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INTENTION TO PRACTISE SOLID WASTE SEGREGATION-AT-SOURCE: ATTITUDE, DESCRIPTIVE NORM, INJUNCTIVE NORM, AND ENVIRONMENTAL KNOWLEDGE

Cheng Kai Wah[1]
Syuhaily Osman[1]
Zuroni Md Jusoh[1]
Jasmine Leby Lau[1]

Abstract

This aim of this paper is to analyse descriptively the attitude, descriptive norm, injunctive norm, and environmental knowledge in the research scope of the intention to practise solid waste segregation-at-source. 400 respondents living in the townships of the nine districts of Selangor, namely Sabak Bernam, Ulu Selangor, Kuala Selangor, Gombak, Ulu Langat, Petaling, Klang, Kuala Langat, and Sepang, were employed via a multistage sampling method to carry out this research. A self-administered bilingual questionnaire was used to collect quantified research data among respondents in order to examine their intention to practise solid waste segregation-at-source in daily routine. The descriptive analysis of the current quantitative data was then analysed using IBM SPSS Statistics Version 26.0. The results of the descriptive investigation inferred that, overall, the Selangor households surveyed were perceived to have a favourable attitude, a high level of intention to practise solid waste segregation-at-source and environmental knowledge but moderately influenced by the descriptive norm and injunctive norm throughout the research. The present research has played a significant role in enriching the existing scarce and limited Malaysian literature on the intention to practise the solid waste segregation-at-source.

Keywords: Attitude; Descriptive norm; Injunctive norm; Environmental knowledge; Intention to practise solid waste segregation-at-source

Abstrak

Tujuan kajian ini adalah untuk menganalisis sikap, norma deskriptif, norma injunktif dan pengetahuan alam sekitar dalam skop kajian niat pengamalan pengasingan sisa pepejal di punca dengan secara deskriptif. Seramai 400 orang responden yang tinggal di sembilan buah daerah Selangor, iaitu Sabak Bernam, Ulu Selangor, Kuala Selangor, Gombak, Ulu Langat, Petaling, Klang, Kuala Langat dan Sepang telah dipilih melalui kaedah persampelan rawak berlapis untuk menjalankan kajian ini. Soal selidik dwibahasa yang ditadbir sendiri telah digunakan untuk mengumpul data kajian

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berbentuk kuantitatif di kalangan responden bagi memeriksa niat mereka dalam mengamalkan pengasingan sisa pepejal di punca dalam kehidupan seharian. Analisis deskriptif data kuantitatif kajian ini telah dianalisis dengan menggunakan IBM SPSS Statistics Versi 26.0. Secara keseluruhannya, hasil dapatan deskriptif menyimpulkan isi rumah Selangor kajian ini didapati mempunyai sikap yang menyenangkan, tahap niat pengamalan sisa pepejal di punca dan pengetahuan alam sekitar yang tinggi tetapi dipengaruhi oleh norma deskriptif dan norma injunktif dengan secara sederhana sepanjang kajian ini dijalankan. Kajian ini telah memainkan peranan penting dalam memperkaya kesusasteraan Malaysia yang terhad tentang niat pengamalan pengasingan sisa pepejal di punca.

Kata kunci: Sikap; Norma deskriptif; Norma injunktif, Pengetahuan alam sekitar, Niat pengamalan pengasingan sisa pepejal di punca

Introduction

The most critical environmental problem in Malaysia is the management of solid waste (Moh & Manaf, 2014). Specifically, municipal solid waste is a solid waste composition that is at the most dominant (64%) (Economic Planning Unit, 2015) compared to other categories of waste in Malaysia, including commercial waste, construction waste, and industrial waste (Fodor & Klemes, 2012). Municipal solid waste commonly includes all community waste, in particular household solid waste (Daskal, Ayalon, & Shechter, 2020).

According to a research conducted by the United Nations Development Programme in 2008, the majority of municipal landfill sites in Malaysia are still unable to accommodate the amount of solid waste production because they have reached the maximum capacity level. Accordingly, this research has assumed that scavenging activities should be prohibited and that existing environmental threat practices should be immediately stopped. However, local households should actively support household waste minimisation strategies (Cole, Osmani, Quddus, Wheatley, & Kay, 2014), including recycling campaigns, to achieve the target of 22.0 per cent of the national recycling rate in Malaysia by 2020 and, subsequently, to achieve the goal of sustainable waste management.

For this reason, the Malaysian Ministry of Housing and Local Government has gradually introduced mandatory waste segregation-at-source policy for all Malaysian citizens under the Solid Waste and Public Cleansing Management Act 2007 (Act 672). It is an act that has been revised in the context of the 11th Malaysian Plan (2016 - 2020). Likewise, it is an offence under the law to not separate solid waste at source according to solid waste composition, namely cardboard, plastic, paper, food waste, glass, metal, farm waste, and lump waste by 1 September 2015. However, it is important to note that despite the implementation and planning of transformational

recycling strategies and solid waste segregation-at-source, there are still several barriers to the success of recycling practices and solid waste segregation-at-source (Moh & Manaf, 2014). For this reason, the aim of this paper is to provide a descriptive analysis of attitude, descriptive norm, injunctive norm, and environmental knowledge in the research scope of the intention to practise solid waste segregation-at-source.

Literature Review

Attitude

Attitude can be claimed as one of the psychological determinants of an individual's behavioural intention (Fujii, 2006). Mansour, Fathelrahman, and Eljelly (2017) further emphasised that an attitude is a person's conviction, liking, or idea of a specific idea or object. Thus, this current research assumes that the attitude indicates a person's dislikes or likes, or an individual's assessment (Millar & Baloglu, 2011) of a given object.

Attitude is one of the common predictors of behavioural intention (Ajzen & Driver, 1991; Cordano, Welcomer, Scherer, Pradenas, & Parada, 2011; Harland, Staats, & Wilke, 1999). However, existing literature on the relationship between attitude and intention to practise solid waste segregation-at-source is rare (Cheng, Osman, Jusoh, & Lau, 2019). Based on a review of the relevant literature, a wide range of successful research has, to date, justified the fact that the variable attitude is known to be an important determinant of the conservation behaviour of resources (Wilke, 1991), behavioural intentions of electricity use and gas use (Fujii, 2006), green hotel visit intention (Trang, Lee, and Han, 2019), food waste separation intention (Ghani, Rusli, Biak, & Idris 2013; Tonglet, Phillips, & Bates, 2004; Tonglet, Phillips, & Read, 2004), intention to reduce car usage (Hsu, Boarnet, & Houston, 2019; White & Sintov, 2017), general pro-environmental behaviour (Cheng & Osman, 2019; Tanner & Wolfing Kast, 2003), as well as energy-efficient product purchase intention (Ha & Janda, 2012).

Descriptive norm

Descriptive norm is one of the social norms in social psychology. Wang, Fan, Zhao, Yang, and Fu (2016) as well as Zhao, Zhang, and Xu (2019) have explained the descriptive norm as an "appropriate" behaviour that is typically demonstrated by important referents of a specific social setting. This situation is due to the perception of the action of other individuals, which leads to a certain degree of motivation in order to show popular action (Cialdini, 2003) as the results of the "proof" of what is likely be good, adaptive, and efficient action (Cialdini, Kallgren, & Reno, 1990). As a result, people always intend to follow the actions and expectations of their significant referents in order to avoid sanctions and to gain the identity of the community (Morris

& Liu, 2015). For example, close friends, neighbours, family members, peer groups, and celebrities.

Descriptive norm has been confirmed and revealed as a stronger predictor of pro-environmental intention compared to the injunctive norm (Cialdini *et al.,* 1990; Keizer, Lindenberg, & Steg, 2011; Melnyk, van Herpen, Fischer, & van Trijp, 2013). For example, the expectations of others that certain targeted groups of people should be recycling (injunctive norm) are thought to be weaker than the social pressure exerted by the knowledge that others are recycling (descriptive norm) (Thomas & Sharp, 2013). This condition is likely due to the need for a simpler cognitive assessment of the descriptive norm, as it already shows the intention of other people, who influence the consumer to more easily comply with such norms through simple imitation (Cialdini, 2003; Melnyk *et al*., 2013).

Injunctive norm

Empirical validation has revealed that the injunctive norm is cognitively linked to the interpersonal merit of social disapproval or approval (Jacobson, Mortensen, & Caildini, 2011). Thus, the injunctive norm is a social norm that gives normative perception (Silvestri & Correia, 2016) of what other people think a particular individual should do. Indeed, the injunctive norm reflects the extent of a specific ethical action that is commonly disapproved or approved in a particular society or group of people, thereby identifying how not to or how to behave, regardless of situation or place (Cialdini *et al*., 1990). The present researcher therefore summarises that the injunctive norm indicates the likelihood of a member in the community in order to obtain social disapproval or approval, and thus enables the member to update his or her community's expectations of accompanying emotional payoffs and material rewards in line with possible action.

To the best of knowledge, this current research is among the first to use the injunctive norm to address the intention to practise solid waste segregation-at-source in Selangor. Furthermore, no research has been conducted so far to explicitly examine the link between the injunctive norm and the intention to practise solid waste segregation-at-source, particularly in the context of Malaysia. Throughout the literature search, the injunctive norm on speeding (Cestac, Paran, & Delhomme, 2014), sexual behaviour (Armitage & Talibudeen, 2010), substance abuse (Collins & Carey, 2007; Hagger, Lonsdale, Hein, Koka, Lintunen, Pasi, Chatzisarantis, 2012), physical activity (Courneya, Conner, & Rhodes, 2006; Rhodes, Macdonald, & McKay, 2006), and household energy use (Allcott, 2011; Schultz, Khazian, & Zaleski, 2008) have been measured. As a result, this current research specifically has the potential to contribute to the solid waste segregation-at-source literature by assessing the role and nature of the injunctive norm in predicting the intention to practise solid waste segregation-at-source in the Selangor household sample.

Environmental knowledge

Environmental knowledge has been seen as an essential element in the promotion of an ecological lifestyle (Otto & Pensini, 2017). The acquisition of environmental knowledge exists on the basis of nature illustrative elements, including animals, soils, and plants within a natural setting. The scope of environmental knowledge also demonstrates a wide range of information from knowledge on environmental action, biology, and knowledge on environmental systems. It is interesting to note that pro-environmental behaviour is only possible if people know what they can do for the environment (Gardner & Stern, 2002; Li & Hu, 2018; Otto & Kaiser, 2014). The current researcher therefore expects people to be more likely to be more environmentally friendly once they have acquired the required skills, knowledge, and sensitivity (Tayci & Uysal, 2012) through nature-based environmental education, either through a formal education system or through an informal education system.

In terms of research-based discussion, although the current research that delineates environmental knowledge as a significant variable to determine the intention of households to practise solid waste segregation-at-source is still limited, there is fortunately still a great deal of research that recognises that environmental knowledge can be well linked to other research disciplines. Examples will be pro-environmental behaviour (Casalo, Escario, & Rodriguez-Sanchez, 2019; Pothitou, Hanna, & Chalvatzis, 2016), ecological behaviour (Otto & Pensini, 2017), behavioural intention (Li & Hu, 2018), voluntary carbon offsetting (Lu & Wang, 2018), energy consumption (Paco & Lavrador, 2017), ecologically conscious consumer behaviour (Taufique, Siwar, Chamhuri, & Sarah, 2016), and marine ecology (Benham, 2017). In the same way, this current research will be one of the first preliminary studies to expand the specific scope of research, that is, the intention to practise solid waste segregation-at-source, particularly in the Southeast Asian country of Malaysia.

Methodology

Selangor is purposely chosen as the research location due to its highest population density, the highest households consumption rate, aggressive economic development, the greatest urbanisation, the potential to be transformed into a low carbon city, and its unique geographical background compared to other states and federal territories in Malaysia.

Besides that, the respondents are the 400 male and female households who are currently living in the housing areas of the nine districts of the state of Selangor, namely Sabak Bernam, Kuala Selangor, Klang, Kuala Langat, Sepang, Hulu Langat, Gombak, Petaling, and Hulu Selangor. In order to obtain a valid and reliable representative for this research, the number of respondents is determined by using the sample size determination equation proposed by Yamane (1967). The multistage

sampling method is also used to ensure that the selected respondents are more precise for the output of the research. As a result, a set of self-administrated bilingual questionnaires is distributed to the respondents during data collection.

Definition of terminologies

Five variables are involved in this current research. These include attitude, descriptive norm, injunctive norm, environmental knowledge as well as the intention to practise solid waste segregation-at-source. Each variable is defined in terms of its conceptual and operational definitions.

Attitude towards intention to practise solid waste segregation-at-source

Attitude can be claimed as the negative or positive assessment of the likelihood of separation of solid waste on the basis of its different properties, which in turn are highly capable of generating influence within the population (Baawain, Al-Mamun, Omidvarborna, Al-Mujaini, & Choudri, 2019). In the present research, the tools of previous research (Ayob, Sheau-Ting, Abdul Jalil, & Chin, 2017; Babaei, Alavi, Goudarzi, Teymouri, Ahmadi, & Rafiee, 2015; Ioannou, Zampetakis, & Lasaridi, 2013; Ramayah, Lee, & Lim, 2012) have been adapted on the basis of respondents' tendency to respond negatively or positively to their relative intention through five scales of Strongly Disagree (1) to Strongly Agree (5).

Descriptive norm towards intention to practise solid waste segregation-at-source

Descriptive norm refers to the perception of the individual (Abdullah, Idris, & Saparon, 2017) towards the tendency of the majority of others to separate unwanted subjects from their origin of production on the basis of different properties. (Ryoo, Hyun, & Sung, 2017). By adapting the instruments proposed in previous research (Culiberg, Elgaaied-Gambier, 2016; Eriksson & Forward, 2011; Fornara, Carrus, Passafaro, & Bonnes, 2011; Jacobson, Jacobson, & Hood, 2015; Kobis, van Prooijen, Righetti, & van Lange, 2016; Koeneman, Chorus, Hopman-Rock, & Chinapaw, 2017; Lapinski, Zhuang, Koh, & Shi, 2017; Park, Klein, Smith, & Martell, 2009), the descriptive norm was measured on the basis of the respondents' thoughts on the action of their key referents, which led them to portray the targeted "appropriate" behaviour in five scales from Never (1) to Always (5).

Injunctive norm towards intention to practise solid waste segregation-at-source

Injunctive norm is determined as the perceptions of individuals (Prince & Carey, 2010) towards the level of approval (Merrill, Miller, Balestrieri, & Carey, 2016) or

acceptability (Ecker, Dean, Buckner, & Foster, 2019) of most of their key people who have judged that the intention to perform certain repeated actions of sorting unwanted materials into different categories is a "right" thing to do in a society (Correge, Clavel, Christophe, & Ammi, 2017). In the context of this research, it was measured by items (Fornara *et al*., 2011; Krieger, Neighbors, Lewis, LaBrie, Foster, & Larimer, 2016; Leavens, Brett, Morgan, Lopez, Shaikh, Leffingwell, & Wagener, 2018; Minton & Rose, 1997) tested on the response of households ranging from Strongly Disapproval (1) to Strongly Approval (5) (Ecker *et al.*, 2019) in terms of their belief in acceptability of the level of disapproval or approval of others in terms of their intention to portray certain daily waste sorting procedures in life.

Environmental knowledge towards intention to practise solid waste segregation-at-source

Environmental knowledge can be defined as the factual information that has a powerful influence (Tong, Anders, Zhang, & Zhang, 2020) on the relationships, concepts or facts related to the ecosystem and its surrounding environment (Paco & Lavrador, 2017) generated by interacting and observing with the non-human and human world. In this research, an adaption of the measurement was made to reflect the current context on the impact of human activities on the environment and general information on how domestic waste is produced and how it affects the environment (Bang, Ellinger, Hadjimarcou, & Traichal, 2000; Braun & Dierkes, 2019; Gambro & Switzky, 1999; Paco & Lavrador, 2017; Ramayah *et al.,* 2012).

Intention to practise solid waste segregation-at-source

The intention to practise solid waste segregation-at-source can be seen as a tendency to systematically perform a repeated and typical action of separating unwanted material or matter into different elements according to their recycling potential (Charuvichaipong & Sajor, 2006). This term was used to indicate the extent to which targeted respondents intend to carry out waste sorting activities into the required fractions at the place of waste generation – at the source. The measurements for this variable have been adapted from Ayob *et al.* (2017), Ghani *et al.* (2013), and Ioannou *et al.* (2013). As a result, the five-point Likert scale, which ranges from (1) strongly disagree to (5) strongly agree, is used to measure this variable in the research.

Results and Discussions

Respondents' particulars

Frequency distribution, percentage distribution, measure of central tendency, measure of dispersion as well as maximum and minimum values were used to

describe the particulars of the respondents. The particulars of the respondents therefore consist of socio-demographic information and socio-economic information. Table 1 shows the distribution of respondents' particulars of the research.

Table 1: Distribution of Respondents' Particulars [a], N = 400

Item	Number of Respondent	Percentage (%)
Sex		
Male	148	37.0
Female	252	63.0
Age (years old) [a]		
≤ 20	7	1.8
21 – 30	177	44.3
31 – 40	39	9.8
41 – 50	93	23.3
51 – 60	73	18.3
> 61	11	2.8
Ethnic Group [a]		
Bumiputera	291	72.8
Chinese	95	23.8
Indian	8	2.0
Others	6	1.5
Monthly Individual Income [a]		
≤ RM3000	286	71.5
RM3001 – RM5000	78	19.5
RM5001 – RM7000	13	3.3
RM7001 – RM9000	12	3.0
> RM9000	11	2.8

Note: Sd = Standard deviation; N = Total number of respondents;
[a] = Totals do not sum to 100.0 due to rounding.

As shown in Table 1, the data collected was 37.0 percent male and 63.0 percent female among the 400 respondents. The mean age of respondents was 37.9 years old and the median age was 36.5 years old. The youngest and oldest respondent in this sample were 21 and 78 years old, respectively. 44.3 percent of the age of the respondent ranged from 21 to 30. There were only seven respondents below the age of 20, of whom eleven were above the age of 61. In this research, the Bumiputera respondents appeared to be the largest ethnic group in the sample (72.8%). It was followed by the percentage distribution of the Chinese and Indian ethnic groups, comprising 23.8 percent and 2.0 percent, respectively. Lastly, there were only 11 respondents whose monthly incomes was over RM9000 in the research.

Attitude of respondents on intention to practise solid waste segregation-at-source

Using the fourteen statements in this section, the Selangor households' attitude with the intention to practise solid waste segregation-at-source was examined on the basis of a five-point Likert scale, ranging from "strongly disagree" (1) to "strongly agree" (5). Table 2 presents the survey of respondents in terms of frequency, percentage distributions, and mean of each statement on this topic.

Table 2: Descriptive Analysis of Attitude with Intention to Practise Solid Waste Segregation-at-Source [a], N = 400

No.	Statement	Total Frequency / (%)					Mean
		1	2	3	4	5	
1.	I feel good about myself when I have the intention to practise solid waste segregation-at-source.	3 (0.8)	12 (3.0)	94 (23.5)	204 (51.0)	87 (21.8)	3.90
2.	I believe that my intention to practise solid waste segregation-at-source will help reduce waste management cost.	1 (0.3)	7 (1.8)	55 (13.8)	204 (51.0)	133 (33.3)	4.15
3.	I believe that my intention to practise solid waste segregation-at-source will help reduce pollution and contribute to a cleaner environment.	1 (0.3)	3 (0.8)	60 (15.0)	167 (41.8)	169 (42.3)	4.25
4.	I believe that my intention to practise solid waste segregation-at-source will help reduce wasteful use of landfills.	3 (0.8)	5 (1.3)	56 (14.0)	192 (48.0)	144 (36.0)	4.17
5.	I feel that solid waste segregation-at-source requires additional efforts and is time consuming. *	90 (22.5)	172 (43.0)	92 (23.0)	33 (8.3)	13 (3.3)	2.27
6.	I believe that my intention to practise solid waste segregation-at-source will help conserve natural resources and the environment.	1 (0.3)	2 (0.5)	59 (14.8)	180 (45.0)	158 (39.5)	4.23

Table 2 (continues)

No.	Statement	Total Frequency / (%)					Mean
		1	2	3	4	5	
7.	I find that all citizens are responsible to inculcate the intention to practise solid waste segregation-at-source.	2 (0.5)	8 (2.0)	66 (16.5)	155 (38.8)	169 (42.3)	4.20
8.	My feeling about the intention to practise solid waste segregation-at-source is positive.	4 (1.0)	6 (1.5)	71 (17.8)	176 (44.0)	143 (35.8)	4.12
9.	I find the idea to have the intention to practise solid waste segregation-at-source as unpleasant. *	23 (5.8)	56 (14.0)	65 (16.3)	109 (27.3)	147 (36.8)	3.75
10.	I find the intention to practise solid waste segregation-at-source as meaningless. *	10 (2.5)	38 (9.5)	47 (11.8)	99 (24.8)	206 (51.5)	4.13
11.	I will feel guilty if I do not have the intention to segregate my household solid waste-at-source.	8 (2.0)	24 (6.0)	137 (34.3)	142 (35.5)	89 (22.3)	3.70
12.	It will be wrong of me not to have the intention to segregate my household solid waste-at-source.	9 (2.3)	34 (8.5)	132 (33.0)	159 (39.8)	66 (16.5)	3.60
13.	I find the intention to segregate household solid waste-at-source as interesting.	4 (1.0)	8 (2.0)	103 (25.8)	199 (49.8)	86 (21.5)	3.89
14.	My feelings towards the intention to segregate household solid waste-at-source are favourable.	1 (0.3)	8 (2.0)	76 (19.0)	211 (52.8)	104 (26.0)	4.02

Note: N = Total number of respondents; % = Percentage; 1 = Strongly disagree;
2 = Disagree; 3 = Neither agree nor disagree; 4 = Agree; 5 = Strongly agree;
* = Negative statement; [a] = Totals do not sum to 100.0 due to rounding.

As shown in Table 2, most respondents believed that their intention to practice solid waste segregation-at-source would help reduce pollution and contribute to a cleaner environment (mean = 4.25). Meanwhile, the statement “I find the intention to practice solid waste segregation-at-source as meaningless” indicated the highest percentage (51.5%) of respondents to “strongly agree” (5) response. Respondents agree that they have favourable feelings towards the intention to segregate household solid

waste-at-source (52.8%). In addition to that, they will feel good about themselves (51.0%) because they believe that this is an interesting intention (49.8%) which, in turn, will help to reduce waste management cost (51.0%) and wasteful use of landfills (48.0%). However, the statement "I feel that solid waste segregation-at-source requires additional efforts and is time consuming" indicated the highest percentage (43.0%) for disagree (2) response. As a result, it can be interpreted that there is a higher distribution of respondents who believe that they do not need to allocate extra time and effort to perform solid waste segregation-at-source every day of their lives.

Descriptive norm of respondents on intention to practice solid waste segregation-at-source

The measurement of the descriptive norm in this research consists of a total of twelve positive statements with five-point Likert-type scales ranging from (1) "strongly disagree" to (5) "strongly agree". Table 3 shows the responses of the respondents to each statement in this section.

Table 3: Descriptive Analysis of Descriptive Norm with Intention to Practise Solid Waste Segregation-at-Source [a], N = 400

No.	Statement	Total Frequency / (%)					Mean
		1	2	3	4	5	
1.	Intention to practise solid waste segregation-at-source is generally considered as a common behaviour in my residential neighbourhood.	45 (11.3)	84 (21.0)	132 (33.0)	117 (29.3)	22 (5.5)	2.97
2.	My relatives will appreciate it if I have the intention to segregate the household solid waste at its source.	24 (6.0)	63 (15.8)	137 (34.3)	140 (35.0)	36 (9.0)	3.25
3.	It is easy for me to see most of the people around me who have the intention to participate in solid waste segregation-at-source activities every day.	50 (12.5)	122 (30.5)	117 (29.3)	83 (20.8)	28 (7.0)	2.79
4.	I expect the majority of my friends have the intention to support solid waste segregation-at-source.	8 (2.0)	70 (17.5)	126 (31.5)	148 (37.0)	48 (12.0)	3.40

Table 3 (continues)

No.	Statement	Total Frequency / (%)					Mean
		1	2	3	4	5	
5.	Most people who are important to me think that it is appropriate to have the intention to practise solid waste segregation-at-source as their daily habit.	20 (5.0)	48 (12.0)	131 (32.8)	155 (38.8)	46 (11.5)	3.40
6.	I think that the culture in this country strongly encourages the citizens to have the intention to support activities related to solid waste segregation-at-source.	37 (9.3)	129 (32.3)	116 (29.0)	94 (23.5)	24 (6.0)	2.85
7.	Most of my friends have the intention to be voluntarily involved in solid waste segregation-at-source in a bid to protect the environment.	33 (8.3)	92 (23.0)	146 (36.5)	114 (28.5)	15 (3.8)	2.97
8.	Most of my colleagues have the intention to practise solid waste segregation-at-source at their own houses.	35 (8.8)	102 (25.5)	156 (39.0)	99 (24.8)	8 (2.0)	2.86
9.	Majority of the residents in my community always have the intention to find the proper way to practise solid waste segregation-at-source.	48 (12.0)	115 (28.8)	151 (37.8)	76 (19.0)	10 (2.5)	2.71
10.	My neighbours have the intention to participate actively in solid waste segregation-at-source.	43 (10.8)	128 (32.0)	142 (35.5)	78 (19.5)	9 (2.3)	2.71

Table 3 (continues)

No.	Statement	Total Frequency / (%)					Mean
		1	2	3	4	5	
11.	If many others have the intention to practise solid waste segregation-at-source, I think it is an "appropriate" behaviour for me to practise it too.	16 (4.0)	20 (5.0)	84 (21.0)	195 (48.8)	85 (21.3)	3.78
12.	Having the intention to practise solid waste segregation-at-source is actually what many of my acquaintances are practising now.	8 (2.0)	53 (13.3)	151 (37.8)	152 (38.0)	36 (9.0)	3.39

Note: N = Total number of respondents; % = Percentage; 1 = Never; 2 = Rarely; 3 = Sometimes; 4 = Often; 5 = Always;
[a] = Totals do not sum to 100.0 due to rounding.

After analysing all the statements used to test this variable, the lowest mean (mean = 2.71) is "Majority of the residents in my community always have the intention to find the proper way to practise solid waste segregation-at-source" and "My neighbours have the intention to participate actively in solid waste segregation-at-source". Meanwhile, the findings also showed that the statement "It is easy for me to see most of the people around me who have the intention to participate in solid waste segregation-at-source activities every day" indicated the highest percentage (12.5%) of respondents for "never" (1) response. This situation can be assumed as the culture in this country rarely intentionally encourages its citizens to support all activities in support of solid waste segregation-at-source (32.3%). It was worth noting, however, that acquaintances (38.0%) and most of the people who were important to them (38.8%) often have a similar intention to practise solid waste segregation-at-source. As a result, they will often see this as an "appropriate" intention to them (48.8%) as well. They also noted that many of their relatives (35.0%) and friends (37.0%) often intended to support as well as participate in the solid waste segregation-at-source voluntarily to protect the environment.

Injunctive norm of respondents on intention to practise solid waste segregation-at-source

Using the five measurement scales ranging from (1) "strongly disapprove" to (5) "strongly approve", twelve positive statements were used to assess the injunctive norm with the intention to practise solid waste segregation-at-source in this research.

Subsequently, the relative mean, frequency, and percentage distributions are shown in Table 4.

Table 4: Descriptive Analysis of Injunctive Norm with Intention to Practise Solid Waste Segregation-at-Source [a], N = 400

No.	Statement	Total Frequency / (%)					Mean
		1	2	3	4	5	
1.	Most people who are important to me think that I should have the intention to segregate my household solid waste.	15 (3.8)	37 (9.3)	151 (37.8)	162 (40.5)	35 (8.8)	3.41
2.	Most of my neighbours would agree that I will likely engage in solid waste segregation-at-source in the next two weeks.	14 (3.5)	64 (16.0)	162 (40.5)	140 (35.0)	20 (5.0)	3.22
3.	Nearly all my relatives think that it is a good idea for me to segregate household solid waste before the next disposal process.	17 (4.3)	58 (14.5)	140 (35.0)	149 (37.3)	36 (9.0)	3.22
4.	Majority of my close friends would approve of my good intention to segregate solid waste-at-source every day.	5 (1.3)	43 (10.8)	142 (35.5)	160 (40.0)	50 (12.5)	3.52
5.	Many of my family members would exhibit strong acceptability of my intention to think of solutions to reduce the volume of household solid waste.	16 (4.0)	36 (9.0)	106 (26.5)	181 (45.3)	61 (15.3)	3.59
6.	My peers strongly approve of my good intention to learn the right way to segregate household solid waste at home.	4 (1.0)	44 (11.0)	120 (30.0)	181 (45.3)	51 (12.8)	3.58
7.	My parents think that I should segregate my own solid waste as my daily routine.	21 (5.3)	48 (12.0)	129 (32.3)	152 (38.0)	50 (12.5)	3.41
8.	My intention to segregate my own solid waste-at-source is socially accepted in my residential neighbourhood.	6 (1.5)	59 (14.8)	135 (33.8)	158 (39.5)	42 (10.5)	3.43

Table 4 (continues)

No.	Statement	Total Frequency / (%)					Mean
		1	2	3	4	5	
9.	The local community does approve and accept my intention to know more about the importance of managing my own daily household solid waste.	17 (4.3)	48 (12.0)	155 (38.8)	145 (36.3)	35 (8.8)	3.33
10.	Leaders of my community expect me to have the intention to recycle.	12 (3.0)	76 (19.0)	137 (34.3)	123 (30.8)	52 (13.0)	3.32
11.	Majority of my group members think that being a person with the intention to segregate solid waste-at-source is the "right" thing for me at my community.	14 (3.5)	35 (8.8)	139 (34.8)	170 (42.5)	42 (10.5)	3.48
12.	I expect the perceived adolescents' approval of my intention to practise solid waste segregation-at-source is necessary.	8 (2.0)	44 (11.0)	134 (33.5)	163 (40.8)	51 (12.8)	3.51

Note: N = Total number of respondents; % = Percentage; 1 = Strongly disapprove;
2 = Somewhat disapprove; 3 = Neither disapprove nor approve;
4 = Somewhat approve; 5 = Strongly approve;
[a] = Totals do not sum to 100.0 due to rounding.

As shown in Table 4, the highest mean was reported when many family members of the respondents were somewhat approved of their intention to think about solutions to reduce the volume of household solid waste (mean = 3.59). Besides the data presented in terms of mean, the statement "Leaders of my community expect me to have the intention to recycle" indicated the highest percentage (19.0%) among the Selangor respondents for "somewhat disapprove" of the response (2). In other words, respondents somehow approve that members of Parliament in their communities have a significant role to play in encouraging citizens to have the intention to perform solid waste segregation-at-source. In addition to that, respondents who participated in this survey neither disapprove nor approve that their neighbours (40.5%), the local community (38.8%), and the people who are important to them (37.8%) should obtain more information on the importance of managing their own household solid waste for the next two weeks. However, another two statements – "Many of my family members would exhibit strong acceptability of my intention to think of solutions to reduce the volume of household solid waste" and "My peers strongly approve of my good intention to learn the right way to segregate household solid waste at home" indicated the highest percentage of 40.5 percent for "somewhat approve" (4) response. This

situation shows that it is essential for them to have meaningful recognition from family members and peers that they intend to learn the right way to reduce the volume of household solid waste on a daily basis.

Environmental knowledge of respondents on intention to practise solid waste segregation-at-source

In order to evaluate environmental knowledge, a scale of twenty-five statements had been established and used in this section. A five-point Likert-type scale ranging from (1) "never true" to (5) "always true" was used to assess the measurement of environmental knowledge. As a result, Table 5 shows the mean, frequency, and percentage distributions for each statement in this section.

Table 5: Descriptive Analysis of Environmental Knowledge with Intention to Practise Solid Waste Segregation-at-Source [a], N = 400

No.	Statement	Total Frequency / (%)					Mean
		1	2	3	4	5	
1.	Serious environmental pollution can be reduced by having the intention to practise solid waste segregation-at-source.	0 (0.0)	4 (1.0)	53 (13.3)	201 (50.3)	142 (35.5)	4.20
2.	The tendency to segregate solid waste-at-source is a good measure to reduce wasteful use of landfills.	0 (0.0)	3 (0.8)	51 (12.8)	196 (49.0)	150 (37.5)	4.23
3.	Households should be inclined to portray solid waste segregation-at-source in order to conserve and preserve the natural resources.	2 (0.5)	3 (0.8)	62 (15.5)	181 (45.3)	152 (38.0)	4.20
4.	Malaysian households should be aware of the benefits of having the intention to practise solid waste segregation-at-source in daily life.	1 (0.3)	7 (1.8)	54 (13.5)	174 (43.5)	164 (41.0)	4.23
5.	I am very knowledgeable about the proper way to carry out solid waste segregation-at-source.	10 (2.5)	49 (12.3)	147 (36.8)	149 (37.3)	45 (11.3)	3.43

Table 5 (continues)

No.	Statement	Total Frequency / (%)					Mean
		1	2	3	4	5	
6.	Recycled paper produces more pollutants compared to other types of paper materials. *	33 (8.3)	87 (21.8)	137 (34.3)	80 (20.0)	63 (15.8)	3.13
7.	Most garbage will be sent to a landfill where it is buried after being dumped from the garbage trucks.	11 (2.8)	27 (6.8)	121 (30.3)	171 (42.8)	70 (17.5)	3.66
8.	Overpopulation is one of the dangerous threats to the earth's environment.	11 (2.8)	22 (5.5)	74 (18.5)	156 (39.0)	137 (34.3)	3.97
9.	Recycling means that household buys things that can be used again.	61 (15.3)	46 (11.5)	93 (23.3)	123 (30.8)	77 (19.3)	3.27
10.	Animals alive today are most likely to become extinct if their habitat is destroyed.	4 (1.0)	5 (1.3)	39 (9.8)	150 (37.5)	202 (50.5)	4.35
11.	Coal and petroleum are examples of renewable energy. *	42 (10.5)	74 (18.5)	64 (16.0)	38 (9.5)	182 (45.5)	3.61
12.	Environmental problems are a threat only to a household in the cities. *	41 (10.3)	76 (19.0)	54 (13.5)	69 (17.3)	160 (40.0)	3.58
13.	The main problem with landfills is that they take up too much space.	24 (6.0)	43 (10.8)	107 (26.8)	127 (31.8)	99 (24.8)	3.59
14.	Building a dam on a river can be harmful because it makes the river muddy. *	73 (18.3)	135 (33.8)	127 (31.8)	40 (10.0)	25 (6.3)	2.52
15.	An example of non-renewable energy is tidal/wave energy. *	68 (17.0)	66 (16.5)	88 (22.0)	32 (8.0)	146 (36.5)	3.31
16.	An aluminium can is an example of items which cannot be recycled and reused. *	27 (6.8)	65 (16.3)	58 (14.5)	45 (11.3)	205 (51.3)	3.84
17.	Species that no longer exist should be protected. *	126 (31.5)	104 (26.0)	72 (18.0)	20 (5.0)	78 (19.5)	2.55
18.	Deforestation causes a dryer and hotter climate.	6 (1.5)	3 (0.8)	44 (11.0)	116 (29.0)	231 (57.8)	4.41

Table 5 (continues)

No.	Statement	Total Frequency / (%)					Mean
		1	2	3	4	5	
19.	The greenhouse effect will increase the amount of carbon dioxide in the atmosphere.	27 (6.8)	10 (2.5)	47 (11.8)	122 (30.5)	194 (48.5)	4.12
20.	Households are encouraged to use plastic cups as a contribution to a healthy environment. *	29 (7.3)	67 (16.8)	42 (10.5)	38 (9.5)	224 (56.0)	3.90
21.	Ecology is best described as the study of the relationship between organisms and the environment.	3 (0.8)	5 (1.3)	84 (21.0)	142 (35.5)	166 (41.5)	4.16
22.	We must preserve and conserve the limited resources on the earth by using disposable plates and spoons. *	60 (15.0)	91 (22.8)	59 (14.8)	23 (5.8)	167 (41.8)	3.37
23.	Practically, all the lead in our atmosphere is caused by the usage of cars.	26 (6.5)	56 (14.0)	125 (31.3)	136 (34.0)	57 (14.3)	3.36
24.	Dichlorodiphenyltrichloroethane (DDT) takes anywhere from several days to several years to deteriorate into harmless chemicals. *	62 (15.5)	113 (28.3)	179 (44.8)	16 (4.0)	30 (7.5)	2.60
25.	Ecology views man as being different from nature. *	31 (7.8)	89 (22.3)	145 (36.3)	44 (11.0)	91 (22.8)	3.19

Note: N = Total number of respondents; % = Percentage; 1 = Never true;
2 = Rarely true; 3 = Neutral; 4 = Usually true; 5 = Always true;
* = Negative statement; [a] = Totals do not sum to 100.0 due to rounding.

According to the data shown in Table 5, the statement “Deforestation causes a dryer and hotter climate” indicated the highest mean (mean = 4.41) among the Selangor respondents. This scenario reflected that about two-fifths of the respondents fully understood that the concentration of carbon dioxide in the atmosphere would increase (48.5%) when trees were cut down and the forest cleared, giving rise to the greenhouse effect that causes global warming. In addition to global warming, natural habitats had also been destroyed as the wetlands, highland forests, and tropical rainforests had been lost. These scenarios have caused many ill effects and animals to become extinct (50.5%).

It is important to note that the statement "Serious environmental pollution can be reduced by having the intention to practise solid waste segregation-at-source" rated as the highest percentage distribution (50.3%) for the "usually true" response (4). They quite understood that the intention to segregate solid waste-at-source is a good way to reduce the wasteful use of landfill sites (49.0%) as well as the space occupied by landfill sites (31.8%). Conservation and preservation of natural resources (45.3%) are very important. Unfortunately, most of the garbage was shipped to the landfill after being dumped from the garbage trucks (42.8%). In order to address environmental issues, respondents understand that they need to be aware of the benefits (43.5%) and knowledgeable about the correct way to practise solid waste segregation-at-source (37.3%).

Respondents' intention to practise solid waste segregation-at-source

In this research, the measurement of the dependent variable, namely the intention to practise solid waste segregation-at-source, consists of eight positive statements included in this section. In this section, the five measurement scales range from (1) "strongly disagree" to (5) "strongly agree" in an attempt to assess the dependent variable. The results of the mean, frequency, and percentage distributions for the statements were shown in Table 6.

Table 6: Descriptive Analysis of Intention to Practise Solid Waste Segregation-at-Source [a], N = 400

No.	Statement	Total Frequency / (%)					Mean
		1	2	3	4	5	
1.	I truly intend to separate my household solid waste at home as much as possible in the next three months.	5 (1.3)	12 (3.0)	100 (25.0)	189 (47.3)	94 (23.5)	3.89
2.	I am willing to segregate piles of household solid waste into different categories if proper waste segregation facilities are provided.	0 (0.0)	8 (2.0)	75 (18.8)	186 (46.5)	131 (32.8)	4.10
3.	I will try my best to separate most of my household solid waste at home if I am convinced with the benefits of solid waste segregation-at-source.	1 (0.3)	8 (2.0)	75 (18.8)	188 (47.0)	128 (32.0)	4.09

Table 6 (continues)

No.	Statement	Total Frequency / (%)					Mean
		1	2	3	4	5	
4.	I will make an effort to segregate my household solid waste at home if the local authority enforces public participation in solid waste segregation-at-source.	4 (1.0)	9 (2.3)	66 (16.5)	184 (46.0)	137 (34.3)	4.10
5.	I plan to separate my household solid waste at home if the local authority provides satisfactory services for the separated household solid waste collection.	4 (1.0)	6 (1.5)	74 (18.5)	173 (43.3)	143 (35.8)	4.11
6.	I expect that I will take part in solid waste segregation-at-source activities if I am satisfied with the household garbage collection measures by the local authorities.	4 (1.0)	5 (1.3)	80 (20.0)	178 (44.5)	133 (33.3)	4.08
7.	I tend to separate unwanted household solid waste according to their recycling potential systematically.	3 (0.8)	11 (2.8)	84 (21.0)	185 (46.3)	117 (29.3)	4.01
8.	I will be willing to support the mandatory solid waste segregation-at-source policy under the Solid Waste and Public Cleansing Management Act 2007 (Act 672).	2 (0.5)	8 (2.0)	67 (16.8)	180 (45.0)	143 (35.8)	4.14

Note: N = Total number of respondents; % = Percentage; 1 = Strongly disagree;
2 = Disagree; 3 = Neither agree nor disagree; 4 = Agree; 5 = Strongly agree;
[a] = Totals do not sum to 100.0 due to rounding.

The higher the mean score, the higher the degree of agreeableness of the respondents' intention to practise solid waste segregation-at-source. Based on the data in Table 6, the statement "I will be willing to support the mandatory solid waste segregation-at-source policy under the Solid Waste and Public Cleansing

Management Act 2007 (Act 672)" recorded the highest mean (mean = 4.14) compared to the other statements in this section. Besides that, most of the Selangor respondents agreed to separate piles of household solid waste into different categories as much as possible in the next three months (47.3%) if they were convinced with the benefits of solid waste segregation-at-source (47.0%) as well as proper waste segregation facilities (46.5%). In the meantime, 46.3 per cent of the total number of respondents in Selangor also agreed that they tended to systematically separate unwanted household solid waste according to their recycling potential (46.3%) on condition that local authorities enforced public participation (46.0%) through the mandatory solid waste segregation-at-source policy under the Solid Waste and Public Cleansing Management Act 2007 (Act 672) (45.0%). However, 44.5 per cent of respondents also reported that they would agree to participate in this specific pro-environmentally practice if and only if the local authority could provide satisfactory solid waste collection services (44.5%) to them. Finally, the statement "I plan to separate my household solid waste at home if the local authority provides satisfactory services for the separated household solid waste collection" indicated the lowest percentage distribution (43.3%) compared to the other statements in the "agree" response (4).

Conclusion, Recommendation, Limitation, and Contribution of Research

Of the four hundred respondents, 37.0 percent were male and 63.0 percent were female. There was also a higher percentage of female Bumiputera respondents between the ages of 22 and 31. Their average age was 37.9 years old. The highest proportion of monthly personal income was found to be below RM3000, with a distribution of 71.5 percent.

Finally, a descriptive investigation was conducted on attitude, descriptive norm, injunctive norm, and environmental knowledge on the intention to practise solid waste segregation-at-source among households in Selangor, Malaysia. The results inferred that, overall, the respondents were perceived as having a favourable attitude, a high level of environmental knowledge, as well as an intention to practise solid waste segregation-at-source. However, throughout the research, they were moderately influenced by the descriptive norm and injunctive norm. Current researchers therefore suggest that, by looking at the trends in these research outputs, government and social workers may plan some community activities to help local households effectively segregate their domestic solid waste. This effort was consistent with the findings of the present research, which reported that 42.3 percent of respondents strongly agreed that all citizens were responsible for inculcating the intention to practise solid waste segregation-at-source as their daily routine. Relevant programmes should therefore be organised frequently in order to strengthen the sense of responsibility between households in order to maintain environmental cleanliness in Selangor, Malaysia.

The research limitation should also be stated in this section because it could potentially affect the quality of the findings of the present research. Due to time and budget constraints, this research is limited to only 400 respondents. Using the formula proposed by Yamane (1967) to estimate the desired sample sizes, although it is assumed that the number of households, i.e. respondents engaged in this particular research, is sufficient to be carried out in Selangor. However, this sample size may lead to the issue of representativeness at the end of this research compared to the actual population of Malaysian citizens as a whole. As a result, the generalisation of the final findings of the research is still not warranted in this current research.

From the perspective of the contribution to the literature, this current research aims to contribute to this growing area of research by bridging the gap that exists in previous relevant literature due to the fact that the reading articles used to examine the attitude, descriptive norm, injunctive norm, environmental knowledge, and the intention to practise solid waste segregation-at-source are limited and scarce in existing literature (Cheng *et al.,* 2019). Accordingly, the present researcher sees this research as one of the first preliminary research that focusses solely on the intention to practise solid waste segregation-at-source after this particular policy, which was recently launched by the Malaysian Ministry of Urban Wellbeing, Housing, and Local Government in 2015. As a result, this current research is significant to explore a new field of research by providing concrete references for future direction in an effort to further expand, as well as a more accurate picture of the intention to practise solid waste segregation-at-source in a local context that has scarcely been targeted by previous researchers.

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