ASSESSMENT OF WASTE MANAGEMENT INITIATIVES OF SELECTED HEIS IN THE BICOL REGION

Shiela I. Arroco
Jonathan C. Arroco
Alvin A. Sario

Introduction

The environment has a crucial influence on the kind of life we live. With the advent of industrialization and economic growth, changes occurred in people's way of living. Varied lifestyle and consumption patterns have contributed to increasing quantities of waste.

While some countries have long before called and awakened their constituents for a deeper environmental sensitivity, there are others who are just starting to be aware of its importance. Some already had a realization of the negative impacts that wastes have had on the environment. In the Philippines for instance, the environment-related tragedies are destructive, such as that of Payatas that paved way to the enactment of Republic Act No. 9003 or the Ecological Solid Waste Management of 2000. Likewise, the alarming effects of floods in some parts of the country awakened the citizens concerning proper disposal of wastes, since most causes of floods were associated with clogged canals and rivers due to various kinds of waste. These scenarios are clear manifestations of environmental neglect or abuse. However, with the implementation of RA No. 9003 by the Local Government Units (LGUs), communities are increasingly becoming aware of simple and proper waste disposal method.

In the Bicol Region, the experiences of floods and other calamities prompted not only the LGUs but also schools to initiate waste management activities that address waste-related problems. In the higher education institutions, emphasis and importance have been given to environmental education in their major programs or projects particularly in the National Service Training Program (NSTP). Whatever initiatives each higher educational institution (HEI) may have on waste management, these will still meet at a common goal, which could revolve within reduction, recycle or re-use of wastes. Hence, with the belief that each HEI in the Bicol Region has waste management, this research attempted to describe and assess their initiatives implementation according to their stakeholder's awareness, perceived outcomes and influence along environment, economic, and social aspects.

Rationale/Framework/s

In the Philippines, Republic Act No. 9003 or the Ecological Solid Waste Management Act of 2000 was implemented in 2000. Its objectives are articulated in Sections 55 and 56, which, among others, will "aim to develop public awareness of, and the community-based solutions to, the solid waste problem; concentrate on waste reduction, resource conservation and recovery, recycling, segregation at source, reuse and composting activities; encourage the public… to endorse and patronize environmentally acceptable products and packaging materials; and strengthen the integration of environmental concerns, particularly on solid waste management, in the school curricula at all levels."

As stated, the Philippine government does not only limit implementation of waste management to national or local institutions, but also recognizes the initiatives of schools to implement waste management program in their vicinity. This was anchored on the following characteristics of schools; namely, 1) Schools, by nature, serve as the most ideal models for correct/proper behavior and attitude development, and are composed of many young people who are impressionable and idealistic. 2) The students are on campus most of the day and theories learned in the classroom can be reinforced by rules and guidelines for behavior. 3) They are let out all together or in big segments at recess time, eating their snacks after playing. 4) There are certain nodes of waste concentration, e.g., paper in classrooms and offices, soiled tissue, soft drink cans, and disposable cups in the canteen, tin cans, and peelings in the kitchen. 5) In all-female schools, feminine napkins make up a big portion of the total waste (Solid Waste Management for Schools, 2005).

Most higher education institutions, through the NSTP, promote environmental concerns as well as establish groundwork for the implementation of solid waste management initiatives. This is beneficial in such a way that it can promote environmental awareness or consciousness among students paving way to answering a solid waste problem in a certain community. Moreover, a school is located within a community where students live. Its waste management initiatives may have some direct or indirect bearing on households through practices, for example, waste segregation at home, recycling, etc. This means that the school can be a channel by which the solid waste management program can be taught.

Theoretical Framework

The study is anchored on six theories: (1) Waste Management Theory, (2) Social Capital Theory, (3) Theory of Reasoned Action, (4) Social Learning Theory, (5) Behaviorism, and (6) Social Influence. These six

theories are interconnected in the discourse of waste management systems of various communities relative to changing contexts.

The Waste Management Theory (WMT) is a unified body of knowledge about waste and waste management, conceptualized in order to facilitate the prevention of waste causing harm to human health and environment and at the same time promoting resource use optimization. It is an attempt to organize diverse variables of the waste management system. It is a proper theoretical background for a scientific systematization establishing explanatory and predictive order among the major problems of waste management. Such theory contributes to the development of a sustainable agenda of waste management. WMT combines waste minimization and resources use optimization measures ensuring that these resources are effectively circulated within ecosystems.

The Social Capital Theory (SCT) can be seen in terms of five dimensions: first, networks-lateral associations that vary in density and size, and occur among both individuals and groups; second, reciprocity-expectation that in short or long term kindness and services will be returned; third, trust-willingness to take initiatives (or risk) in a social context based on assumption that others will respond as expected; fourth, social norms-the unwritten shared values that direct behavior and interaction; and fifth, personal and collective efficacy-the active and willing engagement of citizens within participative community. These five dimensions manifest themselves in various combinations and shape the interaction among the members of a group, organization, community, society or simply network and can be studied through various perspectives. Social capital is context dependent. It assumes many different interrelated forms such as obligations within a group, trust, intergenerational closure, norms, and sanctions. The relationships themselves form the complex web of communications and interactions.

The Theory of Reasoned Action (TRA) proposes that human behavior is influenced by two factors: (1) attitudes toward the behavior and (2) the influence of social environment and general subjective norms on the behavior. Social norms are determined by examples that significant others set for us and by the attitudes they convey to us. According to TRA, attitudes toward behavior are developed and social norms are understood through learning. Social learning assumptions are: (1) Behavior dynamically influences the environment and personal constructs; (2) the environment and personal characteristics affect each other and the person's behavior; (3) For a person to perform a particular behavior s/he needs to know what the behavior is and know that he/she has the skills to do the behavior. Individuals learn what to expect through their own experience and through their social groups; (4) Individuals act in their self interest to get likely outcomes they value; (5) Individuals learn through imitating the behavior of

others around them, and (6) Individuals learn through reinforcements and rewards they receive from their behavior (http://oregonstate.edu/instruct /comm321/gwalker/influence.htm).

Social Learning Theory on the one hand has been applied extensively to the understanding of aggression (Bandura, 1973) and psychological disorders, particularly in the context of behavior modification (Bandura, 1969). It is also the theoretical foundation for the technique of behavior modeling which is widely used in training programs. In recent years, Bandura has focused his work on the concept of self-efficacy in a variety of contexts (e.g., Bandura, 1997).

The most common (and pervasive) examples of social learning situations are television commercials. Commercials suggest that drinking a certain beverage or using a particular shampoo will make us popular and win the admiration of attractive people. Depending upon the component processes involved (such as attention or motivation), we may model the behavior shown in the commercial and buy the product being advertised.

This model behavior is elaborated in the following principles: (1) The highest level of observational learning is achieved by first organizing and rehearsing the modeled behavior symbolically and then enacting it overtly. Coding modeled behavior into words, labels or images results in better retention than simply observing; (2) Individuals are more likely to adopt a modeled behavior if it results in outcomes they value; and (3) Individuals are more likely to adopt a modeled behavior if the model is similar to the observer and has admired status and the behavior has functional value. (http://tip.psychology .org/bandura.html)

In SLT, it is recognized that people learn from other people. They are also influenced to some degree by other people. However, some people, of course, will be more easily influenced than others and children are the most vulnerable to influence on the whole (cited by Carol Roach, Yahoo! Contributor Network Nov. 5, 2010).

On the point of view of the behaviorists, learning can be defined as "the relatively permanent change in behavior brought about as a result of experience or practice." Behaviorists recognize that learning is an internal event. However, it is not recognized as learning until it is displayed by overt behavior.

Variables of individual behavior include (1) heredity, (2) abilities and skills, (3) perception, and (4) attitudes. Heredity provides some genetic explanation of individual differences while abilities and skills can either be innate or learned. Perception on the one hand is a cognitive process which involves receiving a particular stimulus in the brain, and translating and interpreting the stimulus that will influence behavior. On the other hand, attitude is defined as a mental state of readiness, learned and organized through experience that exerts a specific influence on a person's response

to people, objects, and situations with which it is related. Attitudes are learned and organized close to the core of the individual's personality. They form individual tendencies, predilections, and objections with things and situations. Attitudes are the individual's general affective, cognitive and intentional responses towards objects, other people, themselves, or social issues (Ivancevich & Matteson as cited in Zarate, 2006).

Similarly, social influence is the change in behavior that one person causes in another, intentionally or unintentionally, as a result of the way the changed person perceives himself in relationship to the influencer, other people and society in general. Three areas of social influence are conformity, compliance, and obedience. First, conformity is changing how one behaves to be more like others. Conformity can run very deep, as one will even change his beliefs and values to be like those of his peers and admired superiors. Second, compliance is where a person does something that he is asked to do by another. He may choose to comply or not to comply, although the thoughts of social reward and punishment may lead him to compliance when he really does not want to comply. Third, obedience is different from compliance in that it is obeying an order from someone that one accepts as an authority figure. In compliance, one has some choices. In obedience, one believes that he does not have a choice. Many military officers and commercial managers are interested only in obedience (http://changingminds.org/explanations/theories/social_influence.htm).

In the study, the Waste Management Theory is used to show the various mechanisms and strategies given their strengths and weaknesses in order to ensure optimization of the use of resources and promotion of human health and environment. Through the various practices and activities under waste management initiatives and projects, the characteristics of waste management shall be articulated.

Given the context of the HEIs relative to their initiatives on solid waste management, awareness of various stakeholders is the primary key and assumes prior role to the solid waste management and solid waste management initiatives. Stakeholders as social capital are the ultimate measure of the success of solid waste management initiatives. Their active involvement and positive collaboration would elicit significant outcomes and influence on social, economic, and environmental spheres of solid waste management. An example of social capital could be the voluntary participation of the members to discuss various social and organizational aspects along solid waste management initiatives and activities which benefit all the participants.

The theories on reasoned action, social learning, behaviorism and social influence all provide an explanation of the phenomenon being investigated where human behaviors are influenced by various factors and that attitude towards the environment can be learned. Waste management initiatives of

HEIs generally address the societal problem on solid wastes whereas their environment, both internal and external, manifests its aesthetic outcome. Garbage can be easily touched, seen, and smelled. Hence, the waste management initiatives in the HEIs are perceived by their stakeholders according to observation and modeling whereby change in behavior may be influenced intentionally or unintentionally as a result of the practices in the schools. And since the quality of the environment and the quality of life are directly related, the society must prepare its clienteles to carry out their responsibilities through a system of education; therefore, education must develop in each citizen an awareness of, and sensitivity to, the environment and its problems. Figure 1 illustrates the theoretical framework of the study.

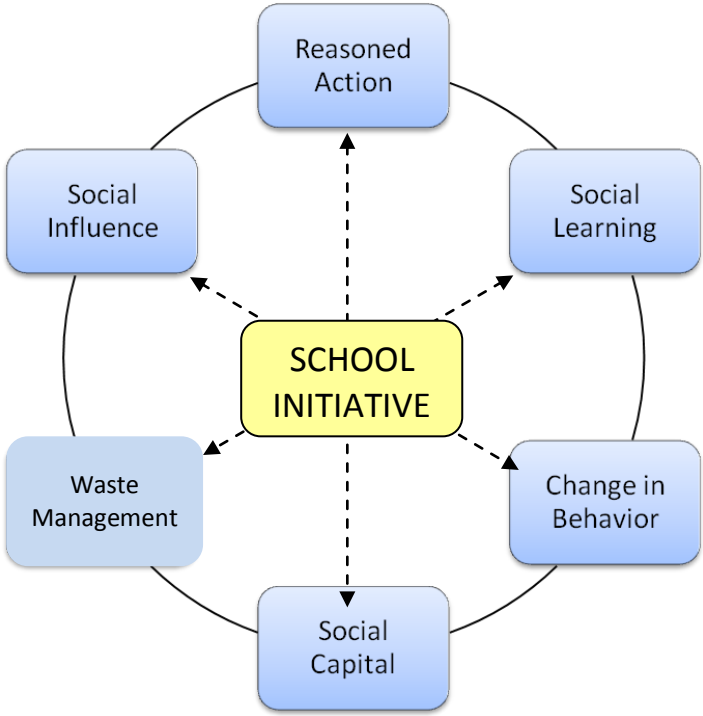

Figure 1. Theoretical Framework Model

Conceptual Framework

RA No. 9003 is the common foundation of the existing waste management initiatives of selected HEIs in the Bicol region. Depending on the nature and the wastes generated, schemes on waste management that

are anchored on the government legislation are adopted by HEIs.

It is a challenge to every individual to reduce his ever increasing contribution of waste to the environment. The everyday routine, whether so simple such as brushing the teeth, bathing, etc., is not exempted from producing wastes in the environment. Except, if one is disciplined enough to properly manage waste, then its production can be minimized or reduced aside from the fact that one can contribute to a healthy living environment free from roaches, flies and other harmful bacteria.

However, the fact that peoples' attitudes and behaviors toward waste management differ, the challenge even increases. As stated by Michael T. Defensor, the schools are basins where people are molded and a training ground through which they instill necessary attitudes and mindsets that would serve as the core toward proper living in a demanding world. Thus, a partnership between and among children and adults and individuals who make up the school community should be strengthened to work on the road to a cleaner and better place conducive to promoting the best learning experience.

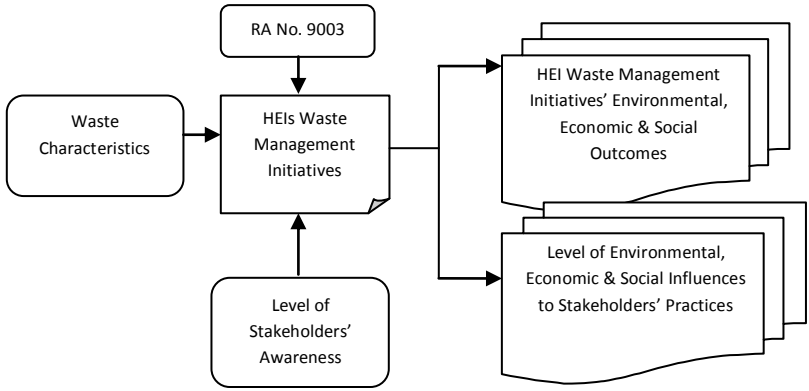

Figure 2. Conceptual Framework Model

The solid waste management module for schools states that the schools, by nature, serve as the most ideal models for correct/proper behavior and attitude development, and are composed of many young people who are impressionable and idealistic. Likewise, the students are on campus most of the day and theories learned in the classroom can be reinforced by rules and guidelines for behavior. They are let out all together or in big segments at recess time, eating their snacks after playing. There are certain nodes of waste concentration, e.g., paper in classrooms and offices, soiled tissue, soft drink cans, and disposable cups in the canteen, tin cans, and peelings in the kitchen. Furthermore, in all-female schools,

feminine napkins make up a big portion of the total waste (ESR and DENR, 2005). In other words, the schools are key players for gaining knowledge and awareness of the various wastes that can possibly harm the environment. Here, people form patterns and thoughts concerning environmental issues. The wastes seen directly within schools do not differ from those found in households and in the communities.

The schools are one of the best places that form the values of the young. Therefore, the development of the value of caring for the earth can ensure a right attitude and behavior towards the waste generation. As Blum (1995 in Owens & Wang, 1996, pp. 8-9) has pointed out, that while there is still an expectation that students learn important facts, there is a growing emphasis on application of facts in problem solving and relating facts to real life outside the school. That is, carrying with them, to their homes or elsewhere, the good habit they had gained from schools.

The prevailing attitude and practices on waste have an impact to the large extent as people deal with wastes. It can be realized then that battles on wastes can be victorious if one cooperates properly and has a sense of care for the surroundings he lives in. As shown in Figure 2, the focus of the study is the determination of the stakeholders' awareness of the waste management initiatives or schemes adopted by each HEI. Whatever initiatives/practices or schemes each HEI adopts, the wastes within the school premises are addressed and these are observed by the stakeholders; hence, perceived outcomes on how well each HEI manages its wastes are manifested in terms of its environmental, economic and social benefits. It is presumed that the students and faculty members must have observed such outcomes. As pointed out earlier, the schools are one of the best places that form the values of the young. Therefore, the development of the positive value on waste management can ensure the right attitude and behavior towards the waste these stakeholders generate at their respective homes and communities. Hence, the waste management initiatives of these HEIs must have positively influenced the stakeholders' waste management practices.

Objectives

This research intended to assess the waste management initiatives of selected HEIs in the Bicol Region. Specifically, it aimed to:

a) determine the waste characteristics found among selected HEIs in the Bicol Region;
b) find out the waste management initiatives adopted by the HEIs;
c) investigate the stakeholders' awareness of the HEIs' waste management initiatives;
d) assess the perceived environmental, economic, and social outcomes of the existing waste management initiatives of HEIs; and

e) determine the environmental, economic, and social influence of the HEIs waste management initiatives to the stakeholders' waste management practices.

Review of Related Studies and Literatures

The Cornell Waste Management Institute (1991) presented a program entitled "Trash Goes to School." It pointed out waste reduction to be one of the most important aspects of waste management. Here, everyone can participate. In the most basic form, there is a need to think about what one is buying. When making purchases, buy only what is needed, use substitutes for toxic substances when possible, buy durable rather than disposable products, and consider packaging and recyclability.

With regard to recycling, its benefits include not only saving of landfill space, but also conservation of energy, decrease of pollution, conservation of resources, and reduction of expenses due to avoided costs. Similarly, compost is a valuable resource for lawns and gardens. By composting, space in landfills can be saved and waste turned into a product that can improve soil and increase its water-holding capacity. In fact, composting is a natural process that occurs with or without our help because in nature the process continues independently.

On the other hand, the role of incineration is one of the most controversial issues that communities are facing in solid waste management. Among the concerns are presence of unwanted metals and organic chemicals, the quality of the ash, which must be land filled, the financial risks, and the worry of becoming a target area for garbage imported from other places. Arguments for incineration include the possibility of recovering energy, the decreased amount of material needing to be sent to a landfill, and the destruction of pathogens.

Landfills will always be needed to manage our noncombustible, nonrecyclable materials, as well as ash from incineration and residues from recycling. In some places, landfills will remain the primary management option when other options become infeasible because of size and population density (http://cwmi.css.cornell.edu/TrashGoesToSchool /TrashIntro.html).

According to the California School Districts (2001, in www.calrecycle.ca.gov), to be responsible stewards of environmental quality, school districts should review processes and operations, and even curriculum choices. They should evaluate the economic, educational, and environmental benefits of implementing an effective waste reduction program. Incorporating waste reduction as part of the school districts overall way of doing business can provide a number of important benefits; namely, reduced disposal costs, improved worker safety, reduced long-term

liability, increased efficiency of school operations, and decreased associated purchasing costs (http://www.calrecycle.ca.gov/ReduceWaste /Schools/).

STFI-Packforsk (Sweden) developed several methods and approaches for supporting waste management decisions at different levels in their society. One of the methods introduced was the environment impact assessment. The paper forwarded that waste management systems thinking is receiving increasing attention. It suggested that if decisions are going to be made, they are likely to be made on a less than perfect basis.

The municipality of Klang in Malaysia (2007) instituted an innovative scheme known as "cash for trash" to address their public Cleansing Management Bill 2007. In this scheme, people themselves bring their garbage to a collection center and receive recompense for every kilogram of trash. The municipality has so far paid for ten (10) tons of garbage collected as of July 2007. Accordingly, it is one way to defray the cost of hiring private contractors to collect rubbish. Likewise, the scheme is coupled with a stricter requirement for waste separation at the household level. Further, it is said that the Klang municipality program could be well adopted for other local authorities nationwide, as a novel adjunct to the urgent effort to improve the cost-effectiveness, efficiency and environmental soundness of country's waste management.

In the Philippines, the waste segregation method is practiced to serve almost the same purpose as that in Malaysia. For some schools, the said method may encourage the production and use of organic fertilizer, as well as provide additional income. The Quezon City government launched a waste segregation scheme that could encourage students to practice recycling in school and at home (Phil. Daily Inquirer, 2008). The Environmental Protection and Waste Management Department identified the pilot sites as Manuel L. Quezon Elementary School, Payatas Elementary School, Lagro Elementary School, Lagro High School, Ernesto Rondon High School, Commonwealth High School and Kalantiaw Elementary School.

Marist School in Marikina has a totally zero waste program. It contributes nothing to the dumpsites of Metro Manila. Its recyclables are bought by junk dealers. Their doy packs go to Kilus Foundation, a non-governmental organization which provides livelihood for grassroots communities who are its partners in the manufacture and export of bags and other items made from this type of waste. The kitchen waste is used as pig feed while its garden waste is composted. Its residual waste is shredded, compacted, baled, and stored to await the day when this can be re-used or recycled. At strategic places in the campus are sets of waste sacks where the common wastes of the school community are segregated at source.

Miriam College in Quezon City has a long SWM history of trial and error. Its present scheme includes creative techniques to improve

segregation at source. For one, the labels for the waste bins use actual specific objects. It has proved extremely effective probably because it requires only a one-step mental process, as opposed to the usual classification where one has to decide whether the waste in one's hand is biodegradable, compostable, recyclable, or residual.

Xavier School in San Juan focuses on the segregation of recyclables from everything else. The paper is classified into bond, newsprint, and cardboard. It has an arrangement with a plastics company whereby the school's recyclables are collected by the latter for free. The company pelletizes the waste plastic and sells the pellets to other factories which manufacture other plastic items. The other wastes like aluminum cans are delivered to the respective factories for recycling. In computing for the financial bottom line, the school comes out ahead; whereas it used to pay the garbage hauler to come by twice a week, the hauler now comes and is paid only once a week.

Assumption in Antipolo has an impressive feature in its SWM program: its vegetable garden fertilized by its compost. The produce is shared by the nuns with Wits staff and friends in the surrounding community (Solid Waste Management Module for Schools, 2005).

In the Bicol region, the Raul S. Roco Youth Achievement Awards (RSYRAA) evaluates youth organizations based on present community participation and contribution in environment, education, health, and other societal issues that will showcase the essential role of the youth as pro-active member of the community. Last February 16, 2009, the committee came up with the list of project entries which qualified for this year's search. These are; (1) Osmeña Colleges Campus Ministry School–Based Solid Waste Management Osmeña Colleges, Osmeña St. Masbate City; (2) Nu Kappa Phi – Nu Kappa Beta Honor Fraternal Organization "LAKDANG ni Nonoy, KWARTA sa Basura & SALUD sa Salud" from University of Nueva Caceres; (3) Kabataang Busig-on Organization Adopt a Mountain Project from Poblacion, Labo, Camarines Norte; (4) SAVE ME MOVEMENT Simultaneous literacy program for the community Universidad De Sta. Isabel; (5) Senior Scouts Outfit "Mata ayaw sa Kalat" from Naga College Foundation; (6) Ateneo Paradigm Eclat Xircle from Ateneo De Naga University; (7) Youth Campus Service Club Campus Zero Waste Management Program from Lewis College, Cogon, Sorsogon City; (8) Young Teachers Society "May Pera sa Basura" from Partido State University; (9) CANR Alpha Phi Omega "Corn Waste Utilization" from CNSC Labo Campus, Talobatib, Labo, Camarines Norte; and, (10) Junior Finance Executives Women Livelihood Development Program (WLDP) Microfinance Loan Program from Partido State University, Goa Campus.

As reported by the National Economic and Development Authority Region V (NEDA V), open dumping is the most commonly used method

of waste disposal in the region. With the passage of the RA 9003, the local government units adopted an ecological waste management program. The open dumpsites were converted to controlled dumpsites and sanitary landfills were provided. Furthermore, NEDA reported that there were already forty-two functional controlled dumpsites in the region at the end of 2006. As of January 2008, there were already twenty-nine functional Material Recovery Facilities and eighty-one markets in the region.

The Civic Welfare Training Service conducted a research regarding solid waste management (Badilla, 2003). It revealed some personal difficulties experienced by CWTS students in waste segregation in their own homes. This included lack of self-discipline, insufficient waste containers, and indifference of other people around them or their lack of cooperation. In the interview, it was revealed that on difficulties in segregation, the following emerged; a) lack of knowledge on solid waste management, b) insufficient containers, and c) lack of discipline. One of the recommendations of the study was to continue collaboration with schools and universities to sustain implementation of solid waste management.

In Portugal, a study was done by Ramos, Cecilio, and de Melo (2008) on environmental impact assessment in higher education and training. The main aim of the research was to assess the Portuguese profile of EIA education, measuring the degree of EIA integration in graduate and undergraduate programs.

Tan and Khoo (2006) conducted a study on impact assessment of waste management options in Singapore. The impact assessment method by SimaPro was carried out by comparing the potential environmental impacts of waste treatment options including land filling, incineration, recycling, and composting. The impact assessment results for climate change, acidification, and ecotoxicity showed that the incineration of materials imposes considerable harms to both human health and the environment. The results also showed that, although some energy can be derived from incineration of wastes, these benefits are outweighed by the air pollution. Out of all the waste strategies, the recycling of wastes offers the best solution for environmental protection and improved human health for the nation.

The Ecological Waste Management Act of 2001 (Republic Act No. 9003, Sections 55 and 56 state that, among others, will "aim to develop public awareness of, and the community-based solutions to, the solid waste problem; concentrate on waste reduction, resource conservation and recovery, recycling, segregation at source, reuse and composting activities; encourage the public…to endorse and patronize environmentally acceptable products and packaging materials; and strengthen the integration of environmental concerns, particularly on solid waste management, in the school curricula at all levels.

Alcuin Papa of the Philippine Daily Inquirer wrote an article entitled "schools urged to teach waste reduction schemes to students" (2010). He mentioned that at the start of the school year, the Eco Waste Coalition in a statement urged the Department of Education to turn the entire Philippines school system "into a dynamic hub where young Filipinos can learn about Zero Waste as a way of life." He wrote further that if the DepEd taps even a fraction of the 23 million students and makes them aware of the zero-waste lifestyle, "we will have a formidable army of Earth-loving Filipinos who will shun wastefulness, including the irksome habit of mixing, littering and burning trash." He also cited what Alvarez said such as "by teaching students at a young age to avoid and manage their waste, important environmental law Republic Act 9003, or the Ecological Solid Waste Management Act, could be easily implemented" (http://newsinfo.inquirer.net /Schools-urged-to-teach-waste-reduction-schemes-to-students).

Research Design

The study is both quantitative and qualitative in nature; specifically, it uses the descriptive-survey design to assess the waste initiatives of the selected HEI's. As Fraenkel and Wallen (1993) stated, quantitative methodology assesses validity through procedures with reliance on statistical indices. This method has preference for statistical summary of results. The qualitative method was employed in studying real world situations through observation and interview. Fraenkel and Wallen (1993) added that certain kinds of research questions could be best answered by observing how people act or how things look. Likewise, interviewing is an important way for the researcher to check the accuracy of –verify or refute- the impressions he or she has gained through observations. The conduct of observation around the campus as well as interview with the key personnel in charge of the HEI's waste management initiative, which included administrators, janitors, faculty, and students was done. A focus group discussion was likewise conducted on HEIs whose personnel were available for discussion at the same time. Interviews and focus group discussions were recorded using a journal and a digital audio recorder.

Variables of the Study

The waste management initiatives of the different schools were assessed in terms of the level of awareness, arrange according to Table 1 awareness, outcome, influence as perceived by the respondents. The level of awareness pertains to the familiarity of the respondents on their school's waste management initiatives or practices. The level of influence refers to the extent of how the given activities were put into practice by the

respondent as an outcome of the school's waste management initiatives. The perceived outcome refers to how often the given circumstances /conditions are present as a consequence or result of the waste initiatives of their school. The view of the respondents on the three variables was quantified using the scale shown in Table 1.

Table 1
Scales Description for the Level of Awareness, Outcome, and Influence

Numerical Rating	Variables and Adjectival Descriptions			Interpretation
	Awareness	Outcome	Influence	
3	Very much aware	Often/High	High	more than 70% of the time
2	Moderately Aware	Sometimes/Moderate	Moderate	30%-70% of the time
1	Not Aware	Seldom/Low	Low	less than 30% of the time

The different types of wastes produced by each school were also identified and ranked by the key informants in terms of quantity. Only four HEIs have data on the quantity of wastes produced; hence, the key informants provided estimation of waste generation in terms of kilograms.

Research Site

This study was conducted in the Bicol Region. It identified fourteen (14) HEIs within the provinces of Albay, Catanduanes, Masbate, Camarines Sur, Camarines Norte, and Sorsogon. Only twelve (12) HEIs participated in the study; namely, the Bicol University (BU) and Aquinas University of Legazpi (AUL); Ateneo de Naga University (AdNU), University of Nueva Caceres (UNC), Central Bicol State University of Agriculture (CBSUA), Partido State University (PSU), University of Saint Anthony (USANT), and Camarines Sur Polytechnic Colleges (CSPC); Camarines Norte State College (CNSC); Sorsogon State College (SSC); Catanduanes State University (CSU); and Don Emilio B. Espinosa Sr. Memorial State College of Agriculture and Technology (DEBESMSCAT). Figure 3 shows the location of each HEI per province.

The reason for the selection of the said HEIs lies on the fact that private universities and state universities and colleges constitute a large number of enrollees. It follows that the bigger the enrolment, the bigger the production of waste is. Likewise, universities are considered not only in terms of size but also in terms of facilities that add up to waste production.

Figure 3. Location of each HEIs per province

Population and Sample

The researchers were able to obtain data from a good number of respondents and the sample size of 22% even exceeded the minimum requirement of at least10% usually used for surveys. This high percentage of respondents from the different groups suggests that data obtained from the sample may not be very different from the population. Other respondents included key informants like the janitors and those in-charge of the waste disposal scheme of the HEIs were interviewed to cross validate information obtained.

Research Instrument

A self administered questionnaire was prepared by the researchers and was used to obtain information from the two groups of respondents. The first part of the questionnaire consists of indicators that were used to measure the level of awareness of the respondent. The indicators included in the second part of the questionnaire were used to evaluate the outcome of the waste initiatives of the HEIs. The third part contains ten indicators which included the different practices or activities which are possible outcomes or results of the waste initiatives. The said indicators provided

answers on the level of influence as perceived by the respondents.

An interview guide was also prepared by the researcher to facilitate data gathering from key informants and also during focus group discussions. The waste characteristics and waste disposal systems were some of the topics included in the guide. The research instrument was validated by pilot testing. The study also utilized secondary data which came from the waste management initiatives of the HEIs, guidelines, accomplishment reports, documentation, and other exhibits. Another instrument was the researchers' journal that contains the activities, observations, and interview results throughout the conduct of the study.

Statistical Treatment

Simple descriptive statistics like frequency and percentage were used to analyze the data obtained from the respondents. The category with the highest percentage of respondents was considered as the most typical answer of the group. The most typical answer (mode) served as the basis in describing the group or variable and also in evaluating the results of the study. The variables were analyzed by comparing the answers of the two groups of respondents. Differences and similarities were also noted among HEIs with institutionalized waste management initiatives and those without.

Results and Discussion of Accomplishments per Objective

Waste Characteristics found in Selected HEIs in the Bicol Region

The waste characteristics per HEI were determined based on the responses of the school waste management key personnel as well as the researchers' observations. Various waste characteristics found in the selected HEIs are papers, plastics, organic wastes, food wastes, glass, metal, sharp wastes, and liquid wastes. The paper wastes usually come from offices and students' everyday classroom activities. The plastics comprise water containers, junk food and candy wrappers, straws, disposable spoons and forks, and glasses. The leaves and twigs in the campus form part the organic wastes.

Figure 4. The common waste characteristics found in HEIs

Chemicals used in laboratory activities are the usual source of the schools' liquid waste. Likewise, the batteries used for experiments, oil from their vehicles and other types of batteries form their hazardous wastes. Disposable needles and blades for schools offering health-related profession courses are sources of the schools sharp wastes. The construction wastes are usually taken care of by the contractors. However, small quantities of demolition wastes left are usually used by the schools for filling the grounds. Left over foods usually from canteens are source of food wastes. Figure 4 shows the common waste characteristics found in HEIs.

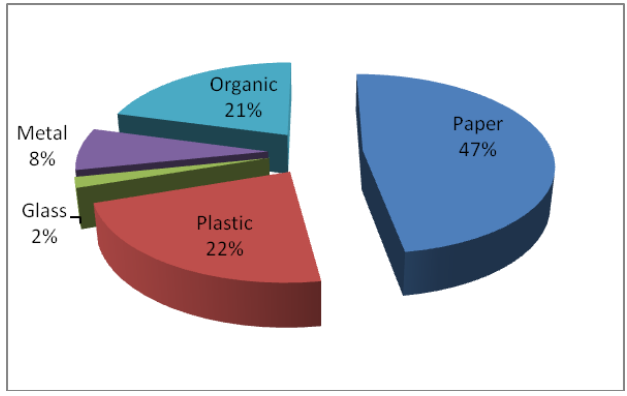

Figure 5. Waste Characteristics in Kilograms

It can be seen Figure 5 that paper, plastic, and organic wastes are the major waste generated common to both types of HEIs. Metal and glass wastes form too little of their entire wastes. It can be noted that other types

of waste such as hazardous and sharp waste are negligible because, as cited by key personnel, the construction wastes are actually taken care of by the contractors. This means that after a project or a construction is finished, all the waste products including debris, demolition wastes, etc. are brought by the contractors with them. Disposal of these types of wastes does not form part of the tasks of their janitors.

Table 2
HEI's Waste Generation Per Capita

HEI	Generation Rate (kg/capita/day)
ADNU	0.006004
AUL	0.002856
BU	0.004349
CBSUA	0.002842
CNSC	0.001091
CSU	0.002358
CSPC	0.001628
DEBESMSCAT	0.003804
PSU	0.001835
SSC	0.001227
UNC	0.002434
USANT	0.000995

As estimated by key informants of the eight HEIs and weighed by four HEIs, the waste generation per capita is presented in table 2. It can be seen from the table that ADNU and BU largely generate wastes daily. These two HEIs also comprise great number of population. This implies that the greater the population a school has, the greater is the amount of waste generated. Although, ADNU has lesser population as compared to BU, yet the generation rate per capita in ADNU is greater than that in BU. This may be because ADNU is located in Naga City that is highly urbanized wherein, the daily waste generation per capita (0.62 kg/capita/day) is also bigger than that in Legazpi City (0.29kg/capita/day) (source: EMB V, 2010).

DEBESMSCAT has the least population among the twelve HEIs yet its generation rate per capita is higher as compared to AUL, CBSUA, CNSC, CSU, CSPC, PSU, SSC, UNC, and USANT. This is because DEBESMSCAT has dormitories and cottages whose occupants stay in the school for the whole semester, that their daily waste form part of the entire

waste generated by the school. Meanwhile, the rest of the HEIs only have the bulk of their population during school hours and most of their wastes are generated in their homes or boarding houses.

Waste Management Initiatives of HEIs

As revealed from the interview with key personnel in-charge in the different HEIs, the schools already have waste management initiatives even before the Ecological Solid Waste Management (ESWM) Act of 2000. Among the twelve HEIs, only three, namely, USANT, DEBESMSCAT, and AUL have institutionalized waste management initiatives. Although other HEIs do not have a waste management initiatives put on paper, their waste management initiatives are patterned after RA No. 9003.

Figure 6. Common Waste Disposal Scheme in HEIs

Common to all HEIs are the waste disposal schemes shown in Figure 6 such as organic wastes converted into fertilizer, use of trash bins and waste segregation, burning, recycling, landfill, and maintenance of material recovery facility.

While each HEI adopts a particular scheme of waste disposal unique to the nature of their institutions, it was observed that in all HEIs, segregation of wastes is not properly observed even when trash bins are labeled biodegradable, non-biodegradable or recyclable. Shown in Figure 7 are common trash bins found in HEIs.

Figure 7. HEIs' Utilization of Trash Bins

The next section presents the summary discussion of the waste disposal initiatives in the selected HEIs in the Bicol Region. Table 3 presents the waste disposal schemes for the top five waste characteristics.

Table 3
Percent Distribution of HEI on Waste Disposal Scheme

Waste Disposal Scheme	Paper		Plastic		Organic Wastes		Construction Waste		Glass	
	Private	SUC	Private	SUC	Private	SUC	Private	SUC	Private	SUC
Recycled	100	63	50	13				63	33	25
Sold	100	75	75	63				100	7	50
Contained		13		13						25
Sanitary landfill	25		25		50					
Open dumping				25				100		
Burning	25	13	25	13						
Composting					50	100				
Collected by LGU				13						

As shown in the table, all (100%) of private HEIs recycle and sell

papers. The same schemes are done on papers in most SUCs. As a common practice, the clean side of used bond papers is reused for letters and other documents within campus use. Some collected papers are used for artworks.

Plastics are primarily sold both by majority of private HEIs and SUCs. The Institute of Agricultural Sciences and Environmental Management (IASEM) in CBSUA collects plastics (residual) and the students make braid out of them. It can be noted however, that some HEIs still practice the burning of plastics. Further, it can be seen in the table that there is also small percentage (13%) of SUCs that contain these types of waste.

With regards to organic wastes, both private HEIs and SUCs compost them. Not limited to agricultural HEIs, organic wastes such as leaves, grass, and animal manure are converted into organic fertilizer. AdNU shreds the leaves for composting. Figure 8 shows where these organic fertilizers are used.

Figure 8. Organic Wastes Used as Fertilizer

Construction wastes in SUCs are primarily sold, recycled, and dumped. Glass wastes are recycled, sold, and contained. Some recycle broken glass by mixing them with cement to make a new product. In general, majority of the waste characteristics found in HEIs are both recycled and sold.

Liquid wastes form too little of the schools' generated waste, yet most of them are either contained or in the case of private HEIs, they have septic tanks for these liquid wastes. Finally, food wastes are usually taken care of by the canteens or collected and used as animal food.

As mentioned in the above discussion, particularly those HEIs with institutionalized waste management initiatives, they have provisions for

recycling, selling, composting, dumping, reusing, and reducing waste materials.

Stakeholders' Awareness of the School Waste Management Initiatives

Based on the interview conducted with the different schools' waste management key personnel, it was revealed that out the twelve HEIs, 83% disseminate information or policies related to school waste management through letters on proper segregation, schedule for waste collection as well as seminars, etc. The rest of them make use of posters and signage.

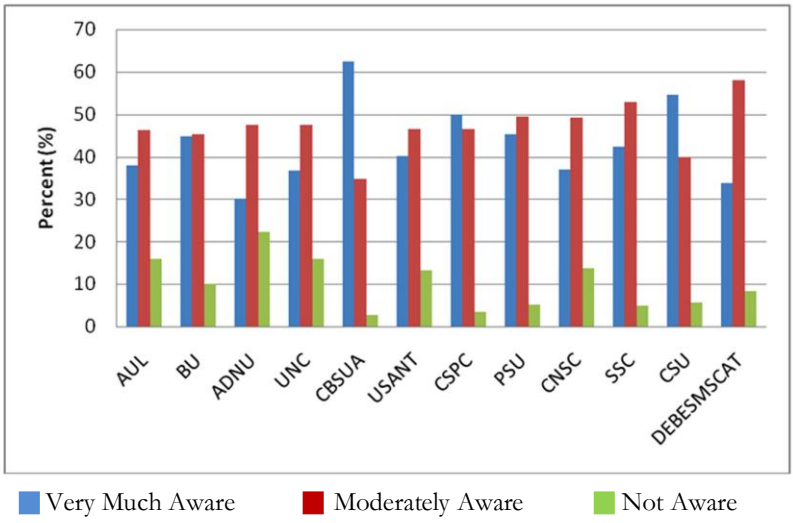

Figure 9. Overall Percent Distribution per HEI on the Stakeholders' Awarenes of the HEI Waste Management initiatives

The above figure shows that majority of the respondents from CBSUA (62%) and CSU (55%) have full knowledge of their waste management initiatives to include the policy dissemination on proper waste disposal, practices, use of trash bins and waste management related lectures, and seminars and meetings. Only DEBESMSCAT and SSC have more than 50% of its respondents who are moderately aware of their schools' waste management initiatives. The rest of the HEIs' respondents who are very much aware and moderately aware fall below 50%. It can be noted that only less than 10% of student respondents at BU, CBSUA, CSPC, PSU, SSC, CSU, and DEBESMSCAT are not aware of the waste management initiatives of their respective HEIs. This implies that stakeholders'

awareness of waste activities does not depend on whether an HEI has institutionalized initiatives or none.

Looking at all the respondents' awareness of the HEIs waste management initiatives, Figure 10 shows that only 10% are not aware or has no knowledge of the waste management initiatives or practices in their respective schools. Almost the same percentages, 43%, are very much aware and 47% are moderately aware of the waste management initiatives of the selected HEIs in the Bicol Region. This implies that more effort on the part of the HEIs is needed for all its stakeholders to be highly aware of their waste management initiatives.

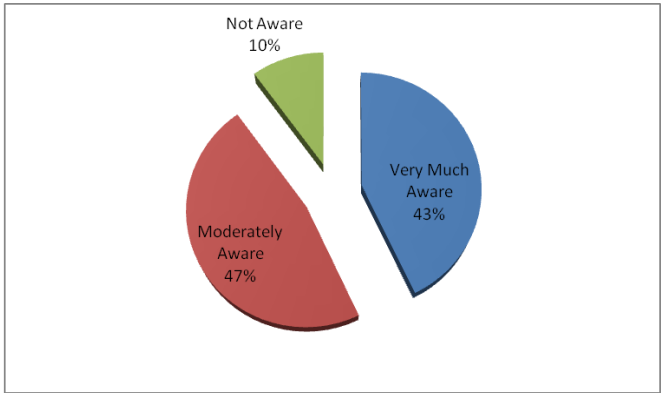

Figure 10. Overall Percent Distribution of the Respondents' Level of Awareness of the HEIs' Waste Management Initiatives

Perceived Environmental Outcome

The environmental factor in this research deals with the aesthetic aspect, which includes surroundings that are clean, free from undesirable insects and unpleasant smell, as well as free from diseases/illnesses brought by unclean environment. Based on the results of the interview conducted with the waste management key personnel of all participating HEIs, with the presence of many trash bins in the campus, litters of all types are minimized.

The figure below shows the comparative percentages of respondents who responded along the environmental outcome of the school waste management initiatives. As shown in the graph, majority of the respondents from all HEIs, except CSU, sometimes observe 30%-70% all the time that the school facilities are free from litters, school surroundings are free from the presence of cockroaches, rats, mosquitoes, etc., all points/locations in the school do not exhibit foul smell or unpleasant odor; there are seldom

[very few] reports of waste-borne diseases/illnesses acquired in the school; and the surroundings are free from unkempt grasses, un-swept grounds or floors.

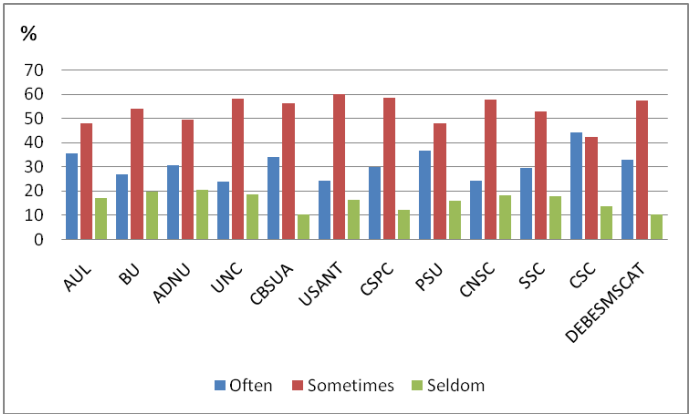

Figure 11. Overall Percent Distribution of the Stakeholders' Perceived Environmental Outcome of the School Waste Management Initiatives

It can be noted that HEIs with institutionalized waste management initiatives are also similar to those which do not have in terms of stakeholders' perceived environmental outcome, which is moderate. This implies that full implementation of these institutionalized waste initiatives should be well imposed to attain high environmental outcomes.

Perceived Economic Outcomes

The economic outcome of this research deals on how the schools as well as the stakeholders were helped in terms of saving, earning, or spending some amounts related to waste management. Interview results revealed that majority of HEIs do not have a separate office for waste management staff. Their initiatives are built in one of the HEIs' offices success the office of the physical plant director, research director, environmental institute, administrative officer, students' services, or extension directors. No additional compensation is given by the school to the lead personnel of the waste management. There are a few HEIs whose waste management is assigned to an ordinary faculty with student assistants or student labors as the staff.

Moreover, there are HEIs, like UNC and CBSUA, wherein most of their trash bins were donated by some sponsors or were purchased by

college-based organizations. In other words, the school waste management initiatives do not rely too much from budget coming from school.

In general, Figure 12 shows the comparative percentages of respondents who responded along the economic outcome of the school waste management initiatives. As shown in the graph, majority of the respondents from all (100%) HEIs sometimes practice the indicators associated along this aspect, namely; re-use/recycle of some items like bond papers, cardboards, boxes, etc., opt to pay an additional amount in order for meals to be packed using Styrofoam or other non-biodegradable materials, opt to pay other persons to do the job of cleaning the classrooms, laboratory rooms, shops, offices, CRs, etc. in school, earn a significant amount of money from selling some waste materials, and can save a significant amount of money from re-using or recycling some waste materials only moderately or 30%-70% of the time.

It can be noted that HEIs with institutionalized waste management initiatives are also similar to those which do not have in terms of stakeholders' perceived economic outcome, which is moderate. This implies that waste initiatives' economic aspect should be revisited to attain high economic outcome.

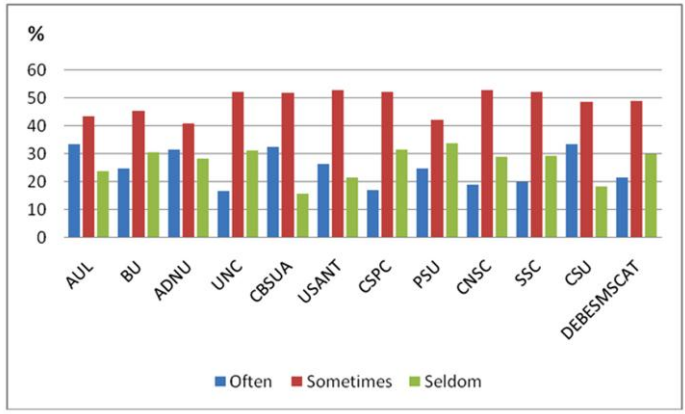

Figure 12. Overall Percent Distribution of the Stakeholders' Perceived Economic Outcome of the School Waste Management Initiatives

Perceived Social Outcome

The social aspect of this research deals with involvement of the school's stakeholders in waste management activities. As reported by some interviewed key personnel, lectures and seminars on waste management are well participated mostly by the students. In fact, most of waste management

related activities were crafted mostly by college-based organizations and supported by their advisers. However, there are schools' extension activities initiated by the coordinators and well participated in by student volunteers.

Figure 13 shows the participation of the Bicol University students in a river clean up drive as part of NSTP. Results of interviews revealed that there are now more students who join in coastal cleanup and clean and green programs as compared to the previous years. Other teachers incorporate waste management in English and Social Science worksheets. Both employees and students are reported joining in barangay sanitation programs. Likewise, students and staff also extend their services in their adopted communities regarding the conduct of waste management services like related seminars and clean up drives. Many students in these HEIs join in the institutions' extension services such as river and lake shore clean up drives, community clean and green programs, conduct of ecological lectures to adopted barangays, etc.

Figure 13. A river clean up by students

The percentage of respondents that perceived the level of social outcome can be summarized in the figure that follows. It can be gleaned from Figure 14 that CBSUA got the highest percentage (46%) is river- and lake-shore followed by PSU, CSU and DEBESMSCAT at 32% and 33%, respectively. Six HEIs fall within the 20% and below bracket. Majority of respondents from the other HEIs, six of which include UNC and CNSC (55%), USANT, CSPC, and SSC (56%), are sometimes involved in waste management initiatives social related activities. The other percentages of

HEIs that are slightly higher still fall under the *sometimes* bracket. Looking at the figure, it can be seen that the most dominant response from the HEIs is that the social outcome of the HEI's waste management initiatives is moderate or only 30%-70% of the time.

It can be noted that HEIs with institutionalized waste management initiatives are also similar to those which do not have in terms of stakeholders' perceived social outcome which is moderate. This implies that waste initiatives' social activities need to be widely disseminated to all its constituents to attain high outcome.

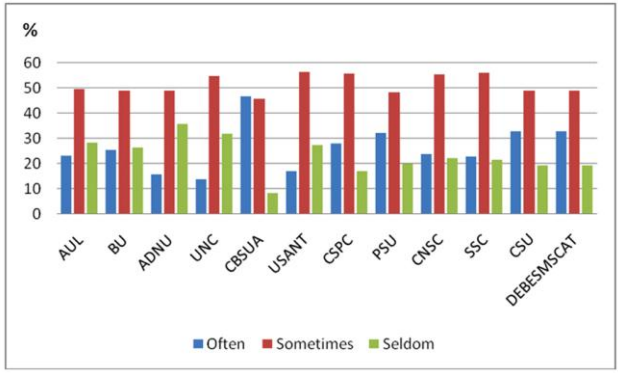

Figure 14. Overall Percent Distribution of the Stakeholders' Perceived Social Outcome of the School Waste Management Initiatives

Influence of the School Waste Management Initiatives on the Respondents' Waste Management Practices

The following section presents the discussion on the influence of the school waste management initiatives on the practices of the respondents. Ten indicators were used and analyzed into three categories namely: a) environmental, b) economic, and c) social influence. These were interpreted according to whether the influence is high or more than 70%, moderate or from 30%-70%, and little less than 30% of the time.

On Environmental Influence

Under the environmental influence, the following indicators were used and analyzed: 1) Looks for trash bins/cans every time a waste is to be thrown or disposed; 2) Uses re-useable bags/containers when buying from grocery stores, market or any store instead of letting the vendor wrap the bought items with plastic bags; 3) Practices at home the waste management

practices observed in school; 4) Dispose wastes properly when in public places, or while riding a vehicle, or when at home, etc.; 5) Practices garbage composting; and 6) Sweeps the yard frequently as compared before.

Table 4
Percent Distribution of School Waste Management Initiative's Environmental Influence to HEIs Respondents

HEIs	FACULTY			STUDENTS			OVERALL		
	High	Moderate	Low	High	Moderate	Low	High	Moderate	Low
ADNU	40	32	28	38	39	23	38	39	24
AUL	46	38	15	44	41	15	45	41	15
BU	61	26	13	47	38	16	50	35	15
CBSUA	63	34	3	41	54	5	44	51	5
CNSC	48	44	8	38	52	11	42	49	10
CSU	59	36	5	53	39	8	55	38	8
CSPC	38	53	11	46	43	11	42	48	11
DBESMSCAT	54	38	8	41	49	10	46	45	9
PSU	64	27	9	40	51	9	52	40	9
SSC	52	40	9	48	45	8	48	45	8
UNC	36	46	18	32	53	16	33	51	17
USANT	53	40	7	45	49	7	48	46	7

Some data may not sum up to 100% due to rounding off.

As revealed in Table 4, except for the percentage of faculty respondents from UNC and CSPC at 36% and 38%, respectively, whose practices and activities are just moderately influenced by the schools' waste management initiatives, the ten HEIs have more faculty respondents who are highly influenced by their schools' waste management initiatives. At AUL, ADNU, and CNSC, the percentage falls below 50% yet this is still more than those that are just moderately aware. For BU, CBSUA, USANT, PSU, SSC, CSU, and DEBESMSCAT, more than 50% of their faculty respondents are highly influenced by the school's waste management initiatives.

This is also true to student respondents from five HEIs; namely, AUL (44%), BU (47%), CSPC (46%), SSC (48%), and CSU (58%). The student respondents who are moderately influenced by the school's waste

management initiatives are almost similar in terms of percentages. It is worthy to note however that the percentage of student respondents (46%) who are highly aware is slightly higher than the faculty respondents (38%). This implies that the students are more influenced by the school's waste management initiatives in their practices at home or in the community.

On Economic Influence

For economic influence, the indicators were: 1) Re-uses or recycles things; and 2) Sells un-used items to the junkshops or to those who go house-to-house buying such items.

Table 5
Percent Distribution of School Waste Management Initiative's Economic Influence to HEIs Respondents

HEIs	FACULTY			STUDENTS			OVERALL		
	High	Moderate	Low	High	Moderate	Low	High	Moderate	Low
ADNU	33	47	21	30	47	24	31	47	24
AUL	47	44	9	36	49	15	38	49	14
BU	59	29	13	45	44	13	48	41	13
CBSUA	60	20	20	48	50	2	50	45	5
CNSC	40	51	9	30	61	8	35	57	9
CSU	63	32	6	39	54	8	45	49	7
CSPC	34	58	9	44	43	14	39	50	11
DEBESMSCAT	42	53	5	21	65	15	30	60	11
PSU	61	28	11	28	59	13	44	44	12
SSC	46	41	15	43	50	8	44	49	9
UNC	43	43	13	37	56	7	39	53	9
USANT	57	42	2	28	58	14	39	53	10

Some data may not sum up to 100% due to rounding off.

In terms of economic influence, Table 5 reveals that majority of faculty respondents from BU (59%), CBSUA (60%), USANT (57%), PSU (61%), and CSU (63%) and just slightly less than 50% are AUL (47%) and SSC (46%) are highly influenced by the waste management initiatives of their schools. This high influence is only true to student respondents at BU (45%) and CSPC (44%) which is almost the same as the percentage for

those who are moderately influenced at 44% and 43%, respectively. For CSPC this percentage (44%) for student respondents is slightly higher than the faculty respondents, which suggests that at CSPC the students are most likely more influenced economically. This means that the students re-use or recycles thing and sell un-used items to the junkshops or to those who go house-to-house buying such items. In fact, some students are reported to have developed charcoal briquettes out of waste products. Likewise, some teachers now incorporate waste management in jingle making as well as encourage students to make projects by recycling and exhibit them during charter week. Many key personnel claimed that students appreciate submitting students' projects out of recyclables.

Collectively, except for BU and CBSUA, there are more respondents who claimed to be just moderately influenced in their practices by the schools' waste management initiatives.

On Social Influence

With regard to social influence, the indicators were: 1) Calls the attention of board mates, housemates, neighbors, or friends who frequently burn their wastes; and 2) Joins/participates in the sanitation program of the barangay/community.

Table 6 presents the percent distribution of school waste management initiatives social influence to HEIs' respondents. It can be gleaned from the table that only four HEIs' faculty respondents claim to be highly influenced socially by the schools waste management initiatives more than those that claim to be just moderately influenced; namely, BU (46%), CBSUA (45%), SSC (60%), and CSU (49%).

Majority of the faculty respondents from UNC (67%), CSPC (67%), USANT (61%) and CNSC (52%) are just moderately influenced by the schools' waste management initiatives along social aspect. This finding is also true for student respondents wherein the majority of the respondents claimed to be moderately influenced.

On the average, no HEI exceeded the percentage of respondents who claimed to be just moderately influenced. This means that the respondents are influenced by the schools' waste management initiatives only 30%-70% of the time along social aspect. Quite noticeable is the increased percentage of respondents who are little or not influenced, the highest percentage of which is 36% and the lowest is 11%. Among the three categories, it appears that the respondents are less influenced socially rather than environmentally and economically influenced.

Table 6
Percent Distribution of School Waste Management Initiative's Social Influence to HEIs Respondents

HEIs	FACULTY			STUDENTS			OVERALL		
	High	Moderate	Low	High	Moderate	Low	High	Moderate	Low
ADNU	12	46	42	17	50	35	15	49	36
AUL	28	42	31	24	52	25	25	50	26
BU	46	32	23	26	49	26	31	45	25
CBSUA	45	15	41	36	61	4	36	53	11
CNSC	31	52	17	26	62	13	28	57	15
CSC	49	39	13	34	49	18	37	47	17
CSPC	19	67	15	20	56	25	20	61	20
DEBESMSCAT	38	43	19	34	48	19	36	46	19
PSU	44	48	8	24	54	23	34	51	16
SSC	60	21	20	36	48	17	38	45	18
UNC	7	67	26	15	61	25	13	62	26
USANT	25	61	15	29	63	9	27	62	12

Some data may not sum up to 100% due to rounding off.

In summary, the HEIs with institutionalized waste management activities attained high environmental influence on their stakeholders. This implies that their waste management initiatives have a high perceived effect on the stakeholders' waste management activities on the environmental aspect. On the other hand, in terms of economic and social influences, the HEIs with institutionalized waste management initiatives are also similar to those that do not have. They both have stakeholders who are economically and socially influenced in a moderate level. This implies that the stakeholders may be not yet fully influenced by the HEIs' institutionalized waste management initiatives on these two aspects.

Figure 15 summarizes the stakeholders' awareness level of the waste management initiatives and the perceived environmental, economic, and social outcomes and influences. Mostly the HEIs' waste management initiatives have moderate outcome in terms of environmental, economic and social aspects. Meanwhile, most of the HEIs' stakeholders are highly environmentally influenced, and moderately economically and socially

influenced by the said waste management initiatives.

Majority of the HEIs' waste management initiatives have moderate degree of environmental, economic and social outcome within their respective campuses. This means that these HEIs make positive effect only 30%-70% of the time considering that most of them do not yet have well defined waste management initiatives.

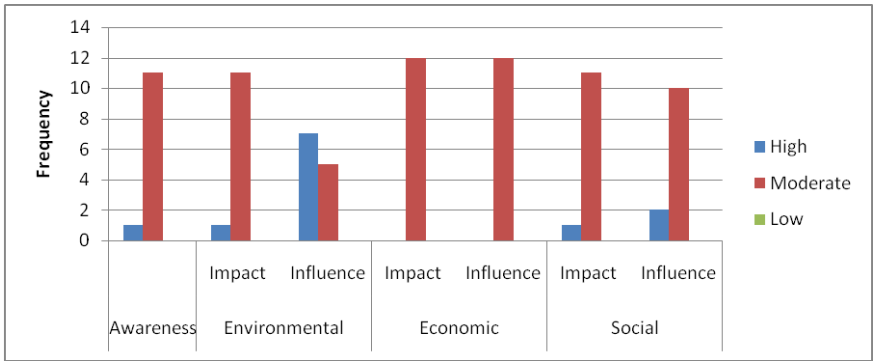

Figure 15. Summary of the Level of Awareness, Outcome and Influence of the Solid Waste Management Initiatives of Selected HEIs in the Bicol Region

While most of the HEIs have stakeholders who are just moderately influenced by their respective waste management initiatives socially and economically, majority of them highly influenced their stakeholders environmentally.

In summary, the figure implies that the moderate level of stakeholders' awareness on the schools' waste management initiatives, whether the school has an institutionalized initiative or none, may result to a moderate environmental, economic, and social outcome. Although the environmental influence is high, the economic and social influences to the stakeholders are moderate. This may be due to the fact that the environmental aspect is what matters most to the stakeholders at present and that the economic and social aspects are not yet fully and clearly defined to them or are not yet their primary concerns. This implies that waste management initiatives, to attain high level of economic and social influences, should also be widely promoted to the stakeholders.

Conclusions and Recommendations

Conclusions

1. All the selected HEIs generate wastes that are mostly recyclable, re-usable and biodegradable. The estimated waste generation per capita in all the HEIs is quite negligible but due to the large number of enrollment, the waste volume has an exponential effect.
2. Not all HEIs in the Bicol Region have institutionalized waste management initiatives. However, with or without institutionalized waste management initiatives, all HEIs do not properly implement waste segregation, collection, transport, storage and disposal. Likewise, malpractice still exists on waste disposal like burning of plastics and organic wastes.
3. There is a moderate stakeholders' awareness of the HEIs' waste management initiatives. The high or low level of awareness of stakeholders did not show the same level of influence in their waste management practices.
4. The HEIs waste management initiatives have a moderate environment, economic, and social outcome. All HEIs are generally free from litters only inside its premises. The wastes as potential resource for IGP are not yet maximized and social activities of HEIs are mostly limited to co-curricular activities.
5. The HEIs waste management initiatives have high environmental influence, and moderate economic and social influences to the stakeholders. The HEIs with institutionalized waste management initiatives and those that do not have, either have a better or just the same level of influence to stakeholders' personal waste management practices.

Recommendations

1. The present waste generation per capita in the HEIs can be reduced to zero waste by maximizing the practice of recycling, re-using, and reducing.
2. Every HEI should institutionalize a waste management propgram in conformity with RA No. 9003 to strengthen its current waste management initiatives and create a waste management task force to enforce proper waste segregation, collection, transport, storage and disposal of wastes, minimize or eradicate malpractice of burning plastics and organic wastes.
3. Every HEI should intensify information and educational campaign on proper waste disposal by trying out creative forms of

dissemination such as contests on best campus/department/area in waste segregation, recycling, MRF and the likes. Integration of waste management concepts to lessons besides environmental or NSTP classes can also be done.

4. HEIs should be waste free campuses inside and out. To maximize economic benefits derived from wastes, every HEI needs to establish an MRF for storage and inventory of recyclable and reusable wastes as well as wastes for sale.
5. Environmental and social waste management related activities should not be limited to schools' co-curricular activities. Voluntary participation of HEI stakeholders in promoting proper waste practices should be encouraged.
6. Further research may be conducted to accurately determine the waste characteristics found in the HEIs as well as in the Elementary and Secondary Schools.

Proposed Utilization/Dissemination activities emanating from results

The following utilization/dissemination activities are proposed:

1. Respondent HEIs may be furnished a copy of the result of the study for use as basis in the creation of their waste management task force;
2. Publication in R&D Journals;
3. Presentation of the result in academic/scientific conferences; and
4. Publication of result in popular format.

Actual/Potential Impact of Results

1. The largest waste volume these HEIs generate are recyclables, re-usable and salable; hence, a potential resource for income generation and waste minimization. This potential can be harnessed if these HEIs will make operational their respective waste management initiatives.
2. Enforcement of proper segregation in school and developing a culture of zero waste will have positive impact towards the stakeholders' own waste management practices at their homes.
3. Considering the huge enrolment of the HEIs, the waste management initiatives that shall be well implemented will have a positive effect in the entire Bicol Region or at least in the vicinity where the HEI is located.

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