RESEARCH PAPER

Level of awareness and practices on solid waste management (SWM) among college students

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Abstract

The earth suffers from many environmental problems which need to be tackled at the individual level, requiring individuals to develop that awareness which will guide them to become environmentally supportive. The study endeavored to determine the significant relationship between the level of awareness and practices among Filipino college students on solid waste management. It employed descriptive correlational research design with 150 randomly sampled students. Using the adopted standardized survey instrument surfacing the level of awareness of solid waste management of students and their practices. Gathered data were analyzed and interpreted using descriptive and inferential statistics. The findings of the study showed that the students are aware of the solid waste management. Most of them were aware of the policies and management of SWM but relatively not aware of their roles as students in the implementation of SWM. The students also have good practices in solid waste management in terms of properly disposing of, recycling, and reusing but moderately practice proper segregation and reducing. Results of the inferential statistics revealed that the level of awareness of the students influenced their practices on proper segregation, reduce, and recycling but no influence to their practices on solid waste management in terms of reuse and disposal. Present findings can be a basis for policy development on SWM implementation in the campus level.

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Introduction

As the world is faced with critical environmental problems, educational systems must produce environmentally literate citizens who care about the environment and have sufficient knowledge about environmental issues to behave responsibly (Tuncer *et al.*, 2009). Human activities, such as the accumulation of waste, destruction of ecosystems, and depletion of natural resources, have had a profound effect on the environment (WHO, 2005).

Many environmental issues facing society, such as ecosystem collapse, demand considerable public investment to reverse. However, this investment will only arise if it is supported by the general community, and community support is only likely if the issues are widely understood (Miller *et al.* 2006). Sustainability is a problem all over the world. Moving toward it is a social challenge which is always based in international, national, and local laws together with proper implementation and planning. Sustainable development can be achieved by embracing the social, environmental, and economic pillars through good governance with an active participation of the community. It is more on creating a global network in response to environmental problems along with industrialization and technological innovation (Morelli, 2011, Subramanyam & Greenfield, 2008,).

In the Philippines, the Section 55-56 of Republic Act 9003 or The Ecological Solid Waste Management Act stipulates that the national government in coordination with Department of Education (DepEd), Technical Education and Skills Development Authority (TESDA); Commission on Higher Education (CHED) and Philippine Information Agency (PIA), should conduct a continuing education and information campaign on solid waste management and strengthen the integration of environmental concerns in school (Paghasian, 2017).

According to Arora and Agarwal (2011), the problems of waste management are predominant in developing countries without substantial environmental awareness programs for the community. Processes and methods of waste prevention and management necessitate collaboration and participation of all government and non-government institutions. Hence, education is an important component of solid waste management. Awareness of solid waste management will create change in how people look at garbage. People grew up thinking that garbage is garbage, it should not be touched or one should not go near to it. They thought before that all types of garbage should just be thrown in one container (Sarino, 2014). Education on the environment is considered the key to reducing environmental problems. Prevention of any kind of human damage to the environment can be realized by promoting responsible citizenship. As the world is faced with critical environmental problems, educational systems must produce environmentally literate citizens who care about the environment and have sufficient knowledge about environmental issues to behave responsibly (Tuncer *et al.*, 2009).

It is essential to building good SWM awareness in academic institutions. Abne *et al* (2017) presented literature on SWM in academic institutions were mainly; (i) focusing on first-year students concerns towards SWM (Desa *et al.*, 2011); (ii) recycling and disposal practices of medical sciences students (Ehrampoush and Moghadam, 2005); and secondary students understanding and practices towards SWM (Ifegbesan, 2011). In the Philippines there is no study, in particular, dealing with evaluating students' level of awareness and practices towards SWM in a university, making the present study beneficial.

Based on the aforementioned discussion the researcher felt that these ecological crises are not just the task of policy-makers, scientists, and environmentalists to find a solution but rather it involves everyone. Theories and applications are mostly learned at school. The Campus through the Campus Student Government has organized waste management program committee but the pressing concern of voluminous wastes are continuously accumulated every week during school days. Hence, this study endeavored to find out the level of awareness and practices in solid waste management among college students. Specifically, it aimed to achieve the following: (1) assess the level of awareness

on the students; (2) determine their practices on SWM; (3) ascertain the significant relationship between the awareness of the college students and their practices on solid waste management.

Materials and methods

Method of Research

The study employed descriptive-correlational research design investigating the congruity between the level of awareness and practices of the college students on solid waste management. The correlational research design is used to relate the identified variables in the study.

Participants

The research participants of the study were the 150 college students of one Campus of a State University in Region 02, Philippines. They were selected using simple random sampling technique. Ethics protocols were employed using informed consent. The participants were requested to answer the informed consent form indicating that their willingness to participate in the study. Students are particularly targeted since they are regarded as the future of the nation and schools are expected to develop their potential as advocates of the sustainable environment (Ahmad *et al.*, 2015).

Research Instruments

The study used two standardized survey questionnaires. To assess the level of awareness of the participants on the solid waste management questionnaire was adopted from Abolucion, *et al* (2012) was used. Meanwhile, the second part of the questionnaire surfaced o the solid waste management practices of the students which were adopted from Cahoy (2013).

Data Collection Procedure

Seeking approval through a formal communication letter from the authorities concerned to float the questionnaire started the data gathering stage. Upon informed consent, the researcher ensured proper consultation for the schedule of the administration of the questionnaire. Distribution and retrieval were personally executed by the researcher. As agreed upon by the concerned authorities and the researcher,

the data gathered was properly kept to ensure its confidentially and were strictly used for research purposes only. The elicited quantitative data had undergone checking, scoring, analysis, and interpretation. Every item in the questionnaire was analyzed and interpreted. The researcher utilized Weighted Mean in order to analyze and interpret the data that provided an answer to the specific problems posed in this study. Through this procedure, the level of awareness and practices of students on solid waste management were obtained.

Data Analysis

Descriptive statistics, mean and rank, were used to describe the gathered data. Inferential statistics such as Pearson's r was used to determine the magnitude of the relationship between variables. Perception of the respondents was measured using a five-point Likert scale with its numerical scale, statistical limits and verbal description.

For the level of awareness on solid waste management, the following is adopted: 4.20-5.00 (Very Highly Aware); 3.40-4.19 (Highly Aware); 2.60-3.39 (Aware); 1.8-2.59 (Not Aware); 1.0-1.79 (Very Unaware). In like manner, to interpret the data on the practices of the students along solid waste management, the following was also adopted: 4.20-5.00 (Always); 3.40-4.19 (Often); 2.60-3.39 (Sometimes); 1.8-2.59 (Rarely); 1.0-1.79 (Never)

Results and discussion

Level of Solid Waste Management Awareness

As shown in the table, the highest mean of 3.80 fell on the importance of waste minimization, interpreted as "Highly Aware" indicating that the respondents are mindful and aware that Solid Waste Management requires waste minimization for environmental protection and preservation. The study also shows that with the least general mean of 2.06, the role of students on solid waste management interpreted "not aware". This shows that most of the students are not aware of their roles as actors in the effective implementation of Solid Waste Management. Hence, there is a need for the campus to orient students on their functions and responsibilities as the vanguard of the environment.

It also showed that with the mean of 3.52 (SD=0.62) for policies and guidelines on SWM, 3.60 (SD= 1.01) for the implementation of SWM, importance and benefits of SWM to the environment with the mean of 3.40 (SD= 0.74), and proper discipline on SWM with the mean of 3.76 (SD=0.72) all can be interpreted that the students are "highly aware". Moreover, the students also assessed themselves "aware" of the purpose of the management of solid waste management with the mean of 3.36.

Generally, the students are "aware" of the solid waste management as evidenced by the grand mean of 3.35. This indicates that the students have the fair knowledge of the concept of solid waste management as a mechanism for ecological protection and preservation. This finding is congruent to Paghasian (2017) confirming that Filipino college students have favorable knowledge of SWM. Likewise, in the earlier study of Abne *et al* (2017) found that the level of awareness, perception, and practices of students varied.

Table 1. Level of Awareness of Students on Solid Waste Management.

Responses	Mean	SD	Interpretation
Policies and Guidelines of SWM	3.52	0.62	Highly Aware
Implementation of SWM	3.60	1.01	Highly Aware
Importance and benefits of SWM to the environment	3.40	0.74	Highly Aware
Purpose of the Management of SWM	3.36	0.83	Aware
Importance of Waste Minimization	3.80	1.01	Highly Aware
Proper Discipline of SWM	3.76	0.72	Highly Aware
Roles of students on SWM	2.06	0.52	Not Aware
Grand Mean	3.35		Aware

Legend: 4.20-5.00 (Very Highly Aware); 3.40-4.19 (Highly Aware); 2.60-3.39 (Aware); 1.8-2.59 (Not Aware); 1.0-1.79 (Very Unaware)

Level of Practices on Solid Waste Management Awareness

Table 2 displayed the practices of the participants on Solid Waste Management. The highest mean of 3. 28 (SD= 0.66), interpreted as "always" fell on the practice of properly disposing of. Indicating that the participants always practice proper disposal by not throwing and leaving garbage anywhere, by burning waste materials, and by disposing of hazardous/ toxic/ and special wastes properly. The convenient access to solid waste bins may encourage the practice of reducing, reusing, and recycling (Ivy *et al.*, 2013).

Table 2. Practices of Students on Solid Waste Management.

Responses	Mean	SD	Interpretation
The practice of Proper Segregation	2.88	0.73	Sometimes
The practice of Proper Reducing	2.63	0.72	Sometimes
The practice of Proper Reusing	4.14	0.96	Often
The practice of Proper Recycling	3.70	0.56	Often
The practice of Proper Disposing	4.28	0.66	Always
Grand Mean	3.52		Often

Legend: 4.20-5.00 (Always); 3.40-4.19 (Often); 2.60-3.39 (Sometimes); 1.8-2.59 (Rarely); 1.0-1.79 (Never)

Akin to this, the participants also assessed themselves to have "sometimes" practice proper reducing as evidenced by the mean of 2.63 (SD=0.72). This means that the respondents occasionally practice reducing solid waste. It was also revealed that with the computed mean of 2.88 (SD=0.73) the participants "sometimes" practice proper segregation. This means that they can consider the importance of segregating solid wastes. The practice they commonly do is to segregate biodegradable and non-biodegradable waste for collection.

The table also displayed the mean of 4.14 (SD=0.96) for the practice of proper reusing interpreted as "often". This shows that the respondents have a good practice in solid waste management in terms of reuse. A common practice of the students is to reuse washable food containers and reuse old materials than purchasing a new one. It also shows that with the mean of 3.70 (SD=0.56), the participants "often" practice proper recycling. This means that the students are aware of the importance of recycling solid waste materials. Part of recycling activity they do is to make decorative materials from wastes.

With the grand mean of 3.52 interpreted "often" along the practices of solid waste management, it generally disclosed that the respondents observe good practices in terms of proper segregation, proper reducing, proper reusing, recycling and disposing of. According to Tartiu (2011), findings of community-based environmental KAP surveys, such as this study, are essential to attain significant improvement in waste management systems through recycling schemes or composting, as well on the development and proactive implementation of processes or programs that could address the declining community awareness on environmental deterioration and the much needed conservation strategies.

Table 5. The relationship between the level of awareness and practices on Solid Waste management.

Practices			Interpretation
The practice of Proper Segregation	r	0.293	
	p-value	0.000**	Significant
The practice of Proper Reduce	r	1.137	
	p value	.6182**	Significant
The practice of Proper Reuse	r	0.067	
	p-value	0.417	Not Significant
The practice of Proper Disposing	r	0.36	
	p-value	0.661	Not Significant
The practice of Proper Recycling	r	0.533	
	p-value	0.001**	Significant

**= Correlation is significant at the 0.01 level (2-tailed)

The relationship between the level of awareness and practices on Solid Waste Management is presented in Table 5. As manifested in the table, the computed p-value of 0.00 and r-value of 0.293 shows that there is a significant relationship between the level of awareness and practices of students on solid waste management along practice of proper segregation. Hence, the null hypothesis is rejected. It signifies that if the college students are oriented well about the solid waste management, practically they can practice proper segregation of waste according to compostable, recyclable, non-recyclable and special waste.

As also seen in the table, a significant relationship is found on the level of awareness of the students between their practice of proper reducing with the computed p-value of 0.000 and r-value of 1.137.

Hence, the null hypothesis of the study is also rejected. This means that if the students have a good knowledge of solid waste management, there is a possibility that they can reduce garbage accordingly. Meanwhile, with the computed p-value of 0.001 and r-value of 0.533 reveals a significant relationship. Hence, the null hypothesis of the study is rejected. This clearly shows that there is a significant relationship between the level of awareness of the students and their practices in terms of proper recycling. This finding shows that if the students are more aware of solid waste management, the better they recycle things out of waste materials.

In contrast, the computed p-value of 0.417 and r-value of 0.067 shows no significant relationship between the variables. Hence, then the null hypothesis of the study is rejected. This means that level of awareness among the students on solid waste management does not affect their practice along reuse. This also would mean that the students were not able to internalize the practice of proper reusing. Consequently, no relationship was also found between the level of awareness on solid waste management and the practice on disposal with the computed p-value of 0.661 and r-value of 0.36. This indicates that the students have moderate knowledge of solid waste management but not able to practice proper disposal.

The significant relationship between awareness and practices in Solid waste Management can be confirmed by previous studies, Hasaan, Rahman, & Abdullaha (2010) that there was a significant relationship between knowledge, awareness, attitudes, and practices to the environment. Hence, the integration of knowledge, awareness, and attitudes were considered important elements in reshaping the behavior of students towards environmental practices. In like manner, Magulod (2017) findings that environmental awareness is associated with environmental attitude. Previous studies also contradict the relationship between environmental attitude and knowledge, Alp *et al* (2008) reported that a sample of elementary students of Ankara indicated a low level of knowledge, but a high level of environmental attitude. Consequently,

Alp *et al.* (2006) studied with a sample consisting of students from urban schools and proposed that environmental knowledge does not have a direct influence on responsible environmental behaviors of students but mediated by behavioral intentions and environmental effect.

Conclusion

The findings of the study that surface that the students are aware of the solid waste management. Most of them were aware of the policies and management of SWM but relatively not aware of their roles as students in the implementation of SWM. The students also have good practices in solid waste management in terms of properly disposing, recycling, and reusing but moderately practice proper segregation and reducing. Results of the inferential statistics revealed that the level of awareness of the students influenced their practices on proper segregation, reduce, and recycling but no influence to their practices on solid waste management in terms of reuse and disposal.

On the basis of findings of this study, the Filipino college students are mindful and have enough knowledge on solid waste management but need proper orientation and education on their roles as actors in the implementation of solid waste management in the campus level. They also manifest acceptable behavior in the proper disposal, recycling, reusing, reducing and segregation. Finally, there is a positive congruity between the awareness of the students and their practices on solid waste management.

Recommendations

Based from the conclusion of the study, the following recommendations are offered: (1) conduct intensive trainings and seminars about Solid Waste Management among the college students in the campus; (2) The Office and Student Services and Welfare through the Campus Student Government should design students activities that will give direct learning experiences and more information particularly the roles of the students on solid waste management; (3) The Campus-Based Solid Waste Management committee in coordination with the

faculty and staff of the campus should regularly monitor students' behaviour towards the program; (4) Faculty members are also encouraged to reflect on their practices and methods/approaches in incorporating environmental concepts in teaching to further strengthen students' awareness and practices in solid waste management; (5)

The Coordinator of Solid Waste Management Program should lead campaigns and give more information about proper practices in segregation, reducing and reusing waste materials in order for the students to have a very good habit on these practices.

Implications for Educational Management

In consonance with the above-cited results of the study show positive implications to educational management. The process and methods of waste management require strong implementation by any institutions of learning. Keles (2017) opined that educational institutions should take leadership in the process of building knowledge, skills, awareness, values and sustainable action to achieve the goal of the sustainable earth in order to make the leaders of future generations conscious and critical thinkers about environmental sustainability. There is a strong need to capture a greater understanding of the awareness of solid waste management in order for universities to initiate curriculum update and interventions particularly to the internal and external stakeholders of the academic community. Likewise, Magulod (2018) stressed that the quality of the earth's environment is dependent on the students because they are the future leaders and most qualified individuals in protecting the environment.

As an implication of the study to curriculum, curriculum developers and administrators may be initiated to conduct curriculum review and development in different TEIs in the country to strengthen the awareness of students on Solid Waste Management and other environmental-related issues. In like manner, the school administration should have information drive/campaign on Solid Waste Management every General Orientation Programs, Convocation Programs and in Homeroom classes to

ensure full awareness on the wise disposal of garbage. Institutions should have an annual plan of action for sustaining Solid Waste Management.

Labor (2017) confirms that teachers' integration of environmental awareness influences sustainable development practices. The inclusion of relevant topics–with emphasis on proper SWM and other solid waste-issues–in the undergraduate curriculum is recommended to promote awareness on environmental issues and improve the attitude of college students towards environmentally sustainable practices. Hence, development of training module based on the findings of this study may be utilized by teachers to strengthen environmental education instruction. It is hoped that the findings will motivate them to become more environment-minded and critical thinkers through attending seminars/ training relevant to environmental concepts, volunteerism to be exposed to environmental issues, and conducting personal researches relevant to environmental issues and concerns.

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