

Assessing Students' Awareness, Attitude, and Practices on Solid Waste Management in a Philippine Catholic School

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ABSTRACT

This descriptive-correlational study assessed the level of awareness, degree of attitude, and extent of practice on solid waste management (SWM) of high school students of a Diocesan Catholic School. The data were collected using a researcher-made instrument and analyzed using Mean, Standard Deviation, and Pearson r . The findings of the study unveiled that students exhibited a high level of awareness, a very positive attitude, and a great extent of practice on SWM regardless of sex and academic level. Also, a significant relationship was found between awareness and practice and sex and academic level of students. Meanwhile, no relationship was found between attitude and sex and academic level. In addition, awareness, attitude, and practice on SWM were correlates. Finally, it indicated that awareness and attitude significantly predict the practice of SWM. It further provided baseline information in designing a comprehensive and effective SWM program to mitigate the problem of solid waste in the school.

Keywords: Educational Management, Solid Waste Management, Descriptive-Correlational, Catholic School, Antique

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1.0. Introduction

The World Bank estimates that in the present, 1.3 billion tons of waste is generated per year worldwide, forecasted that this amount would increase to 2.2 billion tons per year by 2025 (Moya, Aldás, López, & Kaparaju, 2017). Comparatively, Asia alone is estimated to generate more than 1 million tons of municipal solid waste (MSW) in a day. This amount is expected to reach 1.8 million tons by 2025 (Hoornweg & Bhada-

Tata, 2012, cited in Chen, 2018). Similarly, in European countries, according to Eurostat (2019), 483 kg of MSW is generated per capita per year, while 45% of those wastes were recycled and composted during that same year (Namlis & Komilis, 2019). Also, the United States faces a major waste management problem, in magnitude and kind (Gottinger, 2018). Similarly, China has a growing problem with solid waste management since it is one of the fastest-growing countries in terms of population in the world (Themelis & Mussche, 2013).

The Philippines has been recognized as rich in terms of biodiversity level but is not exempted when it comes to solid waste generation (Castillo & Otoma, 2013). Most of the solid waste generated by the country comprised of biodegradable type (papers, and kitchen wastes) which is 52.31% and the recyclable materials account for 27.78% (Department of Environment and Natural Resources, Environmental Management Bureau, 2015). Even though many people are conscious of the disadvantages of mishandling waste on the surroundings, their insufficient knowledge of environmental protection and attitude towards it usually results in pitiable practices towards sustaining good environmental conditions (Barloa, Lapie, & de la Cruz, 2016).

To address the problem of solid waste, waste management is needed to lessen the increasing disaster on solid waste, which harms the communities, jeopardizes human life, and pollutes the environment (Madrigal & Oracion, 2017). One of the simplest ways to lessen the effect of too much waste is to abide with the Ecological Solid Waste Management Act of 2000 or Republic Act No. 9003 which ensures the proper segregation, collection, transport, and disposal of the solid waste following the codes of conservation, public health, and other concerns.

In the same manner, education plays a vital role in the success of a solid waste management program (Dung, Makilik, & Ozoji, 2017). Through educating the people in the community, they will be able to understand the problem and help in giving solutions to such a problem (Chakraborti, Hussam, & Allaudin, 2003, cited in Madrigal & Oracion, 2017). As a learning institution, a Diocesan Catholic School in Antique aims to promote environmental awareness and spiritual formation among the Antiqueños. It creates activities that consider environmental protection as an integral part of creating change in society. Undeniably, one of the main problems of school is waste management. As the number of students increases each year, the amount of waste generated every day also increases. Though many measures were made, the school still needs to develop a comprehensive program on solid waste management to give a solution to the problem permanently.

To date, however, there is a dearth of substantial evidence supporting the extent to which students have internalized and practiced the environmental concepts, particularly in a Diocesan School in the Province of Antique. In most instances, students are the popular subjects in environmental surveys because they are considered as the future of the nation. Their environmental mindfulness and actions in sustainable environmental advocacies are developed by the schools (Ahmad, Noor, & Ismail, 2015).

Hence, the paper investigated the level of awareness, degree of attitude, and extent of the practice of solid waste management among high school students in a Diocesan Catholic School in Antique. Furthermore, the study will also determine if a relationship exists between the students' awareness, attitude, and practices when they

are taken as a whole and grouped according to academic level and sex. Considering the significance of solid waste management, the findings of the study will be used as the basis for the advancement of a school-based Solid Waste Management Program to raise awareness, form an appropriate attitude, and uphold sound practices among high school students for better solid waste management.

2.0. Framework of the Study

The study was mainly anchored on Knowledge-Attitude-Practice (KAP) Model Theory (Barloa, Lapie & de la Cruz, 2016), which emphasized that increasing personal knowledge will influence behavior change and therefore affects the way things are practiced. Linking this theory to the study, the researcher hypothesized that the high level of awareness results in a high degree of attitude and a higher extent of the practice. The KAP model will be used as a baseline theory to determine the relationship between the students' awareness, attitude, and practices with regards to solid waste management.

Reinforcing the KAP model, the Theory of Planned Behavior (Ajzen, 1991) underscored that what a person performs is defined by personal motivation, which is determined by attitude, social support, and perceived behavioral control. These factors are grounded by the personal perception of social, personal, and situational outcomes of the detailed action (Madden, Ellen, & Ajzen, 1992; Ajzen & Driver, 1992). This theory links belief and behavior and predicts one's intention to engage in a behavior at a specific time and place. It further explains the behavior of humans about how a person's attitude affects his or her actual behaviors (Mohiuddin, Al Mamun, Syed, Mehedi Masud, & Su, 2018). Thus, it is best to test the behavior of humans when there is voluntary participation under the control of the individual (Desa, Kadir, & Yusooff, 2012). Therefore, this theory is suitable to predict a student's intent to participate in a specific behavior relative to solid waste management. In connection to this, the researcher hypothesized that student's awareness of solid waste management could influence their attitude, which will be manifested through their actions in school and at home.

Moreover, according to the Rational Choice Theory crafted by Becker (1974), individuals act in careful analysis and logic (Green & Fox, 2007, cited in Madrigal & Oracion, 2017). It stressed the individual's decision-making ability where the issue of initiating actions with a motive of self-interest is demanded. Whatever is the outcome of the decision made would surely benefit the individual concern. Therefore, the theory implies that the process of analyzing the cost and advantages of proper waste management influences its practice. Similarly, awareness of solid waste management aims to form the right attitude towards proper, correct, and desirable practices of waste disposal in school and at home (Madrigal & Oracion, 2017).

3.0. Methods

The study utilized a quantitative research design using descriptive and correlational approaches. The descriptive approach described and compared the level of awareness, degree of attitude, and extent of practice of students on solid waste management. The correlational approach measured whether a relationship exists

between the respondent's demographics, awareness, attitude, and practices on solid waste management. Also, it determined if a relationship exists between awareness and attitude and practice on solid waste management.

The respondents of this study were the 240 high school students of a Diocesan Catholic School in the province of Antique for the school year 2019-2020 determined using stratified random sampling. The data were collected using a research instrument devised by Madrigal and Oracion (2017), which was divided into two main parts: the profile, which includes students' sex and academic level, and the solid waste management consisting of 30 Likert-type items.

On the other hand, the permission of the school administrator was sought to conduct the survey. Also, the respondents were oriented to the purpose of the study. Their informed consent was secured for their voluntary participation in the study. Likewise, they were assured of full confidentiality. Also, it was made sure that no traces of their identity would be revealed. The materials that contained the raw information derived from them were stored, protected, and disposed of by manual shredding after data processing within a given period.

The data were treated and analyzed using Mean, Standard Deviation, Pearson r , and Multiple Regression.

4.0. Results and Discussion

Level of Awareness on Solid Waste Management

Generally, the findings in Table 1 showed that students demonstrated a high level of awareness of solid waste management ($M=3.95$, $SD=0.53$), which signifies that the level of awareness on solid waste management of students is generally high. This further means that they are aware of solid waste management, its effects, and hazards to the environment. The result revealed that awareness about the environment among students was almost at a good level because environmental issues affected most of the respondents. They had better perception and concern about the environment.

The results indicate that programs like "no plastic" in school, which intend to improve students' environmental awareness, can increase their knowledge of them. It further implies that the high level of awareness of students on solid waste management can be attributed to the magnitude of information they gain from school and at home about SWM. This further confirmed the amount of concern, responsiveness, and efforts done by the administrators and teachers to promote better waste management. However, there should be an existence of a sustainable program to further address the problem of SWM. The school's commitment to educating the students about environmental concerns was further validated. Thus, in this perspective, teachers are expected to be more knowledgeable about environmental concerns since they have a significant influence on the kind of education of the students when it comes to environmental concerns (Esa, 2010).

Significantly, students' awareness of the waste they generate constitutes a very high awareness of solid waste ($M=4.39$). This implied that the students are very aware of the kind of waste they generate. However, students' awareness of the production of wastes through a consumerist lifestyle or way of life got the

lowest mean among the items ($M=3.51$). This implied that the students are aware that a consumerist lifestyle creates more waste. Nevertheless, there is still a call to strengthen the dissemination of information about this to the students. Therefore, it is apparent that based on results, there is still a need to educate the students about the problem of solid waste as this supports the strengthening of their awareness about the problem and their support in establishing waste management measures needed to help clean the school’s environment.

When grouped according to demographics, students also showed a high level of awareness on solid waste management regardless of sex and academic level. Descriptively, female ($M=4.04$, $SD=0.51$) and the senior high school ($M=4.20$, $SD=0.48$) students exhibited higher means, which indicates that the female and senior high school respondents are more aware of solid waste management compared to male and junior high school respondents respectively. Madrigal and Oracion (2017), Do Paco, Raposo, and Leal Filho (2009), Garcia and Luansing (2016), Adeolu, Enesi, and Adeolu (2014), and Guido and Lim (2015) indicated in their studies that females are more conscious about solid waste management than males.

Noticeably, the high level of awareness on solid waste management of students can be attributed to the amount of knowledge they gain from their subjects such as Biological Sciences and the like and their exposure to social media and information derived from the internet through the assignments given by their teachers. Additionally, as the academic level of students increases, the level of awareness of students also increases. Moreover, male and female students have both a high level of awareness, which depicts a considerable amount of information about solid waste received by both sexes.

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

Variable	M	SD	Int
Sex			
Male	3.87	0.54	HA
Female	4.04	0.51	HA
Academic Level			
Junior High School	3.90	0.53	HA
Senior High School	4.20	0.48	HA
<i>As a Whole</i>	<i>3.95</i>	<i>0.53</i>	<i>HA</i>

Note: HA= High Awareness

Degree of Attitude towards Solid Waste Management

Generally, the findings in Table 2 showed that students demonstrated strong agreement on solid waste management ($M=3.32$, $SD=0.38$), which means that they have a very positive attitude towards solid waste management. This further indicates that students, in general, strongly agree with the items in the questionnaire. The students also found agreement in the statement with regards to their views and perception towards solid waste management.

Moreover, the students feel that proper waste management promotes

environmental and human wellness, which obtained the highest mean among the items (M=3.65). This implied that student demonstrates a very positive attitude towards the promotion of environmental and human wellness. However, students seemed not to be embarrassed to throw their wastes anywhere, as shown in the lowest mean of the item among the items (M=3.02). This implied that though the students demonstrate a positive attitude towards solid waste management, there is still a need to educate them on desirable behavior towards solid waste.

Compared according to demographics, students also showed a very positive attitude towards solid waste management regardless of sex and academic level. Descriptively, female (M=3.36, SD=0.37) and the senior high school (M=3.39, SD=0.38) students exhibited higher means, which implies that in terms of gender, female students have more possibility to have a positive attitude towards solid waste management. Additionally, it also implied that the higher the students' academic level, the more positive the attitude they possess on solid waste management. This confirms that students' attitudes were influenced by their education, which supports the idea that education can play a vital role in developing people's attitudes towards environmental concerns (bin Hamad Al-Rabaani, & Al-Mekhlafi, 2009). Moreover, the findings validated the study of Madrigal and Oracion (2017); and Adeolu, Enesi, and Adeolu (2014); Raudsepp (2001), which emphasized that female students could be said to have positive waste management attitude than their male counterpart. Additionally, the findings of the study contradict the study of Abdul-Wahab and Abdo (2010), which found out that the younger educated respondents are more knowledgeable than the older, less educated respondents.

Significantly, the findings of this study implied that regardless of sex, the students have almost the same degree of attitude towards solid waste management. It further indicated a noticeable change in students' attitude towards solid waste management as their academic level increases. This might be attributed to the knowledge they gain about the effects and hazards of solid waste on the environment.

Table 2. Degree of Attitude towards Solid Waste Management

Variable	M	SD	Int
Sex			
Male	3.28	0.39	SA
Female	3.36	0.37	SA
Academic Level			
Junior High School	3.30	0.38	SA
Senior High School	3.39	0.38	SA
As a Whole	3.32	0.38	SA

Note: SA= Strongly Agree

Extent of Practice on Solid Waste Management

Overall, the findings in Table 3 revealed that students demonstrated a great extent of practice on solid waste management (M=3.57, SD=0.59), which means that they often practice solid waste management activity/habit in school or their homes.

The data further implied that the students have favorable practices towards solid waste management. Meaningfully, the student’s response in putting their trash in their bags when waste bins are not available obtained the highest mean (M= 4.07), which implied that they often practice putting their trash in their bags when there is no available trash around. This agreed with the findings of the study of Madrigal and Oracion (2017). On the other hand, item number 2 in the questionnaire, which states that “I do not use materials made of plastic,” obtained the lowest mean among the items (M= 2.77). This implied that the students sometimes could not avoid using materials that are made of plastics. It further means that the students need further reinforcement in how they should faithfully practice solid waste management.

Assessed according to demographics, students also showed a great extent of practice on solid waste management regardless of sex and academic level. Descriptively, females (M=3.68, SD=0.56), and the senior high school (M=3.86, SD=0.54) students exhibited higher means, which implied that the female and senior high school respondents often practice solid waste management activity/habit in school or at home. This further indicated that the higher the students’ academic level, the better the extent of practice they do in terms of solid waste management (Raudsepp, 2001; Ifegbesan, 2010; Adeolu, Enesi & Adeolu, 2014; Jatau, 2013). The result of the study further established how development in education becomes a substantial variable that enhances desirable practices of individuals toward solid waste management.

Table 3. Extent of Practice on Solid Waste Management

Variable	M	SD	Int
Sex			
Male	3.47	0.60	GE
Female	3.68	0.56	GE
Academic Level			
Junior High School	3.51	0.58	GE
Senior High School	3.86	0.54	GE
As a Whole	3.57	0.59	GE

Note: GE= Great Extent

Relationship between Demographics and SWM Awareness, Attitude, Practice

Pearson r was used to determine the significant relationship between awareness, attitude, practice on solid waste management of high school students, and their demographics.

The findings in Table 4 reveal that there was a significant relationship between awareness on solid waste management of high school students and sex [$r(238)=0.164$, $p=0.011$], and academic level [$r(238)=0.216$, $p=0.001$]. Hence, the null hypothesis, which asserts that there is no significant relationship between awareness and demographics, was rejected. The result implied that both sex and academic level influences the level of awareness of students. The findings agreed with the findings of the study of Su (2008), Guido and Lim (2015), and Shorofi and Arbon (2017). The findings further suggested that awareness on solid waste management somehow increases as academic level

increases as emphasized by Raudsepp, (2001), Ifegbesan, (2010) and Adeolu, Enesi, and Adeolu (2014).

Table 4. Relationship between Sex and Academic Level and SWM Awareness

Variable	r	df	p
Sex	0.164*	238	0.011
Academic Level	0.216*	238	0.001

Note: *the correlation is significant when $p \leq 0.05$

On the other hand, the data in Table 5 show that there was no significant relationship between attitude on solid waste management of high school students and sex [$r(238)=0.100$, $p=0.124$], and academic level [$r(238)=0.085$, $p=0.190$]. Thus, the null hypothesis, which affirmed that there is no significant relationship between attitude and demographics, was accepted. The results implied that sex and the academic level do not affect how students behave concerning solid waste management. This is in congruence with the study of Barloa, Lapie, and de la Cruz (2016), Tatlonghari and Jamias (2010), and Amouei, Hosseini, Khafri, Tirgar, Aghalari, Faraji, and Namvar (2016). The study further established that attitude is not influenced by sex nor as a student increase the academic level.

Table 5. Relationship between Sex and Academic Level and SWM Attitude

Variable	r	df	p
Sex	0.100	238	0.124
Academic Level	0.085	238	0.190

Note: *the correlation is significant when $p \leq 0.05$

Moreover, the findings in Table 6 significantly indicate the relationship between practices on solid waste management of high school students and sex [$r(238)=0.181$, $p=0.005$], and academic level [$r(238)=0.225$, $p=0.000$] was found out in this study. Further, the null hypothesis, which affirms that there is no significant relationship between practices and demographics, was rejected. The result implied that both sex and academic level influence the degree of practice on solid waste management of students. The findings of the study agreed with that of Shorofi and Arbon (2017), which suggested that education is significantly related to practice. Moreover, the findings disagree with the study of Amouei, Hosseini, Khafri, Tirgar, Aghalari, Faraji, and Namvar (2016), which found out that there is no significant relationship between gender and practices on solid waste management. It further suggested that the degree of practice of students is dependent on sex and the academic level of the students, which means that as the academic level of students increases, the degree of practice of students towards solid waste management also increases.

Table 6. *Relationship between Sex and Academic Level and SWM Practice*

Variable	r	df	p
Sex	0.181*	238	0.005
Academic Level	0.225*	238	0.000

Note: *the correlation is significant when $p \leq 0.05$

Relationship between SWM Awareness, Attitude, and Practice

The Pearson product-moment correlation was used to determine the significant relationship between awareness and attitude, awareness and practice, and attitude and practice on solid waste management. The data in Table 7 showed that there was a significant relationship between awareness and attitude [$r(238)=0.585$, $p=0.000$], awareness and practice [$r(238)=0.547$, $p=0.000$], and attitude and practice [$r(238)=0.487$, $p=0.000$] on solid waste management. Thus, the findings rejected the null hypothesis.

Significantly, the findings of the study implied that awareness of students on solid waste management affects their attitude towards the same. This further means that knowledge of solid waste management directly influences how the students behave about it. This may be associated with the truth that as the students are being exposed to solid waste management information and ideas, the more positive attitude they create towards it.

Also, the findings of the study implied that the more a student is aware of solid waste management, the more desirable are the practices observed. This further means that as students are exposed to ideas and knowledge about solid waste management increases, the degree of desirable practice is also improved. This may be attributed to the perception of the students towards the negative outcome of solid waste and the positive effects of managing it properly.

Furthermore, the students' attitude towards solid waste management directly influences the degree of practice of the same. This means that the students' practices on solid waste management reflect the kind of attitude they possess towards it.

The findings of the study agreed with that of Karatekin (2014), Madrigal and Oracion (2017), Barloa, Lapie, and de la Cruz (2016), and Licy, Vivek, Saritha, Anies, and Josphina (2013), which revealed that awareness of solid waste management results in a positive attitude and essential factor in practice. The study of Tatlonghari and Jamias (2010) emphasized the relationship between awareness, attitude, and practices, further supporting the results of this study.

On the other hand, the result of the study contradicts that of Desa, Kadir, & Yusooff, (2012), Hassan, Rahman, and Abdullah (2011), Wahida, Hamidi, and Tuan (2004), and Paghasian (2017) which revealed that the level of awareness does not affect the degree of practice on solid waste and that of Dung, Makilik, and Ozoji (2017), which emphasized that awareness and attitude are not significantly related.

Table 7. Relationship between SWM Awareness, Attitude, and Practice

Variable	r	df	p
Awareness x Attitude	0.585*	238	0.000
Awareness x Practices	0.547*	238	0.000
Attitude x Practices	0.487*	238	0.000

Note: *the correlation is significant when $p \leq 0.05$

Predictors of Practice of Solid Waste Management

Multiple regression was used to determine the predictors of the practice of solid waste management. Multiple linear regression data in Tables 8 and 9 indicated that there was a significant collective effect between the awareness, and attitude, on the practice of solid waste management [F(2, 237)=61.592, $p=0.000$, $r^2=0.342$]. Hence, the findings rejected the null hypothesis.

Also, the individual predictors were examined further and indicated that awareness [$\beta=0.442$, $t(238)=6.138$, $p=0.000$], and attitude [$\beta=0.392$, $t(238)=3.912$, $p=0.000$] significantly predict practice of solid waste management. This implied that awareness, attitude, and practice directly influence each other. Hence, as awareness and attitude decrease, there is also a possibility of a decrease in desirable practice.

On the other hand, if there is a high level of awareness and a positive degree of attitude, there will also be a substantial positive desirable extent of practice towards solid waste management. As supported by the Knowledge-Attitude-Practice (KAP) Model Theory (Barloa, Lapie & de la Cruz, 2016), which states that knowledge affects behavior and thus significantly affect practice, the findings of the study further agrees with the theory. Furthermore, the findings confirm the theory of this study that awareness and attitude affect solid waste management practices.

Table 8. Predictors of Practice of Solid Waste Management

Variable	r ²	F	df	p
Constant, Awareness, Attitude	0.342	61.592	2, 237	0.000

Table 9. Predictors of Practice of Solid Waste Management

Coefficients	Beta	t	p
(Constant)	0.525	1.832	0.068
Awareness	0.442	6.138*	0.000
Attitude	0.392	3.912*	0.000

Note: *predictors of the practice of solid waste management when $p \leq 0.05$

5.0. Conclusion

High awareness, desirable attitude, and good practice of solid waste management are integral in keeping a healthy, safe, and conducive place for learning. This goes along with essential programs, support, and initiative of addressing problems on SWM to mitigate the effect of solid waste in a learning environment.

Teachers, as well as the administration, have a huge responsibility in creating programs to create substantial awareness on SWM to the school community in order to nurture better and desirable attitude and practice, which suggests that education has

a significant influence on the proliferation of solid waste management awareness and measures. It further showed that higher awareness level and attitude had a positive effect on SWM practice. This means that the school is an influential medium of creating consciousness in the way students deal with solid waste in school and at home.

Moreover, the school's commitment to fostering desirable attitude and practice towards SWM is portrayed based on findings. As an institution committed to providing quality Catholic Education which includes concern about the environment, the integration of SWM topics is an essential indicator in the promotion of better SWM practices. This is a desirable step in warranting a better and safe environment and promoting the community's common good.

The administrators are therefore encouraged to design a solid waste management program which includes activities on awareness, attitude and practices on SWM to facilitate comprehensive awareness, foster moral attitude, and form environment-friendly practices related to solid waste management among members of the school community towards a safer, healthier, and more sustainable school campus. Moreover, teachers may organize lectures about solid waste management; include discussions of SWM in their classes through integration in performance tasks and projects; conducting clean-up drives and environmental exhibits and competitions and other relevant programs which promote environmental concern and actively encourage students and teachers to participate in giving solutions to problems on solid waste.

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