

Participation of Mahidol University Students in Solid Waste Management : A Case Study of Salaya Campus Nakhon Pathom Province

Yanaporn Tharethian^{1*}

Seree Woraphong²

¹Student of Master of Arts Programme in Environmental Social Sciences,

Faculty of Social Sciences and Humanities, Mahidol University

²Advisor and Chairman of the thesis Committee, Master of Arts Programme in Environmental Social Sciences,

Faculty of Social Sciences and Humanities, Mahidol University

*Corresponding Author, E-mail : yanaporn.tha@mahidol.ac.th

(Received: 9 June 2020 Revised: 19 October 2020 Accepted: 5 November 2020)

3

Abstract

This research aimed to study the participation of Mahidol University students in solid waste management. Factors influencing students' participation in solid waste management were investigated. The problems, barriers, and suggestions towards participation in solid waste management were also explored. Quantitative research method was employed. The target population included 400 bachelor students in Mahidol University. Questionnaire survey was applied as a tool to collect data. The data was analyzed by using multiple regression, mean, and standard deviation.

Most of the respondents were female (65.5%) and 19 years old (63.3%). Some 64.2 percent of the respondents were from Nonthaburi, Nakhon Pathom, Chonburi, Samutprakarn, and Nakhon Ratchasima Province. Most of the respondents were Buddhist (98.8%) and were studying

Sciences and Engineering (45.3%). The study result found that the knowledge of respondents regarding solid waste management was moderate (59.3%). The level of participation in solid waste management was moderate (63.6%). The factors significantly related to participation in solid waste management included sex (p -value = 0.05) and knowledge (p -value = 0.01).

This research recommended to conduct future study by surveying the areas of solid waste problems in order to place waste containers in those areas. Separate waste containers should be provided in the buildings and over the university. Since the knowledge of solid waste management was moderate, the training on solid waste management and biodegradable transformation process should be offered to the students. The awareness towards solid waste should be raised. The information on solid waste management should be disseminated via info graphic poster. The content in info graphic should be easy to understand in order to enhance effective solid waste management in Mahidol University, Salaya Campus, Nakhon Pathom Province.

Keywords : Participation, Solid Waste Management, Students

Introduction

The state policy encourages people's awareness to see the importance of the environment. Trainings on solid waste management in industrial sector, agricultural sector, and schools have been promoted in order to enhance understanding. Solid waste management modules are contained in the course syllabus in primary and secondary school. Waste management campaigns are widely promoted in various communities to improve discipline in community waste management. Raising awareness

among the youths is important. The education encourages youths to acknowledge environmental impacts, to stimulate them ready to collaborate in solving environmental problems, and to achieve sustainable development (Bureau of Policy and Strategy Ministry of Education, 2015).

Zero waste management in the university is one of sustainable environmental management. Zero waste needs the collaboration from lecturers, students, and all staffs. The university's environmental policy should be endorsed while all stakeholders in Mahidol University, Salaya Campus should follow the environmental policy. Zero waste management projects have been funded and implemented continuously. University's zero waste emphasized on waste separation, recycle, and waste management plan. The undertaken activities include recycle waste bank, waste fertilizer, and food waste for biogas. The zero waste management in the university starts with surveying the location of waste containers in all buildings in the campus. Then, the type of waste containers must be identified. Waste container with white plastic bag is for recyclable waste such as glass, PET, aluminum cans, and other containers. Waste container with black plastic bag is for non-recycling waste. (Journal of Environmental Management, 2011).

Mahidol University aims to achieve eco-university. Policies and social responsibility policies have been endorsed. Following the national waste management master plan 2016-2021, Mahidol University has implemented waste and hazardous waste management policy (Waste and hazardous waste management policy, Mahidol University, 2016).

Currently, the students' participation in solid waste management is still limited due to lack of public relation. The course in some faculties may not include environmental management aspect. Therefore, the students do not deeply understand about the consequences of their

actions towards environmental problems. The increasing number of population leads to higher amount of wastes. It is essential that university students pay attention to the environment because the environment affect the human health. The university students should understand and appropriately participate in solid waste management in order to achieve the university's environmental policy.

From the above reasons, the researcher is interested to develop the way to improve students' participation in solid waste management. This study contributes to the reduction of waste in the university. This study came up with the measures to change students' waste management behavior. The obtained data has been analyzed to identify problems, barriers, and suggestions for effective solid waste management. The participation is vital for students' learning because the students have opportunity to engage in policy decision making with the university's executives. Consequently, the environment in the university will be continuously improved.

Objectives

1. To explore level of students' participation in solid waste management in Salaya Campus, Nakhonpathom Province
2. To study factors influencing students' participation in solid waste management in Salaya Campus, Nakhon Pathom Province
3. To study the differences between individual factors and knowledge factors towards participation in solid waste management in Salaya Campus, Nakhon Pathom Province
4. To investigate problems, barriers, and suggestions towards participation in solid waste management in Salaya Campus, Nakhon Pathom Province

Material and methods

The target population included 400 students who was studying in first year of their bachelor degree in Mahidol University. The questionnaire included these 4 following parts;

Part 1 Personal factors i.e. sex, age, domicile, religion, and faculty

Part 2 Knowledge of solid waste management

Part 3 Participation in solid waste management

Part 4 Problems, barriers, and suggestions towards solid waste management in Mahidol University, Salaya Campus, Nakhon Pathom Province

Sampling Target group in this research is a 1st year undergraduate student, Mahidol University, Salaya, Nakhon Pathom Province. The researcher selected randomly by quota sampling method for the number of students in each faculty. The researcher uses sampling techniques to get the desired number of samples. (Proportional to size) by using the sample selection formula as a proportion

Quality inspection of research tools

1) Determination of reliability or reliability of the participation of Mahidol University students In waste management A case study of Salaya Campus Nakhon Pathom Province By using the Coefficient of Alpha coefficient of Cronbach

2) Before implementing the questionnaire The researcher presented the questionnaires that were created to all 3 experts for examination. The consistency between the questions and the objectives of the study and the questionnaire (Index of Item Objective Congruence: IOC)

$$\text{Formula } r_{tt} = \frac{K}{S_x^2} [1 - \sum S_i^2]$$

K-1

r_{tt} = confidence value of the questionnaire

K = number of queries of that set of queries

S_x^2 = Variance of the total score

S_i^2 = Sum of the variance of each measurable score

When calculating reliability by Cronbach's alpha coefficient, it is 0.712.

Results

1. General information of the respondents

1.1 Personal factors

Most of the respondents were female (65.5%) and 19 years old (63.3%). Some 64.2 percent of the respondents were from Nonthaburi, Nakhon Pathom, Chonburi, Samutprakarn, and Nakhon Ratchasima Province. Most of the respondents was Buddhist (98.8%) and was studying Sciences and Engineering (45.3%).

1.2 Knowledge of solid waste management

Some 59.3 percent of the respondents had knowledge of solid waste management in moderate level (42-48 scores). The mean was 43.82. S.D. was 4.31. The maximum score was 50 while the minimum score was 30.

1.3 Participation in solid waste management

The level of participation in solid waste management of 63.3 percent of the respondents was moderate (29-39 scores). The mean was 32.71. S.D. was 6.46. The maximum score was 50 while the minimum score was 14.

2. The analysis of the differences between personal factors and participation in solid waste management through One-Way Analysis of Variance: One-Way ANOVA and t-test

The differences between personal factors and participation in solid waste management were analyzed. The mean differences of solid waste management participation between personal factors groups such as sex, age, domicile, religion, and faculty were analyzed. One-way Analysis of Variance and t-test were used to analyze data. The study result is presented in Table 1.

Table 1 The analysis of the differences between personal factors and participation in solid waste management (One-way Analysis of Variance and t-test)

	Variables	\bar{X}	S.D.	n	P-Value
Sex					.013*
	Male	32.88	7.121	138	
	Female	32.62	6.103	262	
Age					.905
	18 years	33.01	6.627	70	
	19 years	32.68	6.293	253	
	20 years and above	32.55	6.953	77	
Domicile					.498
	Bangkok	32.68	6.571	143	
	Others (Nonthaburi, Nakhon Pathom, Chonburi, Samutprakarn, and Nakhon Ratchasima Province)	32.73	6.423	257	
Religion					.194
	Buddhist	32.80	6.377	395	
	Others (Christian and Muslim)	25.80	10.377	5	
Faculty					0.796
	Medicine and Public Health	32.90	6.726	94	
	Sciences and Engineering	32.36	6.315	181	
	Social Sciences and Liberal Arts	33.09	6.025	45	
	College of Music and International College	33.08	6.814	80	

*Statistically significant difference found at $p \leq 0.05$

3. Analysis of the differences between knowledge factors and participation in solid waste management through One-Way Analysis of Variance : One-Way ANOVA and t-test

The difference between knowledge factors and participation in solid waste management were analyzed. The mean difference of solid waste management participation between knowledge groups was analyzed. One-way Analysis of Variance and t-test were used to analyze data. The study result is presented in Table 2.

Table 2 The analysis of the differences between knowledge factors and participation in solid waste management (One- way Analysis of Variance and t-test)

10

Variables	\bar{X}	S.D.	n	P-Value
Knowledge				.001*
41 scores and less	30.86	6.288	101	
42 – 48 scores	32.99	6.167	237	
49 scores and more	34.69	7.196	62	

* Statistically significant difference found at $p \leq 0.01$

Discussion and Conclusion

The study result found that the participation level of most of the respondent was moderate. The students may have knowledge about solid waste management but did not gave values to it. As a result, the level of their participation in solid waste management in Salaya Campus, Nakhonpathom Province was moderate.

The result also revealed that the respondents that have different personal factors and different knowledge factors have different level of participation in solid waste management. The factors significantly related

to participation in solid waste management included sex (p-value = 0.05) and knowledge (p-value = 0.01). Other factors such as age, domicile, religion, and faculty were insignificantly related to participation in solid waste management. This could be implied that the respondents were the first year of bachelor students. They might be interested in solid waste management but they did not have adequate knowledge. Thus, their participation in solid waste management was limited.

From the study found that The sample group with different gender, participation in solid waste management. A case study of Salaya Campus Nakhon Pathom province is significantly different at the level of 0.05 which is in line with the hypothesis set. And in accordance with the research of Sarinee Suwannasaksak (2012: 93-95), it is found that the female and male body groups have different opinions on waste management with statistical significance at the level of 0.05, therefore Sample groups of different genders Therefore making participation in waste management A case study of Salaya Campus Nakhon Pathom Province Significantly different

From the study found that The sample groups of different age, participation in solid waste management A case study of Salaya Campus Nakhon Pathom Province Differences were not statistically significant at the level of 0.05, which was inconsistent with the hypothesis set. This may be due to the age of the sample aged between 18 - 23 years, which is not much different. Therefore, age does not affect participation in waste management. Therefore, different age groups do not make participation in waste management. A case study of Salaya Campus Nakhon Pathom Province Significantly different

From the study found that Sample groups with different domicile, participation in solid waste management A case study of Salaya Campus

Nakhon Pathom Province Not significantly different Which is not in line with the hypothesis set This is because most of the sample groups are domiciled in other provinces (Nonthaburi, Nakhon Pathom, Chon Buri, Samut Prakan and Nakhon Ratchasima, etc.) and 64.2 percent are domiciled in Bangkok, 35.8 percent, and the samples are first year students who have to adapt to Coming to life In Salaya Campus Mahidol University Therefore, the grill groups that have different domiciles do not Make participation in waste management A case study of Salaya Campus Nakhon Pathom Province Significantly different The study found that different religious groups, participation in solid waste management A case study of Salaya Campus Nakhon Pathom Province Not significantly different Which is not in line with the hypothesis set The majority of the respondents are 98.8% Buddhists, and 1.2% are other religions (Christianity and Islam).

When the majority of the respondents are Buddhists, they do not see the difference in participation. Different, therefore does not make participation in waste management A case study of Salaya Campus Nakhon Pathom Province Significantly different

From the study, it is found that the sample group that is studying is different. Participation in solid waste management A case study of Salaya Campus Nakhon Pathom Province Not significantly different Which is not in line with the hypothesis set Most of the respondents, who are studying in the Faculty of Medicine and Public Health, 23.4%, followed by studying in the Faculty of Science and Engineering 45.3% are studying the Faculty of Social Sciences and liberal arts, 11.3 percent, and the College of Music and the International College, 20.0 percent. Which faculties studying in this way may affect the perception characteristics Because awareness is based on experience, attention and value in the perceived It also depends on the style of the thing or subject to be

perceived. Therefore, the sample group that is studying is different. Therefore, does not make participation in waste management A case study of Salaya Campus Nakhon Pathom Province Significantly different

From the study, it is found that the sample group has knowledge and understanding in waste management. Different solid waste in participation in waste management A case study of Salaya Campus Nakhon Pathom Province with statistical significance at the level of 0.01 which is in line with the hypothesis set The sample group that has knowledge and understanding of solid waste management at a high level is more involved in solid waste management than those who have knowledge and understanding of solid waste management. In the medium and low levels, which is consistent with the research of Sarinee Suwannasaksak (2012: 101), found that the groups with different scores on solid waste management have different opinions on solid waste management Different with statistical significance at the level of 0.05. Therefore, the samples with different levels of knowledge and understanding in solid waste management therefore make participation in solid waste management A case study of Salaya Campus Nakhon Pathom Province Significantly different.

Recommendations

This research recommended to conduct future study by surveying the areas of solid waste problems in order to place waste containers in those areas. Separate waste containers should be provided in the buildings and over the university. Since the knowledge of solid waste management was moderate, the training on solid waste management and biodegradable transformation process should be offered to the students. The awareness towards solid waste should be raised.

The information on solid waste management should be disseminated via info graphic poster. The content in info graphic should be easy to understand in order to enhance effective solid waste management in Mahidol University, Salaya Campus, Nakhonpathom Province.

Recommendations for Further Study

1. The ways to promote knowledge regarding solid waste management in Mahidol University, Salaya Campus should be investigated.
2. The ways to promote students' participation in solid waste management in Mahidol University, Salaya Campus should be studied.
3. The participation of every level of graduated students in Mahidol University, Salaya Campus should be explored.

References

Anothai Thian Sawang. (2013). *Participation in Solid Waste Management of Ban Pa Sao Community, Umong Subdistrict, Mueang District, Lamphun Province*. Master of Public Administration Thesis Graduate School Chiang Mai University.

Banya yototha. (2013). *Participation in environmental management of community members in Tha Mai Municipality, Tha Mai District, Nonthaburi Province*. Faculty of Social and Environmental Development National Institute of Development Administration.

Benjamin, S. Bloom. (1971). *Dictionary of Behavioral Sciences*. London: Litton Educational Publishing Inc.,

Cherd klangsri. (2014). *Participation in waste management of the people of Bang Phut Subdistrict Pak Kret Municipality Nonthaburi Province*. Master of Arts Degree Thesis Social Sciences for Development Phranakhon Rajabhat University.

Cohen, John M and Uphoff, Norman T. (1977). *Rural Development, Participation : Concepts and Measures for Project Design, Implementation and Evaluation*. New York : The Rural Development Committee center for International Studies. Cornell University.

Daryl Morey, Mark Maybury and Bhavani Thuraisingham. (2000). *Knowledge Management : Classic and Contemporary Work*. Mass. : The MIT Press.

Department of Environmental Quality Promotion. (2007). *Hazardous waste and waste*. (Online). Available : <http://www.environment.in.th/evdb/info/waste/waste.html>

Journal of Environmental Management. (2011). *Guidelines for waste management to the center within Mahidol University, Salaya*. Year 7, Volume 1, January - June 2011.

Mahidol University (2016). *Waste and hazardous waste management policies*. Mahidol University: Nakhon Pathom.

Ministry of Education. Office of Policy and Strategy (2015). *Official action plan for the fiscal year 2015 of the Ministry of Education*. Bangkok : Office of the Permanent Secretary.

National Education Act 1999 B.E. (19 August 1999). Government Gazette. Book 116, Chapter 74, Page 1-28.

Nonaka, Kojiro and Takeuchi, Hirotaka. (2000). *Classic work: Theory of Organizational Knowledge Creation*.

Orathai Kokphon. (2009). *Partner Guide to Public Participation for Local Administrators*. Bangkok: Charan Sanitwong Printing.

Panphong Kongdechadisak (2014). *Public participation in the conservation of natural resources and the environment in the area of Mu Ko Chang National Park, Trat Province*. College of Public Administration Burapha University, Chonburi.

Papawarin Na Champa. (2014). *Public participation in waste management. Of Khlong Yai Subdistrict Municipality Khlong Yai District, Trat Province.* Degree Thesis Master of Public Administration Department of Public and Private Management College of Public Administration Burapha University.

Pollution Control Department. (2018). *Operation manual 3 uses (3R) to manage community waste.* Bureau of Waste and Hazardous Materials Management Pollution Control Department Ministry of Resources Nature and environment. 2nd edition, Bangkok: Heize Company Limited.

Pollution Control Department. (2018). *Guidelines for reduction guidelines and waste separation in government agencies under the project to do good deeds with heart Reduce environmental hazards.* Bureau of Waste and Hazardous Materials Management Pollution Control Department Ministry of Resources Nature and environment. Bangkok : Heize Company Limited.

Rattikorn Jongvisal. (2013). *Leadership : Research Theory and Ways to Develop.* Bangkok : The Publisher of Chulalongkorn University.

Sahasai Inwongwarn. (30 May 2018). *Participation in environmental conservation.* (Online) Access from <https://sahutchaisocialwork.wordpress.com/>

Tchobanoglous, G. and Kreith, F. (2002). *Handbook of Solid Waste Management.* (2nd Ed.). New York: McGraw-Hill.

World Health Organization. (1998-2002). *Community in Health for Primary Health Care.* Paper No. SHS/83-16. Bethesda Md., n.d.