THE REDUCTION OF USING PLASTIC BAGS OF UNDERGRADUATE SUTUDENTS IN FACULTY OF SCIENCE AND TECHNOLOGY, SUAN SUNANDHA RAJABHAT UNIVERSITY.

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ABSTRACT

This research aimed to 1) investigate the amount of plastic bags collected in Faculty of Science and Technology, Suan Sunandha Rajabhat University (SSRU); and 2) study on the attitude level of undergraduate students on the reduction of using plastic bags in their daily lives. According to the study, questionnaires were used to collect data from the sample which were 349 undergraduate students from 14 programs in Faculty of Science and Technology by applying stratified random sampling and simple random sampling techniques. Data were analyzed by frequency, percentage (%), mean ($\overline{x}$) and standard deviation (S.D.). As a result of this research, it was found that 1) the amount of plastic bags collected in Faculty of Science and Technology during November 2018 to February 2019 was 2.76 kg/day by average or equal to 0.025 kg/student/day; and 2) the attitude of undergraduate students on the reduction of using plastic bags in their daily lives as a whole was at high level ($\overline{x}$ = 4.01). When considering by item separately, it showed that the highest attitude level on reduction of using plastic bags of undergraduate students was subconscious on the conservation of natural resources ($\overline{x}$ = 4.27) followed understanding of the benefit to the environment on plastic bag reduction ($\overline{x}$ = 4.03) and behavior on the reduction of plastic bags in their daily lives ($\overline{x}$ = 3.72), respectively.

Keywords: Reduction of using plastic bags, Attitude level, Undergraduate students

INTRODUCTION

Plastics are typically organic polymers of high molecular mass and often contain other substances. They are usually synthetic, most commonly derived from petrochemicals; however, an array of variants are made from renewable materials such as polylactic acid from corn or cellulosics from cotton linters. There are seven types of plastics existing in current modern world which consists of Polyethylene Terephthalate (PET or PETE), High-Density Polyethylene (HDPE), Polyvinyl Chloride (PVC), Low-Density Polyethylene (LDPE), Polypropylene (PP), Polystyrene (PS), and other [1]. It is estimated that 50 kg of plastic is produced annually per person worldwide, with production doubling every ten years. In developed economies, about a third of plastic is used in packaging and buildings such as piping, plumbing or vinyl siding. Other uses include automobiles (up to 20% plastic), furniture and toys. In the developing world, however, the applications of plastic may differ;

for example, 42% of India's consumption is used in packaging [2]. In the case of Thailand, Pollution Control Department (PCD) reported that plastic consumption for the whole country in 2017 was about 5.28 million tons in every industrial sector such as packaging, electrical & electronics, auto part, construction, and housewares. Of these, the application for packaging took an important part of 41.4% among the others. After the use of these amount of plastics, it turned out to be plastic wastes about 1.93 million tons in that year in which 78.24% of them polluted to the environment and only 20.21% returned to recycling process [3].

In was also stated that Thais used a lot of plastic bags which was about 45,000 million pieces per year. The use of plastic bags came from three main sources including fresh-food markets, groceries, supermarkets and convenient stores for 40, 30, and 30%, respectively. The report by PCD indicated that people living in Bangkok area consumed plastic bags for 80 million pieces per day or about 8 pieces per person per day [4]. Because of the high volume of plastic bag consumption each year, it leads to the problem of plastic pollution around the country especially for those dumping into the sea and ocean. According to the Ministry of Natural resources and Environment of Thailand, a number of marine animals such as 150 sea turtles, 100 whales and dolphins, and 12 dugongs died each year from discarded trash in which half of them died from eating plastic bags [5].

In Recent year, the Royal Thai Government kicked off a campaign to reduce the use of single-use plastic bags countrywide. Target group of the campaign focused on the three main sources of plastic bag consumption as mentioned earlier, i.e. fresh-food markets, groceries, supermarkets and convenient stores. It is, therefore, the purpose of this research to investigate the attitude of public to participate in the reduction of plastic bags by using undergraduate students from Faculty of Science and Technology, Suan Sunandha Rajabhat University, as the case study. Result of this research is anticipated to be useful for executives of the faculty and the university to help the government run the campaign successfully.

OBJECTIVES

This research focused on reduction of using plastic bags in Suan Sunandha Rajabhat University (SSRU), as a case study, by the following objectives:-

1. to investigate the amount of plastic bags collected in Faculty of Science and Technology, SSRU, and
2. to study on the attitude of undergraduate students in Faculty of Science and Technology, SSRU, on the reduction of using plastic bags in their daily lives.

METHODOLOGY

The study method of this research can be described according to the following detail:-

1. Population

In this research, population of undergraduate students in the Faculty of Science and Technology, SSRU were 2,703 students in the academic year 2018. They were studying in the 1st to the 4th year of 14 programs which consist of Computer Science, Home Economics, Applied Physics, Applied Statistics, Sport and Health Science, Food Science and Technology, Information Technology, Biotechnology, Chemistry, Environmental Science, Industrial Microbiology, Biology, Informatics Mathematics and Forensic Science, respectively [6].

2. *Sample size*

The sample size of undergraduate students employed in this study was calculated by using the Taro Yamane's equation [7] as follow:-

$$n = \frac{N}{1 + N(e)\text{^}2}$$

Note that n = corrected sample size

N = population size of undergraduate students

e = Margin of error (MoE) which is equal to 0.05

Therefore, the sample size used in this study was 349 undergraduate students as shown below:-

$$n = \frac{2{,}703}{1 + 2{,}703(0.05)^2}$$

$$= 349$$

The sample of 349 undergraduate students were then selected by stratified sampling technique which was divided into 14 programs as mentioned earlier. After that, those students in each program were selected again by using simple random sampling technique.

3. Research equipment

In order to collect data for this research, a questionnaire involving the attitude on reduction of using plastic bags in Faculty of Science and Technology, SSRU, was established and sent to the experts in this field for approval. This questionnaire was the equipment for this research and distributed to 349 undergraduate students from 14 programs in the faculty. The data mentioned above were then analyzed in order to achieve the objectives of the research.

4. Statistical methods

The statistics used in this study were as follow [8]:-

4.1 Mean ($\bar{X}$) was used to describe the average amount of plastic bags collected in the faculty per day and the average amount of plastic bags per head of the students per day.

4.2 Frequency and percentage were used to describe personal characteristics of 349 undergraduate students which included sex, year and program of their studies, respectively.

4.3 Mean ($\bar{X}$) and standard deviation (S.D.) were used to describe the attitude level on reduction of using plastic bags of undergraduate students in Faculty of Science and Technology, SSRU, by dividing the level into 5 categories as very high, high, moderate, low and very low attitude, respectively.

RESULTS

The results of this research can be described in accordance with objectives of the study. Followings are detail of the results found in this study:-

1. Investigation of the amount of plastic bags collected in Faculty of Science and Technology, SSRU

The amount of plastic bags collected in Faculty of Science and Technology, SSRU, on the weekday during November 21, 2018 to February 13, 2019 for thirteen weeks is shown in Table 1. It was found that the total amount of plastic bags in this period was 69.0 kilograms or equal to 2.76 kilograms per day by average. When measuring this amount of plastic bags per head of the students, it showed that the average amount of plastic bags was about 0.025 kilogram per day. In other words, students used 13 plastic bags by average per head per day in their daily lives.

Table 1. The amount of plastic bags collected in Faculty of Science and Technology, SSRU, during November 2018 to February 2019

Week No.	Date	Plastic Bag Weight (Kg.)
1	21, 23 Nov. 2018	7.2
2	28, 30 Nov. 2018	5.9
3	5, 7 Dec. 2018	8.4
4	12, 14 Dec. 2018	4.8
5	19, 21 Dec. 2018	5.6
6	26, 28 Dec. 2018	5.4
7	2, 4 Jan. 2019	5.5
8	9, 11 Jan. 2019	4.9
9	16, 18 Jan. 2019	5.1
10	23, 25 Jan. 2019	4.9
11	29, 31 Jan. 2019	4.9
12	6, 8 Feb. 2019	4.6
13	13 Feb. 2019	1.8
Total	-	69.0
Average per day	-	2.76

2. The attitude on reduction of using plastic bags of undergraduate students in their daily lives

2.1 Personal characteristics of the sample

The number of 349 undergraduate students who were selected as the sample of this research can be described for their personal characteristics into 3 items as shown in Table 2.

Table 2. Personal characteristics of undergraduate students in this study

Personal Characteristics		Frequency (student)	Percentage (%)
Sex			
	male	183	52.4
	female	166	47.6
	Total	349	100.0
Year of the study			
	1st year students	87	24.9
	2nd year students	100	28.7
	3rd year students	80	22.9
	4th year students	82	23.5
	Total	349	100.0
Program of the study			
	Computer Science	42	12.0
	Home Economics	53	15.2
	Applied Physics	6	1.7
	Applied Statistics	12	3.4
	Sport and Health Science	59	16.9

Table 2 (continued)

Personal Characteristics	Frequency (student)	Percentage (%)
Food Science and Technology	16	4.6
Information Technology	73	21.0
Biotechnology	5	1.4
Chemistry	11	3.2
Industrial Microbiology	11	3.2
Environmental Science	23	6.6
Biology	19	5.4
Forensic Science	13	3.7
Informatics Mathematics	6	1.7
Total	349	100.0

It can be concluded from Table 2 that 52.4% of the sample were male students, and they were studying in the 1st to the 4th year of their studies with the number of 24.9, 28.7,

22.9 and 23.5%, respectively. Most of them were studied in Information Technology Program with 21.0% followed by those from Sport and Health Science Program (16.9%), Home Economics Program (15.2%), Computer Science Program (12%) and the others with 34.9%, respectively.

2.2The attitude level on reduction of using plastic bags of undergraduate students in Faculty of Science and Technology, SSRU

It was found that the attitude level on reduction of using plastic bags by undergraduate students in their daily lives as a whole was at high level ($\overline{X}$ = 4.01). When considering by item separately, it showed that the highest attitude was subconscious to the conservation of natural resources ($\overline{X}$ = 4.27) followed by understanding of the benefit to the environment on plastic bag reduction ($\overline{X}$ = 4.03) and behavior on the reduction of using plastic bags in daily lives ($\overline{X}$ = 3.72), respectively (Table 3).

Table 3. Attitude level on reduction of using plastic bags of undergraduate students in their daily lives

Attitude on reduction of using plastic bags	Mean	S.D	Attitude level	Ranking
1. Understanding of the benefit to the environment on plastic bag reduction	4.03	0.86	high	2
2. Subconscious to the conservation of natural resources	4.27	0.78	Very high	1
3. Behavior on the reduction of using plastic bags in daily lives	3.72	0.97	high	3
Average	4.01	0.87	high	

Table 4 indicates more detail of students' attitude on reduction of using plastic bags in those three items mentioned earlier. All of the attitude listed in this Table are in the very high level starting from students should start reducing the use of plastic bags by themselves ($\overline{X}$ = 4.44), students should support any activities concerned with the reduction of using plastic bags ($\overline{X}$ = 4.38), students should have their responsibility on reduction of using plastic bags ($\overline{X}$ = 4.36), reduction of using plastic bags helps the world protect global warming ($\overline{X}$ = 4.36), reduction of using plastic bags encourages public to conserve the environment ($\overline{X}$ = 4.32), and students should refuse plastic bags from any convenient stores ($\overline{X}$ = 4.30), respectively.

Table 4. Some of the high attitude level on reduction of using plastic bags of undergraduate students in their daily lives

Attitude on reduction of using plastic bags	Mean	S.D	Attitude level	Ranking
1. Understanding :				
1) Reduction of using plastic bags helps the world protect global warming.	4.36	0.77	Very high	3
2) Reduction of using plastic bags encourages public to conserve the environment.	4.32	0.72	Very high	5
2. Subconscious :				
1) Students should start reducing the use of plastic bags by themselves.	4.44	0.69	Very high	1
2) Students should have their responsibility on reduction of using plastic bags.	4.36	0.69	Very high	3
3. Behavior :				
1) Students should support any activities concerned with the reduction of using plastic bags.	4.38	0.75	Very high	2
2) Students should refuse plastic bags from any convenient stores	4.30	0.84	Very high	6

CONCLUSIONS

The study on reduction of using plastic bags of undergraduate students in their daily lives was conducted as a case study in Faculty of Science and Technology, Suan Sunandha Rajabhat University (SSRU), Bangkok, Thailand. The aims were to investigate the amount of plastic bags collected in the faculty and also to study on the attitude of undergraduate students on the reduction of using plastic bags in their daily lives. As a result of the study, it was found that the average amount of plastic bags collected in the study area during November 2018 to February 2019 was 2.76 kg/day or equal to 0.025 kg/student/day. In terms of the attitude on reduction of using plastic bags, undergraduate students had the highest

attitude level on their subconscious to the conservation of natural resources. At the same time, they also had high attitude level on understanding of the benefit to the environment on plastic bag reduction and behavior to reduce plastic bags in their daily lives.

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