



THE STUDY OF BEHAVIOR TO CLASSIFY FOR ELECTRONIC WASTE IN MUANG NAKHON PATHOM DISTRICT, NAKHON PATHOM PROVINCE

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Abstract

This quantitative research was conducted to observe the people's practicing household electronic waste separation and factors affecting such behavior at Muang Nakhon Pathom District, Nakhon Pathom Province, Data were collected from 388 household representatives 18 years and older to analyze with Statistical Package for Social Sciences Program, engaging statistical Percentage, Mean Frequency, and Standard Deviation, including a Comparative Analysis of Independent Sample T-Test, Pair T-Test and (One - way ANOVA). The research outcomes suggest that the selected representatives' overall practical level in household waste separation was high, having factors affecting their waste separation practice differently, with a statistical significance of 0.001, namely gender, number of electrical appliances and electronic equipment available, and use, knowledge on waste disposal and perceived data-news on electronic waste disposal. Meantime, influential factors on household electronic waste separation created the differences with a statistical significance of 0.05, focusing on primary incomes, the need for electrical and electronic gadgets, and electric appliances and electronic equipment. Regarding problems and obstacles, the representatives listed a lack of understanding in waste management, difficulty separating waste as well as no equipment for

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waste separation. The community lacks understanding of storing waste, is time-consuming, is without a proper site to store waste, and higher repair cost than purchasing new equipment, difficult to destroy, and causes pollution. This research suggests that people help separate household electronic waste. There should be a waste receptacle for every type of waste placed at each site regularly, with active training and practice that focuses on participation, public relations, and operations on regular basis. Moreover, the concerned parties should provide accurate data or processes to eliminate waste.

Keywords; Behavior/Electronic Waste Management

Introduction

With respect to the electronic waste problems in Thailand, electronic waste volume had continued increasing every year based on economic growth. Nonetheless, electronic waste volume in Thailand is likely to increase even more (The Secretariat of the House of Representatives, 2016). Problems from pollution have rapidly escalated from a growing number of populations that cause heavy consumption and eventually lead to increasing waste volume. Presently, electrical appliances and electronic gadgets such as television, electrical fan, Refrigerator, Air-condition, mobile phones, and computers have been a part of daily life, making upward living more convenient, as well as marketing, became a more intense competition (National Statistical Office. 2019: 18). Busabok (2013: Abstract) in her study on awareness of the hazardous effects of mobile phone waste on Bangkok residents mentioned that most people lack accurate knowledge in gathering electronic waste, including the disadvantages of improper mobile phone waste disposal that majority of electronic gadgets' consumers prefer



using new electronic gadgets all days, causing more mobile phone waste. In addition, most manufacturers of electronic gadgets focus more on marketing, technological development, and competing in profit making, instead of actively engaging in the disposal of mobile phones and electronic gadgets which compose of hazardous waste and chemicals, that required new technology to dispose of electronic wastes. Muang Nakhon Pathom District is in charge of administrative areas divided into 25 Sub-district and 220 villages, with a current area of 417.44 square meters or 260,900 meters. In Thailand, the waste management system comprises of the collection, transportation, treatment, and disposal of waste in which the waste is collected directly from households by trucks and indirectly at fixed stations daily or on specific dates depending on the amount of waste generated in each area. Such event has created consistent waste problems due to the economic and tour expansion that altered people's livelihoods, more trading, and touring businesses, thus leading to more piling of household solid and electronic wastes each year. Muang Nakhon Pathom District is currently facing similar problems from the accumulation of household and industrial solid and electronic wastes. Electronic wastes such as mobile phones, computers, television, and refrigerator were discarded by the people who stop using these products or replacing old products with new ones and failed to separate, store and transport wastes properly and would eventually become electronic. Although Nakhon Pathom has arranged various campaigns to seek the public support in electronic waste reduction, waste problems had not subsided. One of the causes of waste increment is the public lacking awareness and responsibility towards environmental preservation, frequently discarding waste in all the empty lots (Maung Nakhon Pathom District, Nakhon Pathom Province, 2019). The Thai



government has tried to eliminate electronic waste problems by limiting the import waste volume from foreign countries as well as collaborating with Mobile Phone companies to solve the electronic waste problem. For example, on December 16, 2020, the Ministry of Natural Resources and the Environment joined forces with AIS to create campaign the “Thais Say No To E-Waste” around the country, aiming to build public awareness and encourage participation to preserve the environment.

Research Objectives

This research aimed to observe the people’s practicing household electronic waste disposal as well as seeking influential factors on people’s actions, including the study of problems, obstacles, and recommendations in managing household electronic waste at Muang Nakhon Pathom District, Nakhon Pathom Province. Moreover, the study revealed outcomes from testing differences between research variables.

Research Content

This research involved the study of people’s practicing household electronic waste disposal at Muang Nakhon Pathom District, Nakhon Pathom Province by selecting 47 villages in 5 Sub-districts, namely Thummasala, Don Yai Hom, Wang Yen, Prong Ma-dae, and Nakhon Pathom by selecting samples from 388 households in the studied areas.

Research Glossary

People’s managing electronic waste is the display of perception on electronic waste reduction, electronic waste separation, storing waste in proper containers, gathering



electronic waste, reusing electronic waste, and elimination of electronic waste which creates knowledge and understanding of electronic waste management in order to lead to better electronic waste management.

Research Methodology

This quantitative research was conducted to study how the resident of Muang Nakhon Pathom District, Nakhon Pathom Province managed household wastes, to test the differences between factors affecting how the residents of Muang Nakhon Pathom District, Nakhon Pathom Province managed households, and to study obstacles and recommendations from the residents of Muang Nakhon Pathom District, Nakhon Pathom Province on managing household electronic wastes among sub-districts communities, selecting 47 villages from Thammasala, Don Yai Hom, Wang Yen, Prong Madae and Nakhon Pathom. The sample size for this research was calculated with Taro Yamane formula and derived at 388 samples, including the use of a Multi-stage that engaged 5 parts questionnaires.

Research Results

Research results are presented as follows:

Part 1: Personal Data

As for samples' personal data, majorities or 59.96% were 221 males, 203 samples or 52.32% aged over 55%, total 210 samples or 54.12% graduated with Associate Degree/Bachelor's Degree, whereas 115 samples, or 29.64% made their livelihoods as vendors or own businesses, 281 samples or 72.42% earned monthly income 20,001-30,000 Baht, 193 samples or 49.74% lived in the community over 5 years, 201 samples.



Part 2: Data on Samples’ practicing electronic waste management

The study outcomes suggest that sample 3 most correct answers were no.14 on the statement, majorities or 59.96% were 221 males, 203 samples, or 52.32% aged over 55%, and a total of 210 samples or 54.12% graduated with Associate Degree/Bachelor’s Degree, whereas 115 samples or 29.64% made their livelihoods as vendors or own businesses, 281 samples or 72.42% earned monthly income 20,001-30,000 Baht, 193 samples or 49.74% lived in the community over 5 years, 201 samples or 51.80% lived at home with members less than 4 persons. The study outcomes suggest the 3 most correct answers are first No. 14 on improper waste management can cause a problem for health and the environment. samples 96.68% answered correctly, followed by samples 96.65% answered correctly on statement No. 7 regarding the separation of electronic waste from general waste before dumping can help reduce electronic waste volume, and samples 92.01% on No.8 on waste can be classified into biodegradable organic waste, general waste, hazardous waste, and recycle waste.

Knowledge Level in Samples’ knowledge in household electronic waste

The findings suggest that samples 70.90% had a high level of knowledge in electronic waste Management, followed by 15.50% at a moderate level and 13.70% at a low level, having a Mean of 10.16% and a Standard Deviation of 0.17%. The highest score equaled 15 points and the minimum score was 0 .

Part 3: Samples Perceived Data in Household Electronic Waste Management



Television: The findings reveal 3 most preferred statements on samples perceived data-news regularly (over 4 times/month) were first all samples or 100% selected Television, with No. 3 on radio 85.83% and 71.39 % on Newspaper.

In addition, samples 51.50% a had high perception level, followed by samples 27.80% with a moderate level of perception and 20.60% at a low level, having average points 25.50, Standard deviation equaled 0.46, with a maximum of 40 points and a minimum of 4 points.

Part 4: Sample's practicing electronic waste disposal

The study outcomes suggest samples 91.00% had the most practice on electronic waste disposal, followed by samples with 9.00% more practice. The Standard Deviation equaled 0.21 with a maximum point of 88 and a minimum of 67 points.

Part 5: Analysis of Differences between Personal Factors and People's Practice in Electronic Waste Management

The findings suggest that male samples ($\bar{X}=3.31$) had a Mean of practicing Electronic Waste Management over females ($\bar{X}=3.29$) and different gender samples had practiced differently in electronic waste management, having statistical significance 0.001. Samples aged 36 - 45 years ($\bar{X}=1.61$) had Mean on practice in Electronic Waste Management over samples aged over 55 years ($\bar{X}=1.46$), as for samples 25 years and under to 35 years ($\bar{X}=1.37$), and samples aged 46-55 years ($\bar{X}=1.30$). Samples with different age had practiced differently in electronic waste management, having statistical significance 0.001. In addition, samples had completed Primary / Secondary educational level ($\bar{X}=1.53$) with



Mean practice in Electronic Waste Management over samples with Associate Degree/Vocational Certificate/Bachelor's Degree ($\bar{X} = 1.40$), and found samples with different educational level had practiced differently in electronic waste management, having statistical significance 0.001. Samples with other occupations such as athlete, and singer ($\bar{X} = 2.00$) had Mean on practice in Electronic Waste Management over samples aged over samples worked for the Government/State enterprises ($\bar{X} = 1.51$), for samples worked as workers/co. employee ($\bar{X} = 1.50$), and vendor/own business ($\bar{X} = 1.36$), and samples as house husband/housewife ($\bar{X} = 1.28$), agriculturist ($\bar{X} = 1.19$), and the statistical findings suggest that samples with different occupations had practiced differently in electronic waste management, having statistical significance 0.001. Moreover, samples with other occupations such as athlete, and singer ($\bar{X} = 2.00$) had Mean practice in Electronic Waste Management over samples aged over samples worked for the Government/State enterprises ($\bar{X} = 1.51$), for samples worked as workers/co. employee ($\bar{X} = 1.50$), and vendor/own business ($\bar{X} = 1.36$), and samples as house husband/housewife ($\bar{X} = 1.28$), agriculturist ($\bar{X} = 1.19$), and samples with different occupations had practiced differently in electronic waste management, having statistical significance 0.001. Samples with average monthly income (baht) 20001 – 30000 and over ($\bar{X} = 1.45$) had Mean practice in Electronic Waste Management over samples aged over samples earned average monthly income 10,000-20000 baht ($\bar{X} = 1.38$), for samples earned average monthly income 5,000 baht and lower -10000 baht ($\bar{X} = 1.33$), and samples with different monthly average earning had practiced



differently in electronic waste management, having statistical significance 0.001. Samples with living duration in the community less than 3 years ($\bar{X}=1.52$) had Mean on practice in Electronic Waste Management over samples lived in the community over 5 years ($\bar{X}=1.45$), and samples lived 3 – 5 years ($\bar{X}=1.33$) in the community, and samples with different living duration in the community had practiced differently in electronic waste management, having statistical significance 0.001. Lastly, samples with household members over 6 persons ($\bar{X}=1.69$) had Mean practice in Electronic Waste Management over samples with 4 household members or less ($\bar{X}=1.39$), and samples with 4-6 household members ($\bar{X}=1.33$), and samples with different household members had practiced differently in electronic waste management, having statistical significance 0.001.

Part 6 : Testing Differences between Personal Factors and People’s Practice Electronic Waste Management

The analysis of differences between Personal Factors and People’s Practice of Electronic Waste Management among 388 samples classified by the aforementioned factors, as related to reducing electronic waste volume, electronic waste separation, storing waste in proper containers, collecting total electronic waste, reusing electronic waste, and electronic waste disposal was done by using One-way Analysis of Variance and t-test.

Testing Hypothesis

HP 1: People with different gender practiced differently on electronic waste management



The findings from analysis of variation suggest that people with different gender had practiced differently in electronic waste separation, having statistical significance 0.05.

HP 2: People with different ages have practiced differently on electronic waste management

The findings suggest that people with different ages had practiced differently in electronic waste separation, having statistical significance 0.05.

HP 3: People with different educational level occupation practiced differently in electronic waste separation

It was found that people with different educational level occupation had indifferently practicing electronic waste separation, having statistical significance 0.01.

HP 4: People with different primary occupation have different practice in electronic waste management

The findings suggest that people with different primary occupation had indifferently practicing electronic waste separation, having statistical significance 0.05.

HP 5: People earned income from different primary occupation practiced differently in electronic waste management

The findings suggest that people who had earned income from different primary occupation had practiced differently in electronic waste separation, having statistical significance 0.05.

HP 6: People with different living duration in the community managed electronic waste differently



The findings suggest that people with different living duration in the community had practiced differently in electronic waste separation, having statistical significance 0.05.

HP 7: People with different number of household members managed electronic waste differently

The findings suggest that people with different number of household members had practiced managing electronic waste differently, having statistical significance 0.05.

HP 8: People own and use different number of electric and electronic equipment practiced electronic waste differently

The findings suggest from available/the use of electric and electronic equipment and electric and electronic equipment that people with different use and availability of electric and electronic equipment had practiced electronic waste differently, having statistical significance 0.05.

HP 9: People with different knowledge of electric and electronic equipment managed electronic waste differently

The findings suggest that people who had different knowledge on electronic waste management practiced electronic waste separation differently, having a statistical significance of 0.05.

HP 10: People perceived differently on news of electric and electronic equipment managed electronic waste differently



The findings suggest people with different perceptions of electronic waste management practiced electronic waste separation differently, having a statistical significance of 0.05.

Discussion and Conclusion

Problems and Obstacles Found

While conducting the study, the problems and obstacles found first in failure to reduce waste resulted from using inferior products, short-life, or inoperable after using in a short period. Second, people lack knowledge and understanding of proper electronic waste separation or storing electronic waste without the right equipment and container. Such a procedure is time-consuming and difficult to handle without proper equipment. Third, the community has no specific place to store electronic waste, coupled with a lack of advice and failure to make the people understand. Fourth, the concept of reusing or recycling electronic waste is unpopular due to the higher repair cost of equipment of the damaged device, which may not be worth repairing or may not well function as before. Fifth, the difficulty found in disposing of electronic waste where some products are large in size, causing problems in transporting and paying the high cost, not to mention the cause of pollution. Lastly, lacking leaders to organize group support and provide correct knowledge of waste disposal.

Recommendations for Further Research

More studies should focus on other factors affecting people's decision to dispose of electronic waste beyond the areas already mentioned in this research. Since the serious concern appeared in the subject of unsafe handling of used electronics and e-waste in



developing countries that may become health hazard, there should be more studies that focus on open-air burning and acid baths being used to retrieve sellable items from electronic components. The general public should be taught more things than just knowledge, awareness, and understanding because sorting and recycling processes are also crucial factors that the public is unfamiliar. There should be more studies on how to make the public discard outdated products appropriately because Thailand still lacks knowledge, regulation, and good electronic waste management

Because ignorance and unawareness are often problems, the government should set up a campaign for Thais to gain more knowledge and campaigns to raise awareness on a continuous basis, including revitalizing the waste management system and seeking collaboration from all parties.

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