recycle)	3.29	E	3
2. Using 5S. (Sort, Set in Order, Shine, Standardized, Sustain)	3.45	E	1
3. Full implementation of MRF. (Material Recovery Facility)	3.32	E	2
Composite Mean	3.35	E	

Table 3 presented the effectiveness of the existing waste management practices in terms of recovery and processing. Based from the table, the respondents are aware in the recovery and processing of the wastes. This statement is attested by the composite mean of 3.35, with using 5s as first, full implementation of materials recovery facility as 2nd, and practice of 3r as 3rd. This means that the management is determined to turn wastes into new reusable thing or object.

As presented in the above tables about the effectiveness of the existing waste management practices of LPU - B, it can be viewed that the recovery has the highest weighted mean (3.35), followed by disposal (3.18), and the collection (3.13) as last. This means that respondents are aware of the waste management practices. Further, it attested that the school officials fully understand the significance of the implementation of proper and order waste disposal practices.

According to the study of Furto and Reyes (2010), residents of Batangas City, in general, moderately implement the solid waste management practices in their communities. The residents practiced fully the feeding of left over foods to pets. Selling of bottles, plastics, cans and other scraps to junkshops; avoiding the use of toxic and hazardous materials and chemicals; collection of garbage by municipal trucks; reuse of reusable materials; segregation of biodegradable from non-biodegradable wastes and acquisition of sanitary landfill are practiced to a moderate level. Practices such

as reducing waste generation, composting and recycling are implemented slightly.

Table 4. Problems Encountered in the Existing Waste Management Practices

Problems Encountered	WM	VI	Rank
1. Disposal area is not strategically located.	2.15	MA	1
2. None compliance of the department/offices.	2.02	MA	4
3. 5S/3r is not strictly implemented	2.06	MA	2
4. Waste Materials are not properly disposed.	1.90	MA	7
5. Delayed schedules of collection.	1.99	MA	6
6. No designated area for disposal of infectious waste/chemical wastes.	2.03	MA	3
7. No safe disposal of infectious waste, toxic waste, sharps waste, chemical waste, pressurized container and radioactive waste. (if applicable)	2.00	MA	5
Composite Mean	2.02	MA	

The problems encountered in the effectiveness of the waste management practices are presented in Table 4. All items yield from 1.90 – 2.15 and is interpreted verbally as Moderately Agree. Disposal area are not strategically located ranked 1st while waste materials are not properly disposed ranked 7th.The composite mean of 2.02, verbally interpreted as Moderately Agree, showed that collection, disposal, and recovery and processing of waste, though they are means of doing it, are moderately practiced and implemented.

The finding is synonymous with Furto and Paz (2013) study. The residents of Batangas City encountered problems in the implementation of Solid Waste Management practices to a moderate level such as lack of awareness regarding the effects of solid waste management to health, lack of training on proper solid waste management practices, public indifference, increasing population and inadequate government policies.

Other problems were encountered at a minimum level and these are the non – operation of a good disposal facility, irresponsible government officials, rapid urbanization, and inefficient collection of garbage.

Further, the similar result from Bhaktapur faced numerous problems from poor response for its effort to

encourage waste minimization at source. One of the major problems is that the waste management work force is too small to enable the municipality to achieve its vision. Similar with the present studies of the researchers department of offices did not complied that match to the vision of the project. Moreover, the municipality of Bhaktapur charges a very nominal yearly fee for waste management in so thus not have sufficient in count to fund needed investment.

The municipality Tribhuvannagar encountered poor response from citizens to waste minimizations initiatives due to shortage of waste management staffs and lack of authority of the community development section to make financial and administrative decisions and implement enforcement measures. Similar to the presents study of the researchers problem encountered are delayed schedules of collection disposal area are not strategically located, none compliance of the department or offices and 5s/3r is not strictly implemented.

Table 5. Correlation of the Existing Waste Management Practices

	r value	p - value	Interpretation
Collection-Disposal	0.662**	0.000	Significant
Collection-Recovery and Processing	0.591**	0.000	Significant
Disposal - Recovery and Processing	0.626**	0.000	Significant

**. *Correlation is significant at the 0.01 level (2-tailed);* Legend: Significant at p-value< 0.05

Table 5 reveals the correlation of the existing waste management practices of LPU - B when paired. It can be viewed that practices when paired exhibited from moderate to strong positive correlation ranging from 0.591 to 0.662 r values. Based form the result, the computed p values were all less than the 0.05 level of significance, thus the alternative hypothesis of significant relationship between waste management practices is accepted. This means that if level of collection practices on waste management is high, the disposal and recovery and processing practices will also be high.

V. CONCLUSIONS AND RECOMMENDATIONS

The Waste Management practices of LPU-B are effective in terms of collection, disposable, recovery and processing as perceived by the respondents. The respondents are moderately agreed that there are problems occurring in the waste management practices of LPU-B, specifically that disposal area of waste materials is not strategically located. Moreover, though there are means of recovering and reusing such waste but there were not strictly implemented. There are significant relationships in the waste management practices of LPU-B in terms of collection, disposal and recovery and processing. The researchers proposed an action plan for the improvement of waste management practices in LPU-B.

It is recommended that the implementation of waste disposal, collection and proper segregation of Waste may strictly be implemented and monitored in all offices/colleges. School officials/Management PFMO may conduct regular assessments and evaluation on the programs supporting Waste Management Practices. Seminars may be conducted to keep them abreast with the current technologies on waste management practices. Disciplinary actions/ sanctions may be given for those who violate the rules and regulations on waste management practices of LPU-B through community service and sponsoring seminars/forums regarding waste management practices. Future researcher may conduct similar study using different variables.

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